

# EVALUATION REPORT

## CALIFORNIA K-12 HIGH SPEED NETWORK A Legislative Requirement



Submitted to:  
California K12HSN at the Imperial County Office of Education  
February 2009

Submitted by:  
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## CALIFORNIA K12HSN 2009 EVALUATION

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# CALIFORNIA K12HSN EVALUATION

## Executive Summary

### Introduction

#### **The K12HSN**

*The legislative purpose of the K12HSN is to enrich pupil educational experiences and improve pupil academic performance by providing high-speed, high-bandwidth Internet connectivity.*

Since 2004-2005, the Imperial County Office of Education (ICOE) has been the lead administrative agency for the California K-12 High Speed Network (K12HSN). Operationally, the K12HSN is a network of Node Sites in all 58 counties through which public K-12 education entities in California connect to the Internet, and to each other. The K12HSN is part of the California Research and Education Network (CalREN), which enables K-12 entities to connect to higher education institutes, Internet2, and other organizations. For K-12 students and staff, these networks provide services ranging from basic Internet connectivity to more advanced high-speed networking to support administrative, instructional and professional development activities.

#### **The 2009 Evaluation**

*A legislative activity required ICOE to conduct a program evaluation of the K12HSN with a report due to the California Department of Education in March 2009.*

ICOE selected the Wexford Institute to conduct an independent evaluation in order to fulfill the legislative requirement of an evaluation report due in March 2009. The evaluation process began in February 2008. The evaluators used the K12HSN legislative activities, the K12HSN Advisory Board Performance Measures, and the K12HSN 2008-2009 Goals and Objectives as frameworks for this evaluation and the development of the evaluation questions.

#### **The Overarching Evaluation Questions**

*The evaluation was designed to answer four overarching questions.*

1. How is the staff managing the project and to what degree has K12HSN met its legislative purpose and activities?
2. To what degree has ICOE grown the capacity of the K12HSN and is the current bandwidth adequate for how K12 educators want to use the Network?
3. How are educators using the Network?
4. How is information about K12HSN being disseminated and what else needs to be done to increase best practices in using the Network?

#### **Data Collection**

*Existing data and new data from a variety of sources was collected to answer the overarching question and 21 sub-questions.*

The evaluators collected existing information from program reports, program documents, and program web data. New data was collected from the K12HSN Advisory Board, the Network Implementation Committee (NIC), the Applications Coordination Committee (ACC), Node Site contacts, connected district and school site contacts, E-Rate training participants, K12HSN staff, and the California Department of Education (CDE). Survey data for this evaluation report was collected from more than 1,600 Node Site, district and school site contacts across California, CDE staff, K12HSN staff and Advisory Board members.

## Findings

### **Meeting the Legislative Purpose**

*First and foremost, the K12HSN is continuing to develop, maintain and update the statewide K-12 Network to provide free Internet access and services for county offices of education, districts, schools and other public entities.*

*Its connection to CalREN creates a united Network for PK-20 agencies.*

- K12HSN has continued to establish, update and support both the network of agencies and the technological network, providing **free Internet service to over 8,695 public education agencies**, including, as of December 2008, 71 Node Sites connecting:
  - 100% of County Offices of Education – 58 of 58 COEs
  - 86% of Districts – 855 of 994 Districts
  - 80% of Schools – 7,782 of 9,782 Schools
- K12HSN completed updating the Network according to the Technology Refresh plan, by upgrading 68% of the total circuits.
- K12HSN continues to work with Node Sites and directly with non-connected districts to connect additional districts, successfully connecting 9 of them during 2008 and is in the process of connecting 10 others.
- 70% to 100% of the 68 responding Node Site contacts indicated they provided these services to their connected districts:
  - 100% - Basic connection
  - 87% - Technical support & Primary/Secondary DNS
  - 82% - Network monitoring
  - 75% - Email services
  - 72% - Fiscal services & Firewall
  - 71% - Spam filtering

### **Managing the K12HSN and Progress on Legislative Activities**

*K12HSN legislative activities are comprised of processes and outcomes in these areas:*

- Setting goals & objectives
- Administration
- Fiscal & technical oversight
- Specified services
- Contract requirements

- ICOE staff has worked toward managing the K12HSN with transparency through 1) their work with the K12HSN Advisory Board, the NIC and ACC, and other Node Site contacts, and 2) the use of the project website to provide information to the field, including project reports located there.
- Node Site satisfaction level with K12HSN ranges from 80% to 100% on specific survey items, with most above 90%. This high satisfaction rating is due, in part, to the cost-containment rather than profit-making basis of the K12HSN, the support from K12HSN in getting Node Sites and districts connected, the upgrading of bandwidth, and the no-cost consultation available to districts from Node Sites.
- K12HSN has completed the short-term legislative activities and has made progress on long-term activities.

### **K12HSN Budget**

*90% of the budget is spent on Network connectivity and support.*

- 78% of the current K12HSN budget is designated for connectivity through the CENIC contract. Nearly 90% of program expenditures are for network-related contracted services. All other expenses, including staffing, operations, and others represent about 10% of the total expenditures.

### **E-Rate Support**

*E-Rate is a federal program to assist schools and to obtain affordable and reliable telecommunications services.*

- K12HSN, in collaboration with CDE, provides information, training, online training resources, and support services to assist districts in understanding the E-Rate program and submitting paperwork to receive E-Rate funds.
- The E-Rate program provides districts in California between \$260 million and \$400 million each year. E-Rate has paid for roughly \$3 million of the annual telecommunications costs associated with operating the K12HSN.

## Findings, continued

<p><b>E-Rate Support, continued</b></p> <p><i>E-rate support for the state is critical to enable a primary goal of the program—100% district connectivity. K12HSN assistance to ensure all federal funds are leveraged is critical.</i></p>	<ul style="list-style-type: none"> <li>➤ Portions of connectivity costs for districts may be funded by E-Rate.</li> <li>➤ Participants in K12HSN E-Rate training and the CDE contract monitor were very satisfied with the E-Rate services provided by the K12HSN.</li> <li>➤ One criteria for judging the amount E-Rate funding that California should receive is based on population – with California having 12% of the U.S. population according to the last national census. From 1998-2004, California E-Rate funding averaged 13.7% of the national total. It is estimated that from 2005-2008, the California E-Rate funding will average 15.0% of the national total.</li> </ul>
<p><b>Growing the Capacity of K12HSN</b></p> <p><i>In January 2006 the Bureau of State Audits (BSA) Report found that the network was not overbuilt, stating that given options in circuit size, the capacity for the K-12 node sites was appropriate for the use. The BSA recommended that the K12HSN promote the use of the network to improve teaching and learning and work to increase awareness of the Network's capacity to deliver additional resources.</i></p>	<ul style="list-style-type: none"> <li>➤ Since the BSA report was released, K12HSN working with CENIC has significantly expanded bandwidth capacity to address the growing needs of districts. This growth in bandwidth has been accomplished while keeping costs for the connectivity from increasing.</li> <li>➤ The bandwidth demand has grown with the support of the K12HSN and as a consequence of users implementing new practices. The K12HSN's responses to the BSA's suggestion resulted in: <ul style="list-style-type: none"> <li>• The launch of a tool suite for teachers inside a “trusted community” of K-12 practitioners</li> <li>• Expanding the use of videoconferencing to increase access to new experiences and save money and other resources for Network users</li> </ul> </li> <li>➤ Since 2003, connected agencies with bandwidth greater than a T1 have increased from 22% to 57% in 2008.</li> <li>➤ Since 2005, connected schools have increased from 74% to 80%.</li> <li>➤ Since 2005 there has been a 92% increase in the annual metered and charged ISP traffic - indicating an increased utilization of the Network's circuits.</li> </ul>
<p><b>Uses of the Network</b></p> <p><i>School sites and county offices of education indicated some of the benefits they receive from being on the Network, including the free Internet access, and broadband uses.</i></p>	<ul style="list-style-type: none"> <li>➤ Node Site contacts indicate the greatest Network benefits to districts and county offices of education is the no-cost access to the commercial Internet resulting in significant savings as well as greater opportunity for the inclusion of Internet content into the classroom.</li> <li>➤ School respondents indicated that the following types of broadband use, to access educational resources and to communicate with one other, were seen as value-added components to their Network connection: <ul style="list-style-type: none"> <li>• Videoconferencing, virtual field-trips</li> <li>• Videostreaming, YouTube/Teacher Tube</li> <li>• Research using the Internet, Webquests</li> <li>• Educational websites (e.g. Brainpop, National Geographic)</li> <li>• Web-based educational programs (e.g. Renzulli Learning)</li> <li>• Web-based tools, Podcasting, blogs, wikis</li> <li>• Online student assessment platforms (e.g. Edusoft, OARS)</li> </ul> </li> <li>➤ County offices of education indicated benefits and administrative uses of the Network including videoconferencing of meetings. Some are beginning to investigate the feasibility of using web-based applications that require broadband for administrative functions.</li> </ul>



## Findings, continued

### **K12HSN Information Dissemination**

*K12HSN staff provides strong dissemination services to the Node Sites, and disseminates information through direct contact with the field. They have also established strategic partnerships to support the Network.*

*The K12HSN Advisory Board plays a critical role, including making policy recommendations to the State Superintendent of Public Instruction.*

- K12HSN information dissemination to Node Sites through face-to-face and virtual meetings is strong, based on high satisfaction levels of Node Site contacts.
- K12HSN also disseminates information directly to the field and has contact with Node Sites, districts, school sites and others through: conference workshops, presentations and booths, listserv/email, and journal articles and newsletters.
- The Advisory Board plays a crucial role in the development, implementation and continual renewal of the vision for the K12HSN, and a forum to discuss solutions to issues related to the Network. Members share information with and from the county service regions they represent, and they create policy recommendations to support K12HSN's project goals.
- The Advisory Board has completed its legislative functions for this year through meetings and through the policy recommendations they made to the State Superintendent of Public Instruction.
- K12HSN has established seven strategic partnerships with public and private agencies since 2004, to support the Network.

## Recommendations

### **Recommendations for K12HSN**

*Continue collaborative problem solving to grow the Network and support users.*

- Connectivity and Bandwidth. Continue working collaboratively with the Advisory Board, ACC, NIC and all Node Sites to:
  - Maintain and increase the share of E-Rate funding allocated to California
  - Solve issues to connect non-connected districts
  - Forecast their increasing needs related to bandwidth
  - Increase bandwidth as necessary and possible
- Supporting Promising Uses of the Network. Continue supporting the Network users with or through:
  - Tools they need to best use the Network
  - Identification of instructional and other programs and practices using the capacity of broadband connection
  - Brokers of Expertise resources and its community of learners
  - Strategic partners to fill the Network gaps

### **Recommendations for Statewide Initiatives for K12HSN Use**

*Plan and implement crucial initiatives that do not fall within the current K12HSN work scope, but have implications for Network use and improving student learning.*

- Create a research-based dissemination plan to strengthen dissemination to 1) increase teacher awareness of the types of Network resources available for improving instruction and learning, and 2) increase site and district support of teachers' efforts to utilize them.
- Create a research-based professional development program that focuses on teachers who are not "early adopters" and assists teachers in moving from awareness to at least a routine use of Network resources.
- Conduct studies of: 1) Access and use of the Network; and, 2) Professional development, Network use and adequate bandwidth

# PART 1

## INTRODUCTION

This Introduction provides:

- K12HSN Background Information
- An Overview of the Evaluation Design
- A Description of the Structure of this Report

### K12HSN Background Information

In 2004-2005, legislative action assigned the K-12 high-speed Internet initiative to the California Department of Education which was required to competitively select a grantee, a consortium of county offices of education, for the planning, implementation and day-to-day operation of this statewide effort. The Imperial County Office of Education (ICOE) was chosen as the lead agency with Butte and Mendocino counties serving as consortium partners. The consortium uses the name K-12 High-Speed Network (K12HSN). The purpose of the K12HSN is to enrich pupil educational experiences and improve pupil academic performance by providing high-speed, high-bandwidth Internet connectivity. The project is guided by its legislative activities, its Advisory Board Performance Measures, and its 2008-2009 goals and objectives. The vision and common expectation for the K12HSN is for it to maintain and grow the capacity of the Network – to ensure access to all California students and teachers by working to connect 100% of districts to the Network through a Node Site. Approximately 90% of the K12HSN budget and effort is in this direction, including:

- Coordinating the Network to maintaining reliable and cost-effective connections for Node Sites and districts and ensure satisfaction of Node Sites and districts regarding connectivity, bandwidth, support in solving problems and adequate communications about Network issues
- Connecting non-connected districts
- Providing E-Rate support, critical to enabling connected districts to connect school sites
- Increasing bandwidth as necessary

Staff also focuses on this remaining work scope that accounts for approximately 10% of the budget:

- Identification of resources and applications for use on the Network
- Outreach to disseminate information about the Network throughout California
- Establishment of strategic partnerships to fill gaps in the Network services
- Tool development to support Network use, based on Network-user requests
- Awareness level and introductory professional development at major conferences and workshops to support use of broadband resources and videoconferencing.

## **An Overview of the Evaluation Design**

K12HSN is required by legislation to have an independent evaluation, conducted by March 1, 2009. To ensure this being completed, in February 2008, ICOE selected Wexford Institute, a non-profit educational agency, to conduct the evaluation. This report provides a summary of the data, findings, and recommendations that are the results of that evaluation effort.

The evaluators used the K12HSN legislative activities, the K12HSN Advisory Board Performance Measures, and the K12HSN 2008-2009 goals and objectives as frameworks for this evaluation, and the development of the evaluation questions. Also referenced were six project reports, issued since 2005, regarding the functioning of the K12HSN, providing baseline data, earlier findings, and context for this report. Those program reports are available on the K12HSN website, and include:

- *California K12HSN Status Report*, April 2005
- *Connecting California's Children Report*, June 2005
- *California State Auditor K-12 High Speed Network Report*, January 2006
- *Technology Refresh Plan*, January 2007
- *2006-07 Evaluation Framework*, February 2007
- *Legislative Report: Report of the K12HSN Advisory Board to the Legislature*, March 2007

The evaluation was designed to answer four overarching questions – the first about the main mission of K12HSN, the other three to provide them with information that has implications for future needs and growth:

1. How is the staff managing the project and to what degree has K12HSN met its legislative purpose and activities?
2. To what degree has ICOE grown the capacity of the K12HSN, including connectivity and bandwidth?
3. How are educators using the Network?
4. How is information about HSN being disseminated and what else needs to be done to increase best practices in using the Network?

Twenty-one evaluation sub-questions, related to the four overarching questions and the project frameworks, were developed to guide the evaluation. To answer these evaluation questions, the evaluators:

- Drew from existing information and data from the program reports, program documents, and program web data
- Collected new data from the K12HSN Advisory Board, the Network Implementation Committee (NIC), the Applications Coordination Committee (ACC), other Node Site contacts, connected districts and school site contacts, E-Rate training participants, K12HSN staff, and the California Department of Education contract monitor.
- Collected survey data from more than 1,500 Node Site, district and school site contacts across the state of California, CDE contract monitor, K12HSN staff and Advisory Board members.

For a summary of data collection activities, see Chart 1 on the following page.

**Chart I: Data Collection Summary**

<b>Information Type and Instrument</b>	<b>Data Collection Dates</b>	<b>Number of Surveys Administered</b>	<b>Number of Actual Respondents</b>	<b>Percent Return</b>
Survey of Node Site Contacts	May-June 2008	71	68	95%
Survey of District Contacts	May-June 2008	783	267	34%
Survey of School Site Contacts	May-July 2008	4791	1193	25%
E-Rate Training Survey (administered by K12HSN)	June-July 2008	409	104	25%
Project Snapshots	October-December 2008	3	3	100%
Survey/Interview of Advisory Board Members	November 2008	11	11	100%
Data from K12HSN Staff Records	December 2008	5	5	100%
Data from CDE Contract Monitor	December 2008	1	1	100%

## **A Description of the Structure of this Report**

Part 2 of this report provides a summary of the findings of this evaluation and recommendations for growing the capacity of the K12HSN. Parts 3 through 6 provide the findings related to connectivity, bandwidth, Network support, uses of the Network, and dissemination of Network information and resources. Part 7 uses the findings to provide a summary of progress on the K12HSN Legislative Activities, and the Advisory Board Performance Measures. Part 8 provides the evidence for each finding, organized by project goals. Part 9 and Appendix A provide fuller descriptions of the evaluation design.

# PART 2

## SUMMARY OF FINDINGS AND RECOMMENDATIONS

This part provides information related to:

- Managing the K12HSN
- Growth of the Capacity of the K12HSN
- Uses of the Network
- Dissemination of Network Information
- Issues Related to Use of the Network and Improving Student Learning
- Conclusions and Recommendations – K12HSN
- Conclusions and Recommendations – For Future State Planning with Implications for Use of the K12HSN and Student Learning

### Managing the K12HSN

*Overarching Evaluation Question 1:*

*How is the staff managing the project and to what degree has K12HSN met its legislative purpose and activities?*

#### **Project Management Indicators**

1. Most importantly, the K12HSN is continuing to develop, maintain and update the statewide K-12 Network (both the network of agencies and the technological infrastructure) to provide **free** Internet access for over 8,695 agencies, including county offices of education, districts, schools and other public agencies. Its connection to CalREN creates a united Network for PK-20 agencies. As of December 2008, 71 Node Sites connect:
  - 100% of County Offices of Education – 58 of 58 COEs
  - 86% of Districts – 855 of 994 Districts
  - 80% of Schools – 7,782 of 9,782 Schools

2. The K12HSN Technology Refresh plan has been followed to upgrade the Network. Currently there are approximately 94 circuits that connect 69 Node sites to CalREN Hub sites. To date all of the routing equipment has been replaced and 64 of the 94 or 68% of the total circuits have been upgraded to meet the bandwidth needs of the Node Site. Another five circuits are scheduled to be completed in early 2009. Once these five are completed, 73% percent of the circuits will have been upgraded. The remaining circuits have not been upgraded due to one or both of the following reasons: bandwidth needs do not warrant an upgrade to date or in many cases there are no vendors capable of providing a larger bandwidth circuit to the Node.
3. In 2008, the K12HSN staff contacted all 149 non-connected districts, successfully connected 10 of them (leaving 139 non-connected), and is in the process of connecting an additional 19 districts.
4. 78% of the current K12HSN budget is designated for connectivity through the CENIC contract, including a portion of the budget designated for personnel, benefits and services. Approximately 90% of the budget is used for updating and supporting the Network. Budget allocations include:
  - 78% - CENIC connectivity contract
  - 10% - Services and other operating expenses
  - 6% - Personnel
  - 3% - Equipment
  - 2% - Benefits
  - 1% - Indirect
  - less than 1% - Supplies and materials
5. Since 2005, 100% of the county offices have been connected to the Network, the percentage of districts connected has remained relatively the same, and there has been an increase of connected schools from 74% to 80%.
6. 60% of the 69 Node Site survey respondents indicated that the K12HSN played a role in helping their Node Sites connect districts to the Network.
7. Over 70% of the 69 responding Node Site contacts indicated they provided these services to their connected districts:
  - 100% - Basic connection
  - 87% - Technical support & Primary/Secondary DNS
  - 82% - Network monitoring
  - 75% - Email services
  - 72% - Fiscal services & Firewall
  - 71% - Spam filtering

8. *ICOE staff has worked toward managing the K12HSN with transparency through: 1) their work with the K12HSN Advisory Board, the Network Implementation Committee (NIC), the Applications Coordination Committee (ACC), and other Node Site contacts, and 2) the use of the project website to provide information to the field, including the project reports located there.*
9. *Node Site satisfaction level with K12HSN ranges from 80% to 100% on specific survey items, with most above 90%. Node Sites contacts have indicated that the K12HSN staff has been very helpful in assisting them in connecting to the Network and in getting the bandwidth they need.*
10. *K12HSN legislative activities are comprised of processes and outcomes in these areas: setting goals & objectives, administration, fiscal & technical oversight, specified services, and requirements for contracts. K12HSN has completed the short-term legislative activities and has made progress on long-term activities. (See Part 7 of this report for details.)*

## **Growth of the Capacity of the K12HSN**

*Overarching Evaluation Question 2:*

*To what degree has ICOE developed the capacity of the K12HSN, including connectivity and bandwidth?*

This question relates to the main work of the K12HSN. It was thoroughly investigated in the *California State Auditor K-12 High Speed Network Report*, January 2006. Related to the overall feasibility of the K12HSN, the State Auditor found:

- The State most likely spent less on the building and operation of the High-Speed Network by expanding the existing infrastructure used by the University of California and other higher education institutions than it would have spent for a separate network with comparable services.
- No compelling technical or financial reason existed to abandon the existing High-Speed Network.

The State Auditor concluded with recommendations which were incorporated into the K12HSN legislative activities and Advisory Board Progress Measures and are reported on in Part 7 of this report. Most are related to fiscal and contractual policies or practices to ensure accountability in those areas.

Following are the indicators of K12HSN growth of capacity related to E-Rate support, bandwidth, Network usage, and Network satisfaction.

### **E-Rate Support Indicators**

1. *One way of judging how much E-Rate funding California should receive is based on population – California having 12% of the U.S. population according to the last national census data. From 1998-2004, California E-Rate funding averaged 13.7% of the national total. Since 2005, a Butte*

County Office of Education staff member has been partially funded by the K12HSN to provide E-Rate support to the CDE, county offices of education and districts. From 2005-2008 (2008 estimated because funding has not yet been fully allocated by the Federal government), it is anticipated the California E-Rate funding will average 15.0% of the national total.

2. Between September 2007 and January 2008, in conjunction with CDE, K12HSN provided four distinct E-Rate training programs to support Node Sites, districts and schools with the E-Rate program, via face-to-face, videoconference or live webcast. An unduplicated count of 409 individuals participated in four types of training.
3. In an online survey of participants in the E-Rate training administered by K12HSN, 90% of the 104 respondents indicated being satisfied or very satisfied with aspects of the training.

### **Bandwidth Indicators**

4. In 2003, just before ICOE became the K12HSN administrative agency, 22% of connected agencies (Node Sites, districts and schools) had bandwidth greater than a T1. By 2008, 57% of connected agencies had bandwidth greater than a T1. Bandwidth expansion has been occurring as indicated by constituent need.
5. 75% of district contacts are satisfied with their bandwidth.
6. Current bandwidths for all connected agencies are shown below.

**Chart 2: Current Bandwidths of Connected Sites**

<b>Agency Type</b>	<b>Less than 45 Mbps</b>	<b>Between 45 Mbps and 1 Gbps</b>	<b>Greater than 1 Gbps</b>
COEs	3%	43%	54%
Districts	71%	22%	7%
Schools	69%	19%	12%

### **Usage Indicator**

7. There was a 92% increase in the annual metered and charged ISP traffic between 2005 and 2008. This is an indicator of increased utilization of the Network's circuits.
8. Beginning in January 2009, CENIC has increased the capability of measuring Network usage, which will provide greater ability to analyze usage in the future.



### **Indicators of Satisfaction with Network Support**

9. K12HSN is effectively supporting the Node Sites, with Node Site satisfaction level (“Satisfied” or “Very Satisfied”) ranging from 80% to 100% on specific survey items, with most above 90%.
10. District satisfaction with Node Site support was at a level of 70% to 88%.

### **Statewide Access Indicator**

11. All the growth and satisfaction indicators listed above are indications of greater access to services and resources to greater numbers of teachers and students in California schools. The Network is providing connectivity to the places in California that would not be able to develop an affordable business model with telecommunications vendors.

### **Uses of the Network**

Overarching Evaluation Question 3:  
How are educators using the Network?

### **Indicator of Benefits of the Network and Web-Based Resources**

1. Node Sites indicate the greatest benefits to districts and county offices of education are the no-cost access to the commercial Internet resulting in significant savings to the districts as well as greater opportunity for the inclusion of Internet content into the classroom. This has resulted in large increases of computers connected to the Internet in some regions, and large increases of Internet use. Other benefits are the Network support services Node Sites provide. Following are examples from one Node Site:
  - Ability to bundle services (services required by ERATE and CIPA)
  - Prior experience in working with educators
  - Security (secure network)
  - Reliability (uptime)
  - Robust backbone (network infrastructure)
  - K-12 for K-12 personal customer service to ensure our district IT operations receive stellar support
  - No cost technical seminars to fit clients needs
  - Outreach initiatives to support technical requirements at each site, including leveraging/collaborating with other regional technology services including EdTech/CTAP

2. School site respondents indicated that the following types of broadband use (to access educational resources and to communicate with one other) were seen as value added components to their Network connection:
  - Videostreaming, YouTube/Teacher Tube
  - Research using the Internet, Webquests
  - Educational websites (e.g. Brainpop, National Geographic)
  - Videoconferencing
  - Web-based educational programs (e.g. Renzulli Learning)
  - Virtual field-trips, Podcasting, blogs, wikis
  - Online student assessment platforms (e.g. Edusoft, OARS)

### **Indicators of Use of K12HSN Web-Based Tools and Videoconferencing**

3. Based on constituent requests and needs, K12HSN developed a set of free web-based tools, launching them in March 2008. Between March and December 2008, over 1,500 K-12 classroom teachers, technology specialists and administrators created 1,509 Galaxy (formerly edZone) accounts and its home page has been viewed over 23,000 times.
4. For comparable ten-month periods in 2007 and 2008 respectively, 1,323 and 1,373 multi-point videoconferences were held and scheduled through K12video.org with a total of 49% used for administrative purposes, 28% for professional development and 23% for classroom instruction.

In addition, it is likely that a greater number of point-to-point videoconferences were scheduled and held in each of those years, but data related to those is not captured through the K12video.org system.
5. Videoconferencing equipment is available at all county offices of education.

### **Project Snapshots**

6. In the 2006 California State Auditor K-12 High Speed Network Report it was recommended that K12HSN continue to expand the knowledge of how educators are using the Network. In response to the State Auditor recommendation, K12HSN created an annual project objective to identify 3 examples of broadband use. In 2008, K12HSN met this objective by identifying 3 examples - each making use of their broadband connection in distinct ways to deliver content via non-traditional methods to students that are not able to access course content in a traditional school setting. (See Project Snapshots on the next three pages.)

## PROJECT SNAPSHOT I

### Riverside Virtual School – Riverside Unified School District Interactive Online Courses for Students <http://rvsweb.rusd.k12.ca.us/>

#### District Overview

- Riverside USD is the 15th largest school district in California.
- For the 2007-08 school year, the district served approximately 44,000 K-12 students.
- The district has 47 schools: 30 elementary schools, 1 special education preschool, 6 middle schools, 5 comprehensive high schools, 2 continuation high schools, 2 alternative education schools, and the Riverside Virtual School.
- More than 50 languages and dialects are spoken by students and families in the district.

#### Description of the Riverside Virtual School

*“Online courses ensure academic rigor by requiring all students to participate on a daily basis, to turn in assignments, and to express their ideas and prove their learning by the use of discussion groups and teleconferencing. It is not easy to hide in the online course. Additionally, the structure of the course challenges students to develop the skills of organization, time management, and self-discipline in order to succeed in the online learning atmosphere. Additions to the standard District-adopted curriculum include incorporating the Internet as an extension to the class, assigning research projects, supplying specific links to supporting materials for the curriculum, and offering rich resources from most of the powerful information available in the educational field helps to stretch the curriculum outside the pages of the adopted textbook.” – D. Haglund, Principal*

- The Riverside Virtual School (RVS) connects via the K12HSN at the Riverside County Office of Education. Its 759 students connect to course-embedded digital resources from school and from home, making the high-speed connectivity critical to their program's success.
- RVS enrolls students full-time for grades 9-11 and supports web-enabled classes at all RUSD comprehensive high schools. Students living within Riverside, San Bernardino, Orange, or San Diego counties may apply to enroll in the RVS Program (including students that are home schooled).
- Students have access to both online and face-to-face support. Teachers provide a minimum of 2 online office hours per week via instant messaging and other interactive communication tools. Face-to-face support is provided throughout the week in school-based computer labs.

#### Online Resources/Applications Utilized that are Only Accessible with a Broadband Connection

*“Each of these resources provide opportunities for online teachers to make their classes a more interactive and dynamic experience for students. Without them, the courses would be much more “flat” and much less engaging.... We continually review products and pilot those we feel have promise. Many of our product choices are the result of our direct work with vendors. The reputation of the Riverside Virtual School has opened door for involvement with vendor product development teams and has provided opportunities for articulating our specific needs before final products are released to the public.” – D. Haglund, Principal*

- Teachers use streaming videos ([streaming.discoveryeducation.com](http://streaming.discoveryeducation.com)) to enhance online instruction and provide enrichment activities for students.
- Wimba Classroom ([www.wimba.com](http://www.wimba.com)) provides video and audio conferencing between students and teachers. Tutorial sessions and lectures can be recorded for students to review at any time.

The screenshot shows the Riverside Virtual School website. At the top, there is a navigation bar with links for Home, About Us, Contact Us, and a dropdown menu for Courses. Below this is a banner with the school's logo and name. The main content area is titled "Becoming a Full-Time Student at RVS" and is divided into several sections: "Full-timers" (describing the program for students in grades 9-11), "Who may enroll?" (listing eligibility criteria), "Extracurricular Programs" (listing sports and arts programs), "Program Enhancements" (listing AP and dual enrollment options), "Sample Academic Pathway" (providing a list of courses for 9th, 10th, 11th, and 12th grades), and "Summer AP Boot Camp" (describing a pre-school summer program).

## PROJECT SNAPSHOT 2

### Elk Grove Unified School District EETT Project Project Based Learning using Blogs and Videoconferencing

#### District Overview

- Elk Grove USD is the 5th largest school district in California and the largest in Northern California.
- For the 2007-08 school year, the district served more than 62,000 K-12 students.
- The district has 64 schools: 39 elementary schools, 9 middle schools, 9 high schools, 4 alternative education schools, an adult school, a special education school and one charter school.
- Students and families in the district speak more than 80 languages and dialects.
- Elk Grove USD (EGUSD) connects via the K12HSN at the Sacramento County Office of Education.



#### Description of the Elk Grove USD EETT Project

*“Contrary to the Elk Grove School District’s public image, much of the South Sacramento region is a suburban, poor community. Students therefore do not have access to public transportation to leave their community. Videoconferencing allows their learning experiences to go beyond the walls of their classroom and their community.”*

– G. Desler, Technology Integration Specialist

- Gail Desler is a Technology Integration Specialist for EGUSD working with K-12 teachers to integrate technology in the classroom and leads classroom and/or grade-level based reading/language arts and history/social science projects that use blogs and videoconferencing. A concerted effort is made to “make history come alive” by providing students with opportunities to speak with individuals that are primary sources of information.
- Use of blogs, virtual field trips, and videoconferencing are utilized for professional development to save money on travel and to connect/share experiences with other teachers across the state and the nation. Some notable examples of these projects include,
  - Working with at-risk students at two continuation high schools, Calvin High School in Elk Grove and Maple High School in Lompoc, Mrs. Desler utilized the book, *Always Running* by Luis Rodriguez. Students responded to the readings via blogs and then connected with each other to discuss their readings on a preliminary videoconference. Students continued reading the book and responding to the text via the blog. As a culminating activity, students participated in a ‘book talk’ with the book’s author via videoconference.
  - With a group of 4<sup>th</sup> graders, Mrs. Desler is utilizing the book, *Island of the Blue Dolphins*. The focus of the project is to have students discuss how a story changes when a storyteller changes. Students are reading the novel and discussing it via blogs and will have the opportunity to videoconference with the Morongo Band of Mission Indians to explore and understand California History through multiple lenses/perspectives.

#### Online Resources/Applications Utilized that are Only Accessible with a Broadband Connection

- Each year Mrs. Desler submits a proposal to the Megaconference Jr ([www.megaconferencejr.org/](http://www.megaconferencejr.org/)) to provide an Elk Grove classroom with the opportunity to communicate, collaborate and contribute to each other's learning in real time, using advanced multi-point videoconferencing technology.
- Classrooms are taken on virtual fieldtrips to California State Parks via the PORTS program ([www.ports.parks.ca.gov/](http://www.ports.parks.ca.gov/)).
- As of last year, elementary classrooms are connected with others throughout the state in the international Read Around the Planet videoconferencing project ([www.twice.cc/read/](http://www.twice.cc/read/)) as a celebration of NEA’s Read Across America campaign.

## PROJECT SNAPSHOT 3

### **Shasta County Office of Education Distance Learning Courses Videoconference Algebra Courses for Students in Remote Areas**

#### District Overview

Shasta County Office of Education (SCOE) supports and provides services to 25 local Districts that serve close to 30,000 K-12 students in 106 schools.



#### Description of the Shasta COE Videoconference Courses

*"The most significant impact videoconferencing is having on student achievement is in the area of algebra for remote schools. Having the opportunity to be taught by a highly qualified instructor has opened the doors for many students who historically would have arrived at high school a year behind their peers in math. As a result in preparing students for math and providing technology and math coaching for pre-algebra teachers, the students moving into the algebra classrooms have been better prepared academically than their predecessors at the beginning of the grant."* - C. Beecroft, Education Technology Coordinator

- Shasta COE provides algebra and geometry courses via videoconference to 7<sup>th</sup> and 8<sup>th</sup> grade and high school students in remote area schools that are unable to offer the courses due to a lack of highly qualified teachers in these subject areas. Classes have been provided to ten schools in three rural counties.
- Distance learning classrooms are involved with the integration of technology through the use of Polycom videoconference equipment. The addition of SmartBoards and Bridgit server software allow students to solve problems on a SmartBoard and share with remote classes on their local SmartBoards.
- Students extend their learning via project-based learning activities that provide students with opportunities to participate in virtual field trips, conduct research on the Internet, utilize presentation software, and other applications to share their knowledge with their peers in remote classes.

#### Online Resources/Applications Utilized that are Only Accessible with a Broadband Connection

*"What [technology] seemed magical to students at first has become a routine part of daily instruction, though they still find it "pretty cool" according to their teachers."* – C. Beecroft, Educational Technology Coordinator

- Virtual Field Trips
- PORTS
- NASA
- Arizona State University Mars Education Program
- Read Around the Planet
- Megaconference Jr.

## Dissemination of Network Information

Overarching Evaluation Question 4:

*How is information about HSN being disseminated and what else needs to be done to increase best practices in using the Network?*

### **Indicators of K12HSN Dissemination Efforts**

1. K12HSN to Node Sites. K12HSN support and dissemination to Node Sites through regional meetings (face-to-face and virtual) and through quarterly meetings with Network Implementation Committee (NIC) members and Application Coordination Committee (ACC) members seems strong, based on high satisfaction levels. Node Site representatives responding to survey items about regional meetings indicated they were “Satisfied” or “Very Satisfied” with the length, content and relevancy of the regional meetings.
2. K12HSN Direct Dissemination to the Field. K12HSN staff disseminates information directly to the field and has contact with Node Sites, districts, school sites and others through: conference workshops, presentations and booths, listserv/email, and journal articles and newsletters.

### **Indicators of Advisory Board Legislated Activities**

3. The Advisory Board plays a crucial role in the development, implementation and continual renewal of the vision for the K12HSN. It has become a forum to assist staff in finding solutions for local and state issues related to the Network. Members disseminate information to and collect information from the county service regions they represent, and they create policy recommendations to support K12HSN’s statewide project goals.
4. The Advisory Board has completed its legislative functions for this year through work completed at meetings and through work the policy recommendations made to the State Superintendent of Public Instruction.

### **Indicator of Establishment of Strategic Partnerships**

5. Seven strategic partnerships have been established with public and private agencies since 2004, to support specific work related to the apparent gaps in the network.

## **Issues Related to Use of the Network and Improving Student Learning**

### ***Indicators Related to School Site Issues***

It is not the responsibility of K12HSN to provide school sites with connectivity, videoconferencing equipment or professional development. That is the responsibility of the school districts. However, the following indicators provide some issues to be addressed in the State's future planning and implementation, which have implications for high-quality instructional uses of the Network to improve student instruction:

- 1. Survey data showed that 25% of school site respondents indicated their school sites had videoconferencing equipment.*
- 2. School site respondents indicated there was very limited school site use of videoconferencing and guidance or professional development to use it.*
- 3. 10% of respondents indicated use by site administrators and/or technology leaders, 6% by teachers, and 3% by students.*
- 4. 5% of respondents indicated site administrators and/or technology leaders received professional development to use videoconferencing, 3% indicated teachers received it, and 3% students received guidance on how to use videoconferencing.*
- 5. Bandwidth, proximity to video equipment and professional development to conduct videoconferences (both the use of the technology, and strategies for effective uses, depending on the purpose of the videoconference) seem to be key to videoconferencing usage.*
- 6. To support teachers in integrating videoconferencing into teaching and learning, these factors seem to be key:*
  - Assist teachers in participating in established programs that use videoconferencing.*
  - Assist teachers in becoming aware of other resources that use videoconferencing and how to integrate them into the curriculum.*
  - Provide information and professional development on use of the equipment and in ways to use videoconferencing to support teaching and learning.*
- 7. ADA and other distance learning issues need to be resolved to enable more productive use of available distance learning programs across district lines, and equitable services to students who need access to those programs.*

### ***Indicators Related to Increasing Best Practices in Using the Network***

*K12HSN is not responsible for dissemination of information to and within districts, to schools or within schools to teacher. Neither is K12HSN responsible for conducting professional development to ensure use of the Network to improve student achievement, however the following indicators are useful for future state planning to do so.*

1. Dissemination from Node Sites to Districts. Between 80% and 90% of district respondents were satisfied with the relevancy, frequency and manner of dissemination of information provided to them by their Node Site.
2. Dissemination Within District. Over 90% of district respondents indicated they know whom to contact to find out about technical aspects of their district's connection to the network. However, 20% fewer knew whom to contact about classroom resources and videoconferencing.
3. Dissemination from Districts to Schools. About one-third of the district respondents reported disseminating information about K12HSN resources to their schools.
4. Dissemination at School Sites to Teachers. About one-half of school site respondents indicated they have shared information with their school staffs.
5. Moving Teachers from Awareness to Use of Network Resources. Following are examples of the difference in need for greater awareness of Network resources, as well as the need to help teachers move toward use of Network resources:
  - 23% of 265 district respondents report their schools are aware of Calaxy resources and 8% of district respondents report their schools using these resources.
  - 17% of 1162 schools report their teachers are aware of Calaxy services and 6% report teachers at their school are using the services.
  - 46% of school sites report their teachers use videostreaming (Discovery Education, California Streaming).
  - 6% of sites report their schools use PORTS (Parks Online Resources for Teachers & Students).



## Conclusions and Recommendations- K12HSN

### Fulfilling Its Legislative Purpose

K12HSN is fulfilling its legislative purpose by providing, and effectively coordinating the high-speed, high-bandwidth Internet connectivity, including:

- Financial support through its E-Rate activities
- Maintaining and upgrading connected Node Sites and districts
- Completing the Technology Refresh Plan
- Working to connect non-connected districts
- Receiving an extremely high-satisfaction rating from Node Site respondents

K12HSN is transparently managing and operating the Network, through:

- Work with its Advisory Board, the NIC and ACC
- Dissemination of information to Node Sites and to the field
- Modeling of effective uses of technology including videoconferencing, web-based training, and the project website (including posting of all project reports)

### Recommendation 1a: Connectivity and Bandwidth

*Continue working collaboratively with the Advisory Board, ACC, NIC and all Node Sites to:*

- *Maintain and increase, if possible, the share of E-Rate funding coming to California*
- *Solve “Last Mile” connectivity issues to connect non-connected districts*
- *Project for the increasing needs related to bandwidth*
- *Increase bandwidth as necessary and possible*

### Recommendation 1b: Supporting Promising Uses of the Network

*Continue supporting the Network users with or through:*

- *Tools they need to best use the Network*
- *Identification of examples of county, district and school instructional programs and practices that use the capacity of the broadband connection*
- *Brokers of Expertise resources and community of learners*
- *Strategic partners to fill the Network gaps*

## **Conclusions and Recommendations - For Future State Planning with Implications for Use of the K12HSN and Student Learning**

While the main mission of the K12HSN is to grow the capacity of the Network, providing connectivity and appropriate bandwidth to all California county offices of education and school districts, this capacity is being built to “enrich pupil educational experiences and improve pupil academic performance.” In order to fulfill this part of the purpose of the K12HSN, there needs to be a scaling-up of dissemination and professional development to build the knowledge and skills of teachers to use web-based resources and distance learning courses to improve student learning. Administrators also need information and professional development on how to support the instructional uses that the Network affords. Following are recommendations related to these issues. These recommendations have implications for increased staffing and/or funding for K12HSN, and/or staffing, funding and work scope of other agencies within the K-12 system, and/or contracted agencies.

### Communication and Dissemination

Communication and dissemination are strongest:

- Between the K12HSN and Node Sites
- Between the Node Sites and districts
- Through the K12HSN direct outreach to districts, schools, and others in the field

#### *Recommendation 2a: Dissemination Efforts*

*Create a research-based dissemination plan to strengthen dissemination efforts to increase teacher awareness of the types of resources available to improve instruction and learning, and to increase site and district support of teachers' efforts to utilize them. The dissemination pathways within districts, between districts and schools, and from school contacts to teachers need to be strengthened. This indicates a need for:*

- *Clearly identified district and school Network instructional contact*
- *A process to ensure that district and school contacts are in the information loop*
- *A professional development program for instructional contacts on how to use the Network and web-based resources and how to integrate them into classroom instruction*

### Professional Development

Professional development is being provided, which is adequate for “early adopters,” those who are familiar with technology and teachers who are able to adopt new uses of technology for instruction. Many teachers, in order to truly utilize the Network and its resources will need professional development in both the new uses of technology, and how to integrate it into their specific grade-level content areas.

Recommendation 2b: Focused Professional Development Efforts

Create a research-based professional development program that:

- Focuses on teachers who are not as ready as “early adapters” are to integrate web-based resources and videoconferences
- Assists teachers in moving from awareness of how and what web-based resources and videoconferencing might be used instructionally with students, to at least a routine use of these resources

A review of research on professional development that affects student achievement conducted by the American Educational Research Association in 2005, indicated that these characteristics of effective professional development need to be present to change classroom practice and improve student learning:

*“In a study of a federal program supporting professional development, teachers reported that a **focus on content knowledge** was one of two elements that had the greatest effect on their knowledge and skills and led to changes in instructional practice. The other element was **coherence**, which includes building on what teachers already have learned, aligning professional development with state and district standards and assessment, and encouraging communication among teachers who are striving to reform their instruction in similar ways.*

*. . . professional development is likely to be more effective if it is sustained over time and involves a significant number of hours.*

*Collective participation, which involves professional development designed for groups of teachers from the same school, department, or grade level, tended to create more active learning (e.g., observing and being observed while teaching; planning for classroom use of what was learned in professional development; reviewing student work; and giving presentations, leading discussions, and producing written work), and this had some effect on teacher knowledge and skills.*

*Teachers are more likely to change their teaching practices when professional development is directly linked to the program they are teaching and the standards and assessments that they use.*

*Teacher professional development can improve student achievement when it focuses on teachers’ knowledge of the subject matter and how students understand and learn it” (Research Points, Summer 2005, American Educational Research Association, [www.aera.net](http://www.aera.net)).*

This type of professional development is necessary in order for it to be a strong enough intervention to change classroom practice. Teachers need opportunities to move from a level of awareness of the use of the Network and its resources to greater understanding and then to regular and effective use of the resources available on the Network to improve student achievement (See Concerns Based Adoption Model, Hall & Hord, 1987).

### Studies to Inform Capacity Building

It is important for existing data to be analyzed, and new studies to be conducted to continue adding to the knowledge in the field related to equity of access and use, and bandwidth needs to sustain greater usage of the Network for high-quality instruction.

#### *Recommendation 2c: Studies to Inform Future Capacity Building*

*Conduct studies related to:*

*1) Access and use of the Network*

A follow-up study similar to the *2005 Connecting California's Children Report* would support planning to increase access and use

*2) Professional development, Network use and adequate bandwidth.*

A study of school districts to determine the adequate bandwidth needed by schools based on:

- School characteristics: school size, grade span, location
- Teacher knowledge (during and after professional development), use of web-based resources, and adequate bandwidth

# PART 3

## K12HSN CONNECTIVITY AND BANDWIDTH

This part of the report provides the evaluation findings related to:

- Connected Agencies
- Connecting Non-Connected Agencies
- Bandwidth of Connected Agencies
- Satisfaction with Bandwidth
- Future Projections of Bandwidth

### **Connected Agencies**

#### Overview

With 100% of county offices of education, 86% of school districts, and 80% of schools connected to the K12HSN, the project is moving toward its goal of 100% connectivity for all agencies. Since 2005, 100% of the county offices have been connected. Also, since 2005, relatively the same number of districts have been connected to the Network. However, during the same time period, there has been an increase of connected schools from 74% to 80%.

#### Connected Agencies

As of December 2008, there were 71 Node Sites, connecting these agencies to the K12HSN:

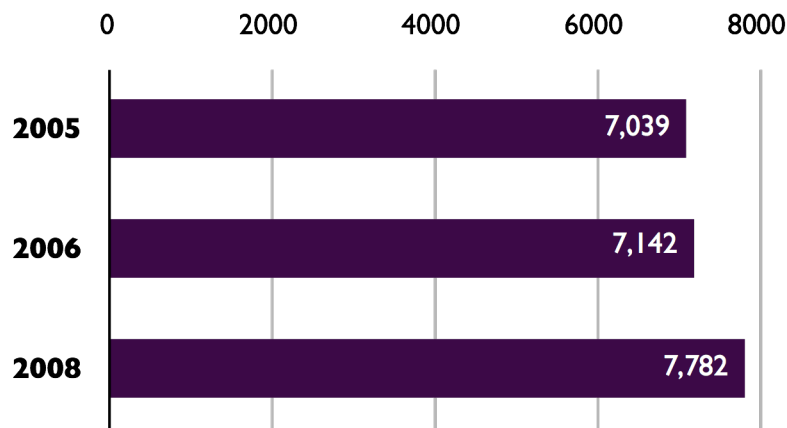
- 100% of County Offices of Education – 58 of 58 COEs
- 86% of Districts – 855 of 994 Districts
- 80% of Schools – 7,782 of 9,782 Schools

Charts 3 and 4 show the increase in connected school sites from 2005 through 2008; while the number of connected county offices of education and connected districts stayed the same or relatively the same.

**Chart 3: Connected Agency Data: 2005, 2006, 2008**

Years	School Sites			Districts			County Offices		
	Total	#	%	Total	#	%	Total	#	%
2005	9,512	7,039	74%	997	887	89%	58	58	100%
2006	9,397	7,142	76%	997	897	90%	58	58	100%
2008	9,782	7,782	80%	994	885	86%	58	58	100%

**Chart 4: Connected Schools Graph: 2005, 2006, 2008**



#### K12HSN Efforts to Connect the Non-Connected Districts

K12HSN staff work year-round to find solutions to get districts connected. Between July and September 2007, K12HSN contacted all 139 non-connected districts via mail. As of December 2008, K12HSN staff conducted audio and videoconferences and face-to-face meetings with 45 of the 139 non-connected districts. Of these 45 districts:

- 10 districts – K12HSN successfully facilitated connection to the network.
- 19 districts – K12HSN is in the process of facilitating their connection.
- 11 districts – either had no interest in connecting to the network and/or reported they were connected to a commercial carrier at a lesser cost than connecting through their Node Site.
- 5 districts – reported having issues with geographic barriers, political barriers, connection costs, and needing equipment upgrades.

#### Node Site Respondents' Perspectives on Challenges In Connecting Districts to the Network

Of the 69 Node Site survey respondents, one-third indicated they encountered problems in connecting districts to the Network. One-fourth of respondents provided additional information and indicated the challenges were related to financial, political, connectivity, and relationship issues. Political and financial issues were cited as their most frequent challenges in connecting districts to the Network.

### Node Site Respondents' Perspectives on K12HSN Role in Connecting Districts to the Network

Sixty percent (60%) of respondents indicated that the K12HSN played the following roles in helping their Node Sites get districts connected to the Network:

- Facilitation/support
- Providing a low cost connection alternative for districts
- Providing last mile funding; technical support
- Providing high bandwidth/Increased bandwidth to districts

### District Respondents' Perspectives on Challenges of Connecting Their District or Schools to the Network

Of the 267 district contacts responding to their survey, 13% indicated they encountered challenges in connecting their district or school to the network. Between 20% and 33% of those respondents (or approximately 3% to 4% of all the district respondents) indicated they had challenges related to:

- Troubleshooting issues with existing conditions
- E-Rate application support
- Assistance dealing with telecommunications carriers
- Technical support

### **Connecting Non-Connected Agencies**

In order to reach the goal of 100% of connectivity, project staff has focused its work in two areas:

- Contacting non-connected districts and facilitating their connection to the K12HSN, which then provides additional school sites with the opportunities to connect to the Network.
- Working with the Advisory Board and other agencies (i.e., CENIC, and vendors) to try to solve the “Last Mile” issues, which are barriers to school sites being connected.

Staff has conducted audio and videoconferences and face-to-face meetings with 45 (approximately one-third) of the 139 non-connected districts. Within the last year, K12HSN has successfully facilitated the connection of 10 of the 45 districts to the network. They are currently in the process of facilitating the connection of another 19 districts.

One-third of the 69 Node Site contacts indicated they encountered problems in connecting districts to the Network. Almost twice as many, 60% of Node Site respondents indicated that the K12HSN played a role in helping their Node Sites connect districts to the Network. Issues that K12HSN and Node Sites need to be ready to deal with to connect districts are related to finances, political contexts, connectivity, and relationships between agencies.

Of the 267 district respondents, 13% indicated they encountered challenges in connecting their district or school to the network. Districts may need support on these issues when connecting their district or school to the network:

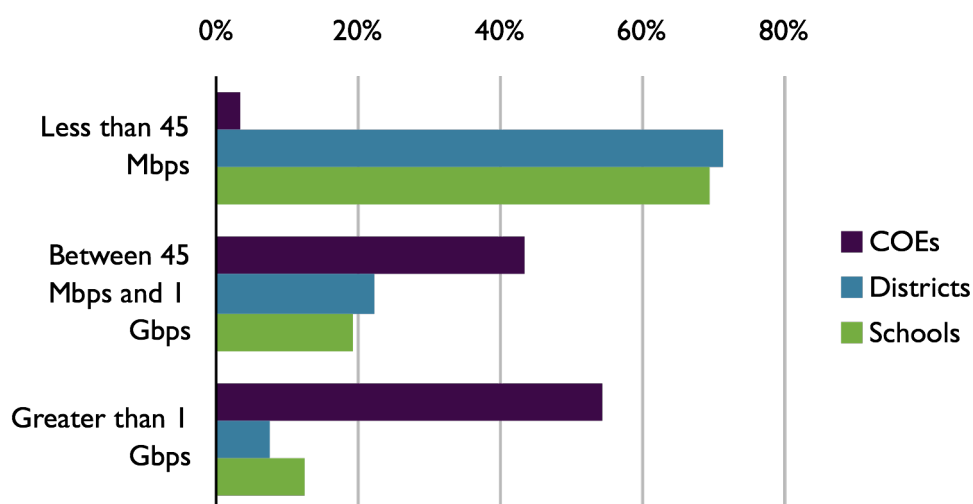
- Troubleshooting issues with existing conditions
- E-Rate application support
- Assistance dealing with telecommunications carriers
- Technical support

## Bandwidth of Connected Agencies

### Current Band Width

Currently, the connection speeds across the network range from smaller than a T-1 to greater than 1 Gbps. Chart 5 shows the range of bandwidth for each type of connected agency: county offices of education, districts, and schools.

**Chart 5: Graph of Current Bandwidths of Connected Sites**



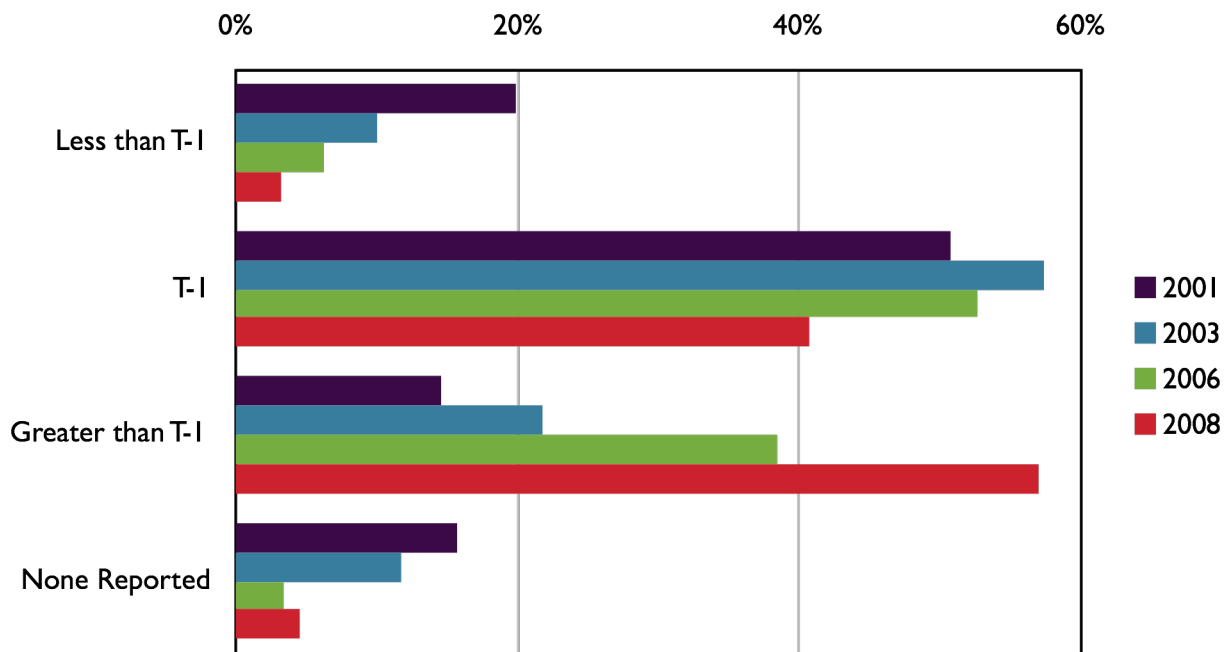
Charts 6 and 7 provide an overview of the increase in bandwidth between 2001-2008.

**Chart 6: Bandwidth Data - 2001, 2003, 2006, 2008**

Reporting Year	Less than T-1	T-1	Greater than T-1	None Reported
2001	20% (1,952)	51% (5,042)	14% (1,430)	16% (1,546)
2003	10% (1,014)	57% (5,869)	22% (2,216)	12% (1,182)
2006	6% (644)	53% (5,573)	38% (4,052)	3% (338)
2008	3% (321)	41% (4,157)	57% (5,888)	4% (468)



**Chart 7: Bandwidth Graph - 2001, 2003, 2006, 2008**



## Satisfaction with Bandwidth

### District Satisfaction

Of a total of 267 district survey respondents:

- 77% indicated they were “Satisfied” or “Very Satisfied” with the level of bandwidth at which their district is connected to the Network.
- 60% indicated they had adequate bandwidth to meet their schools’ needs.

### School Satisfaction with Bandwidth

About three-fourths of the over 1,000 school site respondents indicated they and the teachers at their sites were satisfied with the speed of their connections at their sites. However, when asked, “How do teachers at your school site work around a slow Internet connection?” approximately three-fourths of school site contacts indicated these strategies:

- Wait and try again later (341)
- Have alternative plans or download at home, in the lab, or before school (163)
- Work at home (115)
- Ask for help (109)
- By being patient (105)
- They don’t use the internet (100)

Thirty- one respondents (less than 3%) said that speed was not an issue, but rather that their district blocks/filters sites and resources teachers want to use.

Approximately 10% of school site respondents indicated that teachers would like to use these types of online resources if they had greater bandwidth:

- Video and media streaming (94)
- Web-based applications, online resources for teaching and learning (43)
- Videoconferencing (12)
- Google applications: gmail, google earth (10)

## **Future Projections of Bandwidth**

### District Processes for Future Bandwidth Projections

Seventy respondents indicated they had no process in place for future bandwidth projection. For those who did have processes in place, those most frequently identified for projection of future bandwidth were:

- Monitor bandwidth, usage, network traffic (79)
- Project future needs based on new applications, trends, usage (33)

### K12HSN Future Bandwidth Projections

Node Sites and districts are asked to self-report their connectivity data to K12HSN on an annual basis. Bandwidth utilization is captured by K12HSN using monitoring software and equipment and is reviewed in a proactive manner for program decisions and node site service levels. K12HSN uses the reports of utilization and information collected from node sites related to planned bandwidth growth by the node site or the districts it serves, to anticipate future bandwidth needs. Due to E-rate bidding requirements, these growth projections are made as far as 18 months in advance of the need.

On one day in December 2008, node site peak bandwidth usage varied between 4.9 Mbps to 648 Mbps. The number and size of districts and schools that each node site connects to the network, and the uses or applications that those “clients” employ determine the amount of bandwidth used at each node site. The time and date for which data is reported was chosen because of the robust usage that was observed for the network in general at that point in time.

### Network Usage

Network traffic is in two pools. One pool is the traffic that stays “on Network” – for instance, traffic between two connected districts, between a district and a county office of education, or traffic that moves between K12HSN /CalREN and one of the networks that CalREN peers with. There are no commercial ISP fees for this “on Network” traffic.

The second pool is the ISP traffic that goes “off Network” and incurs commercial ISP fees. Using the metered and charged ISP traffic as an indicator, the increase in utilization of the Network’s circuits is apparent. The annual metered ISP use in 2005 was 6,527 Mbps with an average monthly usage of 544 Mbps. The annual usage in 2008 was 12,541 Mbps with an average monthly usage of 1,045 Mbps. This is an increase of 92% between 2005 and 2008. The chart below shows the increased use of metered traffic by month between 2005 and 2008. It is probable that the non-metered traffic at each Node Site also increased.

**Chart 8: Increase in Paid ISP Use  
Between 2005 and 2008, by Month**

<b>Month</b>	<b>Increase from 2005 to 2008</b>
January	57%
February	112%
March	98%
April	103%
May	98%
June	94%
July	103%
August	80%
September	90%
October	115%
November	78%
December	81%

# PART 4

## K12HSN NETWORK SUPPORT

This part of the report provides findings related to:

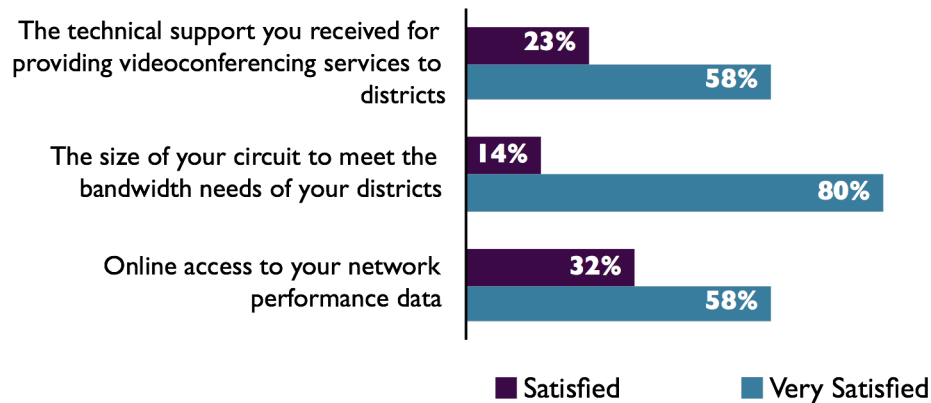
- Node Site Satisfaction with K12HSN Technical Support
- Node Site Services to Districts
- District Satisfaction with Node Sites on Technical Needs
- Satisfaction with E-Rate Support and Resources

### Node Site Satisfaction with K12HSN Technical Support

The following percentages of Node Site respondents were “Satisfied” or “Very Satisfied” with the K12HSN support with their initial needs related to:

- Technical support for providing videoconferencing services to districts (81%)
- The circuit size to meet the bandwidth needs of the district (94%)
- Online access to your network performance data (90%)

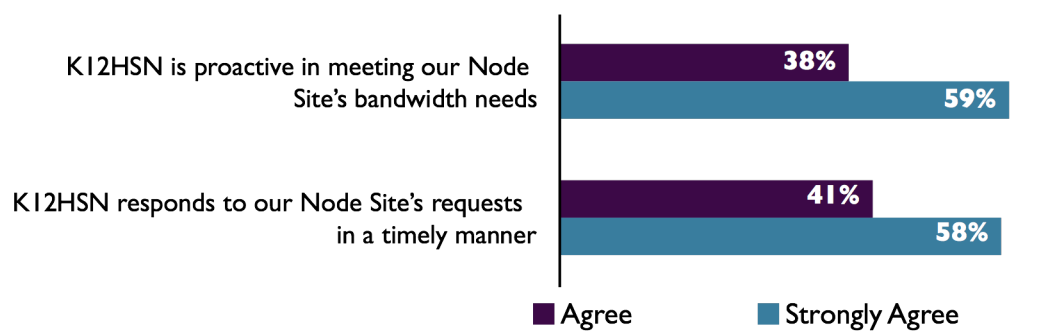
**Chart 9: Node Site Satisfaction with K12HSN’s Set-Up Efforts**



Of the 68 responding Node Sites, almost all of the Node Site survey respondents “Agree” or “Strongly Agree” that K12HSN is supportive of their continuing needs, and:

- Is proactive in meeting their bandwidth needs (97%)
- Is responsive to their needs in a timely manner (99%)

**Chart 10: Node Site Satisfaction with K12HSN's Efforts to Meet Technical Needs**



### Node Site Services to Districts

Approximately 70% or more of Node Site respondents reported providing the eight services shown in Chart 11 to their connected districts, while a smaller percentage of districts reported receiving these services. The difference in their responses may be due to Node Site or district respondents who may not have been aware of the services provided.

**Chart 11: Basic Services Provided by Node Sites**

Survey Item: <i>What services do you provide connected districts (or receive from your Node Site)?</i>	% of <b>Node Sites</b> indicating they <b>provide</b> service n = 68	% of <b>Districts</b> indicating they <b>receive</b> this service n = 266
<b>Services Provided by Node Sites to Districts</b>		
Basic connection	100%	72%
Technical support	87%	57%
Primary/Secondary DNS	87%	40%
Network monitoring	82%	41%
Email services	75%	34%
Fiscal services	72%	43%
Firewall	72%	45%
Spam filtering	71%	39%

While 68 Node Site survey respondents were “Satisfied” or “Very Satisfied” with the services they provide for their connected districts, 28 of them offered suggestions for how K12HSN could assist them in providing better support to their districts, including: funding, tools, training, and network issues.

## **District Satisfaction with Node Site Support on Technical Needs**

Over three-fourths of district respondents were “Satisfied” or “Very Satisfied” with:

- The timeliness with which their Node Sites connected districts to the K12HSN (88%)
- Technical support for videoconferencing (87% - although only 52% of respondents answered this question – probably because not all districts have videoconferencing equipment and only 21% of school respondents indicated their schools had it)
- The timeliness of support they receive from their Node Sites (86%)
- The manner of dissemination and relevancy of the information they receive from the Node Sites related to their connection (79%)

Slightly less than three-fourths (70%) of the district respondents were “Satisfied” or “Very Satisfied” with the frequency of the information they received from their Node Sites.

## **Satisfaction with E-Rate Support and Resources**

### Individuals Participating in E-Rate Training

Of the 409 individuals participating in the 2007-08 CDE-K12HSN E-Rate Training for county offices of education and school districts via face-to-face, videoconference or live webcasts, 25% (n=104) responded to a participant survey. Over 90% of those respondents were “Satisfied” or “Very Satisfied” with the training.

Over 60% of the 104 respondents indicated they were aware of the online E-Rate training materials. Of the 104 respondents, 44% reported using/accessing the online E-Rate training materials. Of those respondents indicating they used the online training materials, 84% (or 37% of all the 104 respondents), reported that the materials were helpful or very helpful.

### CDE Perspective on K12HSN Technical Support

A CDE contract monitor indicated that the that the CDE is “more than satisfied with the E-Rate technical support we receive from the staff” at K12HSN (a collaboration with a staff member from Butte County, partially funded through K12HSN), which generally includes:

- Providing schools with the most current information available related to E-Rate
- Promoting awareness of the E-Rate program at a local and state level
- Understanding and preparing for related national issues

### California E-Rate Funding

One indicator of how well California measures up in the amount of E-Rate funds is the percentage of California funding, based on total national funding. Since 1998, California has received between 12% and 18% of the total national funding. It is not possible at this point to determine any trend of recent increases or decreases because funds for years 2003 through 2008 are still being distributed. However, also to be considered are four major factors that affect the amount of E-Rate funding that is allocated to California, which are identified in the Evidence of Findings section of this report.

# PART 5

## USES OF THE K12HSN NETWORK

This part of the report provides findings related to:

- Value-Added Broadband Use by Connected School Sites
- K12HSN Web-Based Tools – District and School Site Awareness and Use
- Use of Videoconferencing

### **Value-Added Broadband Use by Connected School Sites**

Schools site respondents indicated their sites considered the use of broadband to access many educational resources and to communicate as value added component to their Network connection. They described ways in which one or more teachers at their schools used the high-speed Internet connection to access web-based resources or to communicate, including:

- Research using the Internet
- Educational websites, e.g. NASA, Brainpop, National Geographic, Discovery Channel
- E-mail for teacher and student use
- Videoconferencing
- Web-based educational programs e.g. Renzulli Learning, Compass Learning
- Pod-casting, blogs, wikis
- Online student assessment platforms, e.g. Edusoft, OARS
- Webquests
- Virtual field-trips
- YouTube/TeacherTube

Almost 50% reported their sites were using videostreaming.

### Project Snapshots

One of the focus areas for K12HSN is to find examples of uses of the network that necessitate the broadband connection. Through their dissemination efforts and conferences and meetings throughout the state, K12HSN staff identified three projects: the Riverside Virtual School, the Elk Grove USD EETT Project, and the Shasta COE Distance Learning Courses. Each of these three projects makes use of their broadband connection in distinct ways, but all focus on the delivery of content via non-traditional methods to students that are not able to access course content in a traditional school setting. Descriptions appear in Part 2 of this report.

## **K12HSN Web-Based Tools - District and School Site Awareness and Use**

### Galaxy

As one Advisory Board member said, there are “...*amazing projects that the K12HSN has had up and running in a remarkably short time (i.e., Galaxy)*...” *Galaxy* (formerly known as edZone) is remarkable in the fact that it brings Web 2.0 tools to teachers in a secure environment. These are the types of tools that adolescents use constantly in their personal lives. With access to them here, if classrooms have adequate bandwidth, and teachers have adequate training on how to integrate them into their content areas, they could be extremely powerful learning tools.

Based on needs expressed by K12HSN users for web-based tools in a secure environment, K12HSN created and then launched in March 2008, a comprehensive set of web-based tools to support teaching and learning in California K-12 classrooms. Powered and maintained by K12HSN, *Galaxy* is a suite of free Web 2.0 tools that exist in a secure environment, open only to the California educational community. The tools include: blogs; wikis; and a file sharing system where educators can upload videos, podcasts, images and documents. *Galaxy* also supports videoconferencing scheduling through *k12video.org*. *Galaxy Assets*, an online inventory management system, is another application integrated into *Galaxy* that can be used as a stand-alone solution or tied to MyTechDesk, a free work-order management system. In January 2009, Moodle, an online course management system was made available to all California K-12 teachers through *Galaxy*. Additional applications such as instant messaging and social networking are currently being developed and should soon be integrated into *Galaxy*.

### Galaxy Baseline Data from March through December 2008

Since its launch in March 2008, over 1,500 K-12 classroom teachers, technology specialists and administrators have created 1,509 *Galaxy* accounts. The *Galaxy* home page has been viewed over 11,000 times.

#### *District Perspective –*

- 23% of 265 district respondents report their schools are aware of *Galaxy* resources.
- 8% of district respondents report their schools using these resources.

#### *Site Perspectives –*

- 17% of 1162 schools report their teachers are aware of *Galaxy* services.
- 6% report teachers at their school are using the services.

### K12video.org - District and School Site Awareness and Use

*K12video.org* is a web-based scheduling system designed specifically for the needs of the California K-12 High Speed Network's videoconferencing project.

#### *District Perspective –*

- 44% of 267 district respondents report their schools are aware of *K12video.org* services
- 18% of all district respondents report their schools using these services



#### Site Perspectives –

- 23% of 1188 schools report their teachers are aware of *K12video.org* services
- 5% report teachers at their school are using the services.

### **Use of Videoconferencing**

#### Frequency

K12HSN provides these videoconferencing services to California schools at no cost: scheduling using the *K12video.org* system, multipoint bridging, conference recording, and conference streaming. Only videoconferences using the multi-point bridging equipment are scheduled through the *K12video.org* system, with records of the scheduling and use captured by that system. In comparable ten-month periods in 2007 and 2008 respectively, 1,323 and 1,373 multi-point videoconferences were held and scheduled through *K12video.org*; an increase in 2008 of 4% above 2007. Approximately 85% of conferences scheduled on *K12video.org* were actually held each year with 49% of those used for administrative purposes, 28% for professional development and 23% for classroom instruction. In addition, point-to-point videoconferences were scheduled in each of those years. Although data related to those is not captured through the *K12video.org* system, it is likely that the number of point-to-point videoconferences may have exceeded the number of multi-point videoconferences.

#### Videoconferencing – School Site Use

Of over 1,000 school site respondents, almost 25% indicated that their school sites have videoconferencing equipment.

**Chart 12: School Site Guidance and Use of Videoconferencing**

Item Related to Use of Videoconferencing	% of Respondents about		
	Site Administrators and/or Technology Leaders	Teachers	Students
Use videoconferencing	10%	6%	3%
Have had professional development or guidance in its use	5%	3%	3%

#### Repeat Users of Videoconferencing – School Site Perspectives

School site survey respondents (n=33) indicated that the following factors seem to be descriptive of repeat-users of videoconferencing:

- Participating in established programs using videoconferencing
- Aware of resources such as *PORTS*
- Comfortable with the technology or had received professional development

Respondents indicated that repeat-users seem to use videoconferencing for the following functions: student engagement and learning; communication – student to students; and, teacher learning and meetings. Respondents also indicated that limited bandwidth might deter some use, as might the proximity of the location of the videoconferencing equipment.

# PART 6

## DISSEMINATION OF NETWORK INFORMATION AND RESOURCES

This part of the report provides findings related to:

- Dissemination and Use of Network Information
- Advisory Board Perspectives and Recommendations
- Strategic Partnerships

### **Dissemination and Use of Network Information**

#### K12HSN Dissemination to the Field

Between March 2007 and December 2008, K12HSN staff has disseminated information about the Network and its resources in the following ways:

- Presentations at state and local conferences
- Information booths at national, state and local conferences
- Training on K12HSN resources and tools, both face-to-face and virtual
- Presentations at local county offices of education or regional meetings
- Listserv/email to targeted groups of stakeholders throughout the state
- Articles in journals and newsletters about K12HSN resources

#### K12HSN Support and Dissemination to Node Sites

K12HSN provides support and disseminates information to Node Sites by:

- Scheduling regional meetings to relay information and answer questions about Node Sites and the network.
- Quarterly meetings with regional Network Implementation Committee (NIC) members and Application Coordination Committee (ACC) to discuss issues critical to the effectiveness of the network.

### Node Site Perspectives

100% of the 22 Node Site representatives responding to survey items about regional meetings indicated they were “Satisfied” or “Very Satisfied” with the length, content and relevancy of the regional meetings.

### District Perspectives

Of the over 200 district respondents for whom these items were relevant, the following were “Satisfied” or “Very Satisfied”

- 89% - with the relevancy of information disseminated to them by their Node Site.
- 88% - with the manner in which their Node Site disseminates information to them about their connection to the network.
- 82% - with the frequency with which their Node Site disseminates information to them about the K12HSN Network.

Of the 267 respondents to the District survey, the following indicated they know whom to contact to find out about:

- Over 90% - technical aspects of their district's connection to the network
- Approximately 2/3 - K12HSN online classroom resources and videoconferencing

Approximately one-third of the district respondents reported disseminating information about K12HSN resources to their schools through:

- District-wide meetings/training
- A designated school site contact
- Letters to school site administrative/technical staff

### School Site Perspectives

Regarding sharing information at their schools sites, of the 1,192 school site respondents:

- Almost half shared information about K12HSN resources with their school staffs at staff meetings, with about 1/3 using email.
- Almost half said they haven't shared information with their school staffs.

Almost all of the respondents said they knew whom to contact at their district office if they had a question about technical aspects of their connection. Less than half knew whom to contact if they had a question about K12HSN online classroom resources (e.g., *Galaxy*).

## **Advisory Board Perspectives and Recommendations**

The Advisory Board members described their role as having responsibilities related to providing communication, accountability, policy guidance, advocacy, and being a forum to discuss challenges and barriers around the following areas:

- Support of the K12HSN Effort to Increase Connectivity Statewide
- Support of the K12HSN Efforts to Increase/Promote the Use of Technology for Teaching and Learning Statewide

The Advisory Board made recommendations on their future responsibilities or initiatives and they made seven policy recommendations to the State Superintendent of Public Instruction, including:

1. Create a statewide e-learning council.
2. Provide access to online courses for all students in California, in support of state and federal mandates.
3. Ensure all adopted textbooks and related materials are available to schools in electronic format.
4. Formally embrace the 21<sup>st</sup> Century Learning Framework by joining the current list of states actively participating in the Partnership.
5. Develop policies to ensure that all students are afforded the opportunity to have a successful online experience at least once before graduating.
6. Support staff development opportunities to ensure all staff are fully prepared to support student learning in an online environment.
7. Identify any K-12 sites that do not have sufficient network access or bandwidth, determine the reason for lack of access and develop a plan to remedy the situation by January 1, 2010.

## **Strategic Partnerships**

Seven partnerships have been established since 2004, with: Codian/Tandberg, Discovery Education, AT&T and CENIC, Netcordia, Thinkfinity/Verizon Foundation and the Brokers of Expertise Initiative. These partnerships support specific work related to the gaps in the network, providing network diagnosis equipment; enhancing videoconferencing, providing content via video streaming; and, hosting a content repository on the network.

Partner: Codian/Tandberg

Year Established: 2004-05

Codian entered into a relationship with K12HSN / ICOE after the program invested in Codian videoconferencing equipment. It was important to the expansion of K-12 videoconference use that a scheduling system be developed. Codian granted ICOE access to their API to facilitate this development. The k12video.org scheduling resources are an essential support to the use of videoconferencing around the state – saving schools, districts and county offices of education on travel expenses and significantly increasing their ability to participate in regional and statewide work.

Partner: Polycom Year Established: 2005-06

Polycom provided software to enable desktop videoconferencing by teachers and others engaged in education. From inception through December 2008 more than 500 individuals have received desktop videoconferencing software and have participated in online training on its use. K12HSN accepts requests from teachers, ensures that the teacher completes the online course, and mails the software to the educator.

Partner: Discovery Education Streaming Year Established: 2006-07

California schools and teachers that license *unitedstreaming* from *Discovery Education* (except those that purchased their own server equipment) access the content directly from on-Network servers that are located at the ICOE Node Site. *Discovery Education* provides the hardware and software updates. K12HSN provides “remote hands” support to the server devices. This relationship provides teachers in subscribing schools with fast, reliable access to *unitedstreaming* while also saving the expense of off-Network commercial Internet traffic. (This collaboration was established after *Discovery Education* responded to a 2006 K12HSN competitive RFP process.)

Partner: AT&T and CENIC Year Established: 2007-08

AT&T, CENIC and K12HSN have worked together to clarify the gaps in network infrastructure that result in “have-nots” when it comes to high-speed access among California schools and districts. Quotes have been obtained for many of the hard-to-serve locations. This fact-finding puts the K12HSN and CENIC in a position to capitalize on new or existing infrastructure enhancement opportunities that arise to improve connectivity in rural and remote areas.

Partner: Netcordia Year Established: 2007-08

*Netcordia* supports K12HSN by providing network diagnostic services for districts and county offices of education. *Netcordia* provided three devices at significant discount so that K12HSN can deploy them to districts to help diagnose network inefficiencies and improve service. With each deployment, *Netcordia* cooperatively adjusts the licenses for the devices to permit the new location to monitor and collect local network information to inform the reporting and suggest potential improvements. To date all districts that have requested the service have been accommodated, with improvements to their local network configurations flowing from the process.

Partner: Thinkfinity/Verizon Foundation Year Established: 2008-09

*Thinkfinity-California* and the *Verizon Foundation* continue to work to expand the online resources that are available for California teachers. K12HSN agreed to host the resource repository (developed using *Verizon Foundation* funding) to ensure that California K-12 users have the same for fast, reliable access realized when the content is hosted on the Network.

Partner: Brokers of Expertise Initiative Year Established: 2008

The *Brokers of Expertise (BOE)* initiative, a plan to support California K-12 teachers in their work using an online environment, is a new partnership with the California Department of Education and funding foundations, primarily the Hewlett Foundation. The *BOE* online environment will include resources that are California content standards-aligned, searchable, and supported by collaboration tools to build communities of practice among those who use the resources. K12HSN has agreed to implement the plan while calling on county offices of education and regional efforts to participate in collecting and affecting the culminating repository and its resources. The environment will be engaged in pilot testing between March and June, 2009.

# PART 7

## PROGRESS ON LEGISLATIVE ACTIVITIES AND ADVISORY BOARD PERFORMANCE MEASURES

This part provides a summary of progress related to:

- The K12HSN Legislative Activities
- The K12 HSN Advisory Board Performance Measures

These two frameworks have many similar focus areas, thus there is some duplication of information in these sections.

### **The K12HSN Legislative Activities**

Following is a brief description of the findings related to K12HSN implementation of its Legislative Activities:

- Goals and Objectives
  - *Define high-level goals and objectives and the advisory board has defined evaluation criteria for K12HSN*
    - Goals and Objectives for 2008-2009 completed.
    - Advisory Board Performance Measures are helpful in setting goals and objectives, but still need indicators that provide criteria for measuring success.
  - *Required implementation of videoconferencing*
    - Videoconferencing is in the project goals and objectives and has been implemented at County Offices of Education, some districts and approximately 10% of school sites, based on project and survey data.
  - *Authorizes ICOE to oversee use grants as well as grants to connect unconnected schools*
    - Funding has not been appropriated by the California Legislature to do so.

- *Coordination network use to benefit teaching and learning –*
  - This is part of the K12HSN 2008-2009 Goals and Objectives -- the project works toward this through affordable and reliable network connectivity and bandwidth, development of a bank of resources, dissemination, and strategic partnerships.
- **Administration**
  - *A competitively selected local educational agency (LEA) administers the network on behalf of the Superintendent of Public Instruction*
    - In place.
  - *An advisory board, primarily composed of county and school district representatives, will meet quarterly to provide policy and operational guidance*
    - In place.
- **Oversight**
  - *Fiscal oversight provided by an annual independent audit*
    - ICOE audit completed in November 2008.
  - *Technical oversight provided by an independent evaluation to be completed by March 1, 2009*
    - This report fulfills this requirement.
- **Services**
  - *Internet service, interconnectivity among K-12 entities, connection to higher education institutes, and connection to state and local agencies*
    - Implemented.
  - *Videoconferencing*
    - In place - limited at district and school levels because of lack of equipment.
  - *Distance learning tools*
    - In place and under development.
  - *Statewide coordination of network use*
    - In place with high satisfaction ratings from constituents.
    - Use of K12video.org for coordination of videoconferencing.
- **ICOE Requirements for All ICOE Contracts**
  - *A service level agreement*
    - ICOE has a contract with CENIC.
    - ICOE has contracts in place with all Node Sites. These were revised this year for greater accountability.
  - *Protection of intellectual property ownership rights*
    - No contractors have been used to develop K12HSN, therefore no ownership issues exist to date.

- *Asset protection*
  - Edge equipment routers at node sites that were originally purchased by the State, as well as videoconferencing servers and storage are held for the state.
- *Documentation of appropriate fee structures*
  - Fee structures with CENIC related to K12HSN backbone costs were revised and have remained the same since 2005-2006.
- *Assurance that any interest earned on state funds are used to the benefit of the project*
  - Completed. Interest from interest-earning accounts held by CENIC and ICOE are contributed to program expense accounts and used for K12HSN program expenses.

## **The K12HSN Advisory Board Performance Measures**

- **Network Oversight, Monitoring and Accountability**
  - *Establishment of a sound management and governance structure – includes governing body and a management organization to carry out its directives*
    - Complete
  - *Clear and specific service level agreement with contractor – Services to the K12HSN established under contract from CENIC with a service level agreement to detail services to be provided.*
    - Complete
  - *Independent audit of financial operations and network performance – Financial audits to ensure the proper expenditure of public funds, and performance audits to identify operational shortcomings, and highlight areas of network vulnerabilities and strengths.*
    - ICOE audit completed in November 2008.
  - *Long-term strategic plan for network operations – The vision for the network and related investment, necessary infrastructure replaced/upgraded, and cost estimates for each phase of its implementation.*
    - One phase completed in 2008, but will be ongoing.
    - The Technology Refresh Plan developed in 2007 served as the guide to the overall refresh of the K-12 circuits and equipment completed in 2008. A living document, the implementation adjusts to changing circumstances. A wholesale replacement of the node site routers instead of a staged replacement as defined in the original plan resulted in significant savings and an accelerated schedule for the work. Two things continue to drive the changes to circuits to serve school and district needs. These are the bandwidth needs of the respective node sites and cost comparisons. Changes in the vendor environment and technologies available have resulted - in many cases – in reduced costs for greater bandwidth.



- *Protection of the state's investment – Accountability to include an assurance that balances and interest earned on account balances held by all parties will ultimately fund services and infrastructure improvements for the K12HSN.*
  - Completed. Interest from interest-earning accounts held by CENIC and ICOE are contributed to program expense accounts and used for K12HSN program expenses.
- **Network Operations**
  - *Connection to the network: percent of county offices of education, school districts, and school sites connected to the network – A detailed presentation of connections to the network for all K-12 educational institutions since the inception of the program.*
    - Data from inception exists in a database created by ICOE, with ICOE data collected since 2004-2005.
    - A summary of this data is provided in this report.
  - *Quality of the connections to the network – The demand for higher bandwidth resulting from more data intensive applications and more users.*
    - Node Sites, districts and schools are satisfied with the quality of their connection, although some frustration with slow connection speeds exists at the teacher level, and teachers in at least 10% of connected schools desiring greater bandwidth for instructional applications.
  - *Initiatives to connect unconnected sites – Initiatives to bring these agencies to the network, and identification of impediments to making these connections.*
    - In process with some unconnected sites being connected in 2008, and others in progress.
- **Use of the Network to Improve Learning**
  - *Coordination of academic content and applications for use on the network –An inventory of applications available on the network as an indicator of how this technology is used to improve student performance.*
    - Currently implemented, with additional inventory being identified.
  - *Showcasing exemplary applications – Proactive measures to showcase exemplary programs and market their availability.*
    - Currently implemented, with additional strategies of identifying exemplary programs being explored.
  - *Provision of videoconferencing services - The number of videoconferencing services provided since the inception of the program, a projection of future demand, and the number of workshops on effective use of videoconferencing services.*
    - K12video.org keeps track of multi-point videoconferences. A projection of future demand is being conducted in 2009.

# PART 8

## EVIDENCE OF FINDINGS BY PROJECT GOAL

This part provides findings with the data that forms the basis of evidence for those findings related to the three 2008-2009 project goals:

- **Goal 1: Connectivity and Success of the Network**
- **Goal 2: Coordination of Uses of the Network**
- **Goal 3: Awareness and Dissemination of Network Resources**

### **Goal 1: Connectivity and Success of the Network**

Provide reliable and secure inter-connectivity among K-12 entities, IHEs, and state and local agencies to facilitate efficient interaction, and reliable and cost-effective Internet service, including transmission of data

One of the three goals of the K12HSN is to provide reliable connectivity and support to K-12 schools throughout the state. The success of the network relies on the collaborative efforts of the K12HSN and the Node Sites to ensure K-12 districts and school sites in California are connected to the Network.

#### **Evaluation Question 1**

What is the footprint of the K12HSN, including names and numbers of agencies that are part of and connected to the Network, and what are their connection speeds,

#### **Finding 1: Connected Agencies and Bandwidths**

As of December, 2008, there were 71 Node Sites, connecting the following agencies to the K12HSN:

- 100% of County Offices of Education: 58 of 58 COEs connected
- 86% of Districts: 855 of 994 Districts connected
- 80% of Schools: 7781 of 9782 Schools connected

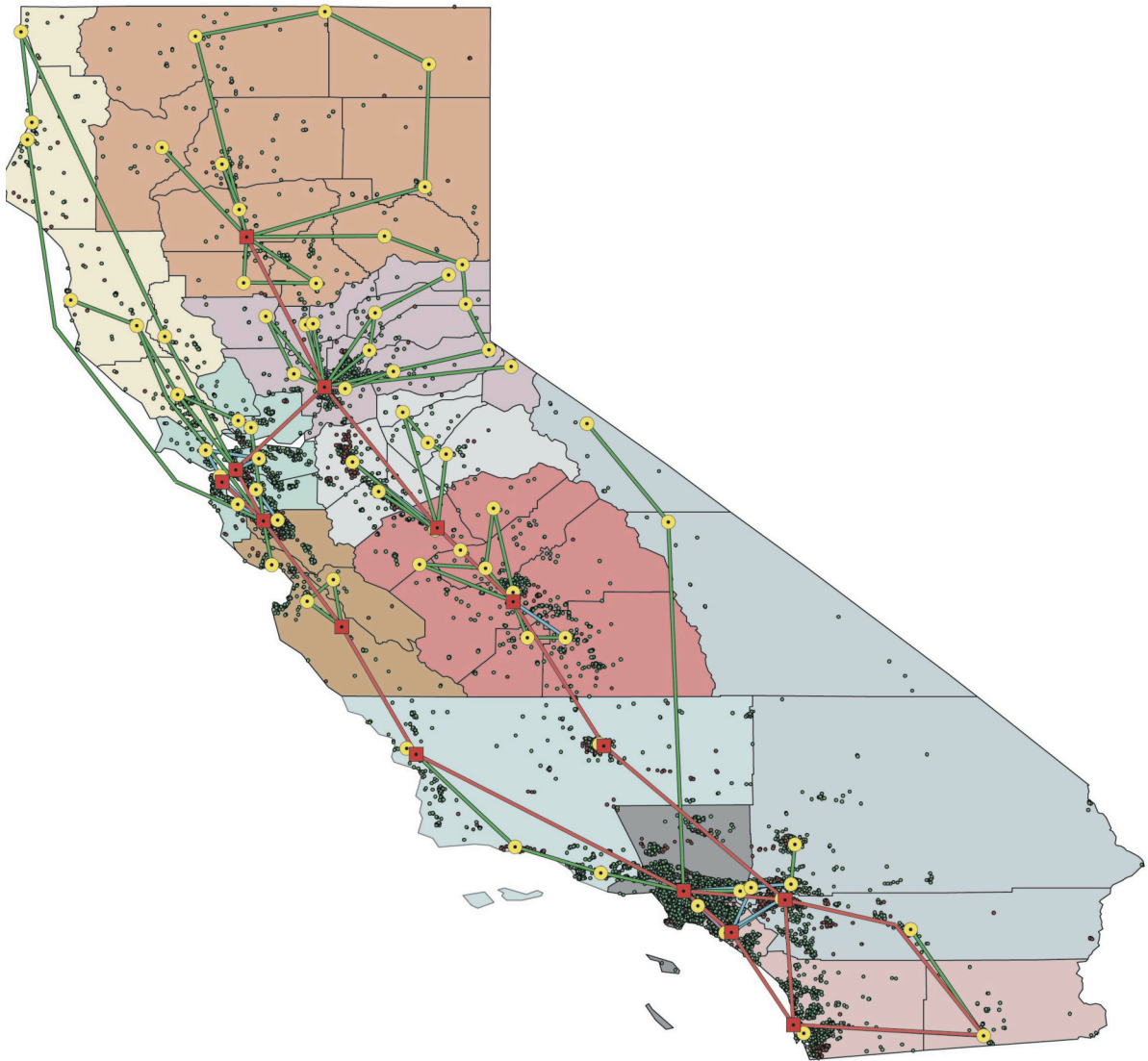
Connection speeds range from smaller than a T-1 to greater than 1 Gbps.

- More than half of the Node Sites at county offices of education have a 1 Gbps connection or greater.
- Approximately one-third of connected districts have greater than a 10 Mbps connection.
- Approximately half of schools have a connection smaller than 10 Mbps.

## Evidence – K12HSN Data on Node Sites and Connected Agencies

In order to address the goals and objectives of the project and the legislated activities, ICOE has continued the establishment of the high-speed network, with Node Sites (connection points on the Network to which districts and school sites are connected) across the state. The majority of these sites were established at county offices of education, although a few are housed at district offices and one is at a community college. Through interactions with the Node Sites representatives on committees, as well as interactions with individual Node Sites, K12HSN identifies statewide or local issues related to school district bandwidth and service needs, that must be addressed in order to create optimum opportunities for districts to connect to the network. The following map shows the footprint of the K12 connections to the California Research and Education Network (CalREN) with Node Sites, districts and schools sites. The map is interactive at: [http://www.k12hsn.org/img/map/33\\_44\\_k12hsn\\_101907.jpg](http://www.k12hsn.org/img/map/33_44_k12hsn_101907.jpg) (See Appendix B: List of Node Sites during the Period of the Evaluation.)

**Figure 1a. Map of K12 Connections to CalREN**



[Source: K12HSN.org – [www.k12hsn.org/img/map/33\\_44\\_k12hsn\\_101907.jpg](http://www.k12hsn.org/img/map/33_44_k12hsn_101907.jpg)]

As of December 2008, there were 71 Node Sites, connecting the following agencies to the K12HSN [Source: dataLINK, K12hsn.org]:

- 100% of County Offices of Education: 58 of 58 COEs connected
- 86% of Districts: 855 of 994 Districts connected
- 80% of Schools: 7781 of 9782 Schools connected

### **Evidence – K12HSN Data on Connection Speeds**

Following is a summary of the size of the bandwidth connecting various types of sites. The average speed of countywide site connections is between 10Mbps and 45Mbps.

**Figure 1b. Summary of Bandwidth Size by Agency Type**

<b>Bandwidth Size</b>	<b>COEs</b>	<b>Districts</b>	<b>Schools</b>
Smaller than a T-1	--	5%	3%
T-1	3%	33%	41%
Between a T-1 and 10Mbps	--	13%	12%
10 Mbps	--	9%	9%
Between 10Mbps and 45Mbps	--	11%	4%
45 Mbps	36%	5%	2%
Between 45Mbps and 100Mbps	--	4%	2%
100 Mbps	2%	11%	13%
Between 100 Mbps and 155 Mbps	2%	0.3%	0.6%
155 Mbps	3%	0.3%	0.3%
Between 155 Mbps and 1Gbps	--	1%	1%
1 Gbps	52%	7%	11%
Greater than 1Gbps	2%	0.4%	1%

**Evaluation Question 2**

To what K-12 entities, agencies and institutions do the respective Node Sites provide services?  
 What support do Node Sites provide?  
 (Goal 1, Obj. 2)

**Finding 2: Node Site Connections and Support Services**

The 71 Node Sites, which are mostly COEs, individually serve between 1 (at least 7, single-district counties) and 63 districts and between 1 (for single-school districts) and approximately 700 schools.

Node Site Services: Approximately three-fourths of the Node Sites indicated they provided the following services, and between a third and three-fourths of the districts indicated they received these services from their Node Sites:

- Basic connection
- Technical support
- Primary/Secondary DNS
- Network monitoring
- Email services
- Fiscal services
- Firewall
- Spam filtering

**Evidence – Connectivity Database**

See Appendix B for a complete report Node Sites and number of connected schools and districts.

**Evidence – Node Site and District Survey on Services from Node Sites**

**Figure 2a. Comparison of Services Node Sites Provide Connected Districts and Services Districts Indicate They Receive from Their Node Sites**

Survey Item: What services do you provide connected districts (or receive from your Node Site)?	% of <b>Node Sites</b> indicating they provide service  n = 68	% of <b>Districts</b> indicating they receive this service  n=266
<b>Services Provided by Node Sites to Districts</b>		
Basic connection	100%	72%
Technical support	87%	57%
Primary/Secondary DNS	87%	40%
Network monitoring	82%	41%
Email services	75%	34%
Fiscal services	72%	43%
Firewall	72%	45%
Spam filtering	71%	39%
System access to spare equipment, space, staff in a crisis	53%	15%
Virus protection	49%	20%
Erate/CTF support	49%	27%
Intrusion detection	37%	12%
Storage/Disaster recovery	35%	10%
Acceptable usage monitoring	29%	14%
Traffic shaping	21%	11%
Caching	13%	11%
Not aware of any services provided by our Node Site	--	12%
Our contract with the Node Site does not include support services of any kind	--	2%

### Evaluation Question 3

How satisfied are Node Sites with K12HSN's efforts to meet their bandwidth needs?  
(Goal 1, Obj. 1)

#### **Finding 3: Node Site Satisfaction with K12HSN Meeting Bandwidth Needs**

Node Sites are positive about the K12HSN's technical support and with their efforts to meet their capacity needs. All or almost all of the Node Site survey respondents "Agree or Strongly Agree" that K12HSN:

- Is proactive in meeting their bandwidth needs (97%)
- Is responsive to their needs in a timely manner (99%)

Node Site respondents were "Satisfied" or "Very Satisfied" with the K12HSN support related to:

- Network set-up and maintenance (99%)
- The circuit size to meet the bandwidth needs of the district (94%)
- Online access to your network performance data (90%)
- Technical support for providing videoconferencing services to districts (81%)

### **Evidence - Node Site Survey Items on Bandwidth and Technical Support Needs**

Node Site survey respondents (n=69) were positive about the K12HSN efforts to meet their bandwidth needs. Nearly all Node Site survey respondents (99%) are satisfied or very satisfied with K12HSN's network set-up and maintenance, specifically:

- The installation of communications equipment
- The operation of the equipment
- The reliability and uptime of their connection to CalREN
- The timeliness and support received to connect to the CalREN hub

**Figure 3a. Node Site Satisfaction with K12HSN's Efforts to Meet Node Site Needs**

Survey Item: Indicate the extent to which you agree with the following statements.	Agree or Strongly Agree n = 69	
	#	%
K12HSN responds to our Node Site's requests in a timely manner.	68	98%
K12HSN is proactive in meeting our Node Site's bandwidth needs.	67	97%
Survey Item: Indicate the extent to which you are satisfied with the following statements.	Satisfied or Very Satisfied n = 69	
	#	%
The size of your circuit to meet the bandwidth needs of your districts	65	94%
Online access to your network performance data	62	90%
The technical support you received for providing videoconferencing services to districts	56	81%

**Evaluation Question 4**

How much of their available bandwidth are Node Sites using?  
(Goal 1, Obj. 4)

**Finding 4: Bandwidth Use**

On a one-day snapshot of bandwidth usage by the node sites, peak bandwidth usage varied between 4.9 Mbps to 648 Mbps. Bandwidth usage at the node sites is determined by:

- Number and size of districts and schools each node site connects to the network
- Uses or applications of the network by connected districts and schools

Of a total of 267, 60% of district survey respondents indicated they had adequate bandwidth to meet their schools' needs. When district survey respondents were asked what processes their district had in place to project its future bandwidth needs, their most frequent answers were:

- Monitor bandwidth, usage, network traffic (79)
- None or No process in place (70)
- Project future needs based on new applications, trends, usage (33)

**Evidence – Node Sites Self-Report Data/Datalink**

Node Sites and districts are asked to self-report their connectivity data to K12HSN on an annual basis. Bandwidth utilization is captured by K12HSN using monitoring software and equipment and is reviewed in a proactive manner for program decisions and node site service levels. K12HSN uses the reports of utilization and information collected from node sites related to planned bandwidth growth by the node site or the districts it serves, to anticipate future bandwidth needs. Due to E-rate bidding requirements, these growth projections are made as far as 18 months in advance of the need.

On one day in December 2008, node site peak bandwidth usage varied between 4.9 Mbps to 648 Mbps. The number and size of districts and schools that each node site connects to the network, and the uses or applications that those "clients" employ determine the amount of bandwidth used at each node site.

See Appendix B for a complete listing of Node Sites, numbers of districts and schools they connect to the network and a snapshot of their bandwidth usage at one moment in time. The time and date for which data is reported was chosen because of the robust usage that was observed for the network in general at that point in time.

**Evidence – District Survey Items on Bandwidth to Meet School Needs**Districts with Adequate Bandwidth to Meet School's Needs

When asked "Do you have adequate bandwidth to meet the needs of your connected schools?" of the 267 district respondents, 160 or 60% indicated "Yes," 31% indicated "No," and 9% were unsure.

**Figure 4a. Ways in Which Districts Determine Adequate Bandwidth for Connected Schools**

Survey Item: How do you determine if you have adequate bandwidth to meet the needs of your connected schools?	
Respondent Group Answering	Responses
<b>Yes</b> We have adequate bandwidth	<ul style="list-style-type: none"> <li>• Monitor (43) <ul style="list-style-type: none"> <li>○ Bandwidth usage/demands (29)</li> <li>○ Utilization reports (21)</li> <li>○ Saturation of the network, speed (18)</li> <li>○ Network traffic (17)</li> <li>○ Using software, tools (17)</li> <li>○ Using reports/assistance from Node Sites/COE (16)</li> </ul> </li> <li>• User/Teacher feedback, teacher complaints (15)</li> </ul>
<b>No</b> We don't have adequate bandwidth	<ul style="list-style-type: none"> <li>• Monitor our bandwidth (24)</li> <li>• Monitor usage/Monitor with software (18)</li> <li>• Saturation of the network, slow connection speed (17)</li> </ul>
<b>Not sure</b> If we have adequate bandwidth	<ul style="list-style-type: none"> <li>• Monitor using reports/assistance from COE (4)</li> <li>• We monitor network traffic/usage (4)</li> </ul>

#### District Process for Projecting Future Bandwidth Needs

All district survey respondents (n=267) were asked what processes their districts had in place to project their future bandwidth needs. Seventy indicated they had no process in place. Seventy-nine indicated they monitor bandwidth, usage and network traffic. Thirty-three project future needs based on new applications, trends and usage. Others indicated these methods of projection:

- District evaluates/projects needs (19)
- District Technology Plan (17)
- Work with Node Sites/COE to determine needs (14)
- Upgrade in progress, just completed or about to begin (14)
- Technology Committee (12)
- Based on number of computers/technology needs (8)
- E-Rate (8)
- Fiber optic (7)
- Utilization reports (6)
- Working on a process (5)
- Annual review (4)
- Filter to block high bandwidth applications (4)



**Evaluation Question 5**

How satisfied are districts with Node Sites efforts to meet their bandwidth and technical support needs?

(Goal 1, Obj. 1)

**Finding 5: District Satisfaction with Node Site Bandwidth and Support**

Over three-fourths of district respondents were “Satisfied” or “Very Satisfied” with:

- Their level of bandwidth, the timeliness with which their Node Sites connected their districts to the K12HSN
- Technical support for videoconferencing (87% -- although only 52% of respondents answered this question – probably because not all districts have videoconferencing equipment and only 25% of school respondents indicated their schools had videoconferencing)
- The timeliness of support they receive from their Node Sites
- The manner of dissemination and relevancy of the information they receive from the Node Sites related to their connection

Slightly less than three-fourths of the respondents were satisfied with the frequency of the information they received from their Node Sites.

**Evidence - District Survey**

**Figure 5a. District Level of Satisfaction with Node Site Services, Technical Support, and Node Site Communications**

Survey Item: <i>Indicate the degree to which you are satisfied with the following items.</i>	<b>Satisfied or Very Satisfied n = 266</b>	
	<b>#</b>	<b>%</b>
The timeliness with which your Node Site connected your district to the K12HSN network.	235	88%
The timeliness of support you receive from your Node Site.	230	86%
The manner in which your Node Site disseminates information to you about your connection to the network.	211	79%
The level of bandwidth (i.e. the speed of your connection) at which your district is connected to the network.	204	77%
The relevancy of information disseminated by your Node Site contact.	201	76%
The frequency with which your Node Site disseminates information to you about the K12HSN network.	187	70%
Technical support for videoconferencing services.	119	45%

### **Evaluation Question 6**

What are the site-based circumstances that distinguish connected versus non-connected sites?  
What are the change agents that move a site from non-connected to connected?  
(Goal 1, Obj. 4)

### **Finding 6: Connected and Non-Connected Sites**

Node Site Contacts: Sixty-nine Node Site contacts responded to their survey. One-third (23) of respondents indicated they encountered problems in connecting districts to the Network. 18 respondents indicated the challenges were related to financial issues, connectivity issues, political and relationship issues. They indicated that political and financial issues were the most frequent challenges for them in connecting districts to the Network.

Three-fifths (41) of respondents indicated that the K12HSN played a role in helping their Node Sites get districts connected. They indicated that K12HSN staff assisted their Node Sites in connecting districts in the following ways: facilitation/support; providing a low cost connection alternative for districts; last mile (round 2) funding; technical support; and, provided high bandwidth/increased bandwidth to districts.

Contacts in Connected District: Two hundred sixty seven district contacts responded to their survey. 13% indicated they encountered challenges getting their district or school connected to the K12HSN. Of this group, between 20% and 33% (or approximately 4% of all connected districts) indicated they had challenges related to:

- Troubleshooting issues with existing conditions
- E-Rate application support
- Assistance dealing with telecommunications carriers
- Technical support

Contacts in Non-Connected Districts: As of December 2008, K12HSN staff conducted audio and videoconferences and face-to-face meetings with 45 of the 126 non-connected districts. Of these 45, K12HSN successfully facilitated 10 districts to connect to the Network and are in the process of facilitating another 19 to connect. Eleven others either reported they were connected to a commercial carrier at a lesser cost than connecting through their Node Site (8) and/or had no interest in connecting to the Network. The remaining reported having issues with connection costs, political barriers, geographic barriers and needing equipment upgrades.

Four areas were examined to determine the differences between connected and non-connected sites and to understand the change factors that help sites connect to the network:

- Review and summary of connectivity database [connected vs. non-connected sites]
- Barriers and challenges to become a connected site [Node and District surveys]
- Factors that facilitated connection for a site [Node and District surveys]
- Factors that prevent sites from connecting to the Network [District survey]

### **Evidence – Connectivity Database**

The process to connect to the K12HSN is different for each district and may depend on:

- Size of the district
- Lack of infrastructure due to financial or geographical barriers
- Commercial carrier contract that is less costly and/or is a multi-year contract
- Political issues beyond the district's control

Evaluators reviewed documents and databases that recorded K12HSN outreach efforts to non-connected districts for the period covering August 2007 and October 2008. During this period, there were approximately 126 non-connected districts. K12HSN contacted these districts by:

- Continuing conversations with another six large districts that began before August 2007.
- Sending a written description of the benefits of connecting to K12HSN to 37 large (enrollment >20,000) districts; conducting follow-up discussions through the next year.
- Sending a written description of the benefits of connecting to K12HSN to the other 83 districts in September 2007; conducting follow-up discussions through the next year.

As of December 2008, K12HSN staff conducted audio and videoconferences and face-to-face meetings with 45 of the 126 non-connected districts. Of these 45, K12HSN successfully facilitated 10 districts to connect to the Network and are in the process of facilitating another 19 to connect. Eleven others either reported they had no interest in connecting to the Network and/or were connected to a commercial carrier at a lesser cost than connecting through their Node Site. The remaining reported having issues with connection costs (12), political barriers (3), geographic barriers (3) and needing equipment upgrades (2).

## **Evidence – Node Site Challenges in Connecting Districts**

**Figure 6a. Node Site Respondents Encountering Challenges in Connecting Districts to the Network**

Node Site Survey Item: Have you encountered any challenges in getting Districts connected to the Network? <i>n = 69</i>		
<b>Response</b>	<b>#</b>	<b>%</b>
Yes	23	33%
No	46	67%

### Node Site Survey Data – Types of Challenges in Connecting Districts to the Network

Most Node Site Survey respondents (67%) reported that they did not encounter any challenges in connecting districts to the Network. Of those respondents indicating that they had encountered problems (n=23), 18 reported having these specific challenges in connecting districts to the network:

- Financial/Funding (13)
  - Competition with cable companies or Telco's
  - Districts cannot afford installation or construction fees
- Connectivity Issues (5)
  - Minimal services provided by the local Telco due to district's remote location
  - Availability of circuits, no fiber service or no high bandwidth copper solutions
  - Limited connectivity
- Districts want autonomy from their local COE (4)
- Political (4)

**Figure 6b. Node Site Perceptions of Types of Challenges They Encounter in Connecting Districts to the Network (n=23)**

Survey Item: What percentage of these challenges would you say are....	% Node Sites Responding to Percentage of Type			
Type of Challenge	0-24%	25-49%	50-74%	75-100%
Political	43%	9%	9%	30%
Financial	26%	13%	26%	13%
Geographical	26%	22%	9%	9%
Technical	43%	4%	9%	4%
Other	22%	--	--	9%

For those for whom this question was applicable,

- Respondents were split on the extent to which political challenges were a problem. For 30% of the respondents these political issues made up 75-100% of the challenges they faced, but for 43% of the respondents these issues made less than 25% of the challenges they faced.
- Respondents had varying experiences with financial issues. About 40% of the respondents indicated that financial issues made up less than 50% of the challenges they faced and another 40% reported that financial issues accounted for 50-100% of the connection challenges they faced.
- About half of the respondents (49%) reported that geographical issues accounted for up to 50% of the challenges they faced connecting districts to the Network.
- Technical issues did not seem to be a major challenge in connecting districts. Most respondents (43%) reported that technical issues made up less than 25% of the challenges they faced.
- Less than one-third had connectivity issues other than those that were political, financial, geographical, or technical.

#### Node Site Perceptions about K12HSN's Role in Helping to Connect Districts

Of the 68 Node Site respondents, 60% indicated that K12HSN played a role in helping their Node Site get districts connected. Of those respondents indicating "Yes", 36 described how K12HSN helped their Node Sites get districts connected to the network:

- Facilitation/support (23)
  - Information dissemination to Districts
  - Facilitating discussions between stakeholders (Node, District, Schools, Telco's)
  - "K12HSN was very helpful and diplomatic in getting some of the larger school districts connected. Historically these sites were very independent, but the K12HSN ... accommodated these districts by allowing direct connection to the K12HSN equipment instead of Node Sites owned gear. Very, very helpful and professional!"
- Providing a low cost connection alternative for Districts (11)
- Last mile (round 2) funding (7)
- Technical support (6)
- Provided high bandwidth/Increased bandwidth to Districts (5)

## Evidence – District Survey – District Challenges in Connecting Schools to Network

**Figure 6c. District Respondents Encountering Challenges in Connecting to the Network**

<i>District Survey Item: Did your district encounter any challenges in getting connected to the Network?</i> <i>n = 267</i>		
<b>Response</b>	<b>#</b>	<b>%</b>
Yes	35	13%
No	232	87%

### District Survey Data – Challenges in Getting Connected to the K12HSN

Less than one-fifth of the District Survey respondents (13%) reported having any challenges in getting connected to the K12HSN. Among those respondents, over three-fourths or approximately 10% of all connected districts indicated that it took up to one year to get connected. Other connectivity challenges included those listed below. These respondents briefly described the challenges their district faced in getting connected to the K12HSN.

- District is in a remote location (7)
- Multiple levels of bureaucracy (7)
- Adequate bandwidth (5)
- Connection cost (4)
- Funding issues (4)

### District Survey Data – Challenges in Getting Their Schools Connected to the K12HSN

When asked what challenges/barriers they had in connecting school sites to the network, district respondents provided the following answers: (some provided multiple responses)

- 29% of district survey respondents indicated not having any challenges in connecting schools to the network.
- Most respondents (n=187, 70%) reported having some barriers in connecting school sites to the network. Those respondents identified the following barriers:
  - 33% - Troubleshooting issues with existing conditions
  - 32% - E-Rate application support
  - 21% - Assistance dealing with telecommunications carriers
  - 20% - Technical support
  - 10% - Advice on site connection readiness issues
  - 9% - Funding, cost of equipment, budget challenges
  - 4% - Reliability of Telcos
  - 3.7% - Bandwidth, increasing capacity
  - 3.7% - Aging facilities and equipment
  - 3.2% - Technical issues due to the remote/geographical location of school site
  - 2.1% - E-Rate process is complicated

#### District Survey - Satisfaction with School Connection & How Districts Facilitated Connection

Of the 267 district respondents, 85% (228) indicated they were “Satisfied” or “Very Satisfied” with the number of schools connected in their district.

Respondents were asked what processes their district has in place to facilitate getting schools connected to the network. Their responses are summarized below with the number of responses noted in the parentheses.

- No process (165) -- All our schools are connected (111); One-school districts (41)
- We contact our COE (55)
- Our district/district IT department works to connect our schools to the network (45)
- E-Rate (14)
- Outside entities (Telcos, outside consultants & vendors) help our schools connect (7)

#### District Survey - Perceptions of Node Sites Assistance with Connecting Schools to the Network

District contacts were asked what role their Node Sites played in helping them get schools connected. Their responses are below.

- Satisfied with the support provided by the Node Sites (132)
  - Provided technical support, information and advice (34)
  - Excellent, outstanding, great (12)
  - Major/critical/primary role in connecting schools (12)
  - Increased bandwidth (4)
- We [districts] are responsible for connecting schools to the network (24)
- Maintain existing connections, all connections made through node/COE (14)
- Node is the ISP/pathway to network (14)
- Don't know, not sure of the Node Sites' role (13)
- All of our schools are connected (12)
- Liaison with Telco providers (10)

At least 40 of the 267 district survey respondents identified themselves as one-school districts that have no additional schools to connect and therefore would not need the help of K12HSN. Fifteen (6%) of the 267 respondents indicated that their Node Sites provided limited to no support in getting schools connected.

When asked what support they need from the Node Sites to increase the number of connected schools in their district, respondents indicated the following:

- Upgrade connections/increase bandwidth (20)
- Technical support, resolve network issues (17)
- Cost/Funding (7)

**Evaluation Question 7**

How satisfied are participants with the E-Rate application training?  
(Goal 1, Obj. 3)

**Finding 7: E-Rate Application Training**

Over 400 individuals participated in the 2007-08 CDE-K12HSN E-Rate Training for county offices of education and school districts via face-to-face, videoconference or live webcast. 25% responded to a participant survey.

- Over 90% of respondents were satisfied or very satisfied with nine aspects of the training.
- Over 60% of respondents are aware of the online E-Rate training materials.
- 44% (46 of 104 total respondents) report actually using/accessing the online E-Rate training materials, and of those respondents, 84% reported that the materials were helpful or very helpful.

**Evidence – E-Rate Training Feedback Survey**

In conjunction with CDE, K12HSN offers E-Rate training to Node Sites (COEs) and Districts to support them with the E-Rate program, via face-to-face, videoconference or live webcast. Four distinct E-Rate trainings were offered to districts between September 2007 and January 2008:

- Beginner E-Rate Training – 273 participants
- Intermediate/Advanced E-Rate Training – 323 participants
- Round Table – Calnet 2 – 123 participants
- Round Table – Form 471 – 107 participants

An online feedback survey, for training offered in 2007-2008, was administered by K12HSN to 409 unique participants (unduplicated count). Of those unique participants, 104 responded (25% response rate) to items about their participation in one or more of the trainings offered.

Thirty-eight percent of respondents attended more than one of the trainings offered, selecting to attend the Beginner (59%) or Intermediate/Advanced offerings (65%) over the Round Table Calnet (20%) and the Round Table Form 471 (7%) training. Respondents participated in these trainings either in person (47%), via videoconference (41%) or via streaming web (12%). A majority of respondents (84%) found the trainings helpful or very helpful.

Over 90% of respondents indicated being satisfied or very satisfied that:

- The content of the training was relevant to their needs (95%)
- The training was adequately paced (95%)
- The presenter was responsive to the needs of participants (95%)
- The format and presentation strategies facilitated their learning (93%)
- The training was well organized (93%)
- The objectives of the training were clear (92%)
- The objectives of the training were met (92%)
- The training met their expectations (91%)
- The training helped them learn new and important skills and knowledge (91%)

Over 60% of respondents are aware of the online E-Rate training materials while only 44% report actually using/accessing them. Of those respondents indicating they use the online materials (46 of 104), 84% reported the materials were “Helpful” (64%) or “Very Helpful” (20%).

**Evaluation Question 8**

What are CDEs technical support needs related to E-Rate and how satisfied are they that these needs are being met?

(Goal 1, Obj. 3)

**Finding 8: CDE Satisfaction with K12HSN Support and Collaboration**

CDE staff indicated they collaborate with K12HSN staff to promote awareness of E-Rate program at a state and local level, provide schools with the most current information available related to E-Rate, and to provide technical support to the CDE on national issues. CDE staff are “more than satisfied” with the support and collaboration.

**Evidence – CDE Staff Questionnaire**

A CDE contract monitor who works closely with K12HSN on these issues provided information on their needs and satisfaction with services from the K12HSN. The contract monitor indicated that the CDE technical support needs generally center around three areas:

1. CDE relies on K12HSN staff to collaborate with them to provide schools with the most current information available related to E-Rate. This is mostly accomplished through the efforts of a staff member from Butte County who is partially funded through the K12HSN. Additionally, an Educations Programs Consultant in the Education Technology Office at the CDE also supports this work.
2. CDE works with the K12HSN staff member to promote awareness of the E-Rate program at a local and state level. This effort supports the collaboration of the CDE with other stakeholders, such as the California Public Utilities Commission and the Schools and Libraries Division of USAC.
3. CDE relies on K12HSN staff for the technical support on related national issues.

In terms of satisfaction, the CDE contract monitor indicated that the CDE is “more than satisfied with the E-Rate technical support we receive from the staff” at K12HSN. CDE staff believes that additional funding for K12HSN staff for an increasing workload as more entities become aware of the support services would be helpful – perhaps through restructuring current resources or through other funding streams, such as the California Teleconnect Fund. The CDE contract monitor indicated that the technical support provided by the K12HSN staff member on national issues is invaluable as our state and nation navigate this time of economic hardship.



**Evaluation Question 9**

By what percentage does California's share of overall E-Rate funding increase annually compared to national E-Rate totals/funds?

(Goal 1, Obj. 3)

**Finding 9: California E-Rate Funding**

Although funding data is not yet finalized for these years, from 2005 – 2007, the E-Rate funding for California compared to the total funding for all states, has increased by 4%, or approximately 1.3% per year. More accurate data for 2008 will be available by June 2009.

**Evidence – CDE/K12HSN Staff Interview & Questionnaire**

The chart below illustrates all of the funding that California has received since 1998, the national total for all states for each of those years, and California's percentage of the national total. For years 2003 through 2008, there are still additional funds to be distributed for each of those funding years, with many applications still pending for Funding Year 2008, so those totals are not final.

**Figure 9a. Percent of California E-Rate Funding Compared to National Total**

<b>Funding Year</b>	<b>State Total</b>	<b>National Total</b>	<b>% Nat. Total</b>
2008	\$202,985,896.45	\$1,640,819,867.82	12.4%
2007	\$442,307,023.41	\$2,478,118,537.80	17.8%
2006	\$267,485,394.30	\$1,962,790,002.58	13.6%
2005	\$283,830,785.26	\$2,052,567,723.47	13.8%
2004	\$261,679,284.77	\$2,226,786,382.23	11.8%
2003	\$361,816,244.25	\$2,713,820,580.48	13.3%
2002	\$231,194,742.44	\$2,256,706,108.10	10.2%
2001	\$328,016,083.68	\$2,182,782,435.10	15.0%
2000	\$432,897,710.84	\$2,072,580,728.17	20.9%
1999	\$270,974,579.41	\$2,140,505,209.25	12.7%
1998	\$207,970,461.98	\$1,695,731,180.36	12.3%

The percentage of the total amount of federal funds is a good indicator of how well California is doing, and can be used as a measure. However, there are four major factors that affect the amount of E-Rate funding that is allocated to California, including:

- It is still early in the 2008 funding cycle to know what California's funding percentage will eventually be – a closer approximation will be available by about June 2009.

- A large factor in who receives internal connection funds is poverty rates -- if other states have higher unemployment rates than California, then their percentage of the E-Rate funds will be higher for internal connections, and reduce California's overall percentage.
- E-Rate is based on each school district's poverty level, and then a federal discount applied to that poverty level.
- In addition to it being poverty based, the actual funding amount is based upon actual costs for E-Rate eligible only items. Classroom software and computers are not eligible. E-Rate funds infrastructure networks and systems, including data-voice lines, school site cabling, not end-user equipment. Most infrastructures have a life span of 5-7 years -- longer for cabling, 15-25 years. Once it is in place, only on-going maintenance is required. Therefore, you will not see a huge increase of districts requesting E-Rate internal connections funding if they implement the correct network and systems up front.

A CDE contract monitor (interviewed for this report) indicates that from past years' percentages, it could be estimated that California could maintain 15-20 percent of the national average if the state has the necessary support system in place, which is likely to include two or three staff members to ensure applicants are trained, and receive proper notices of deadlines, invoicing work, and any necessary follow-up.

### Evaluation Question 10

Across available bandwidth levels of connectivity, what Network resources are sites using, when and for what purpose?

(Goal 1, Obj. 4)

#### Finding 10: Uses of Network Resources

District and Site Perspectives on Awareness and Use of K12video.org. K12video.org is a web-based scheduling system designed specifically for the needs of the California K-12 High Speed Network's (K12HSN) conferencing project. 44% of district respondents report their schools are aware of K12video.org services and resources while only 18% of districts report their schools using these services and resources. 27% of schools report their teachers are aware of K12video.org services, while only 5% report teachers at their school are using the service.

District and Site Perspectives on Awareness and Use of Calaxy. On March 8, 2008, K12HSN launched a comprehensive set of web-based tools developed to support teaching and learning in California K-12 classrooms. Powered and maintained by K12HSN, Calaxy is a suite of free Web 2.0 tools that includes: blogs; wikis; and a file sharing system where educators can upload videos, podcasts, images and documents. Calaxy also supports videoconferencing scheduling through k12video.org. Calaxy Assets, an online inventory management system, is another application integrated into Calaxy that can be used as a stand-alone solution or tied to MyTechDesk, a free work-order management system. In January 2009, Moodle, an online course management system was made available to all California K-12 teachers through Calaxy. Additional applications such as instant messaging and social networking are currently being developed and should soon be integrated into Calaxy. Since its launch in March 2008:

- Over 1,500 K-12 classroom teachers, technology specialists and administrators have created 1,509 Calaxy accounts.
- The Calaxy home page has been viewed over 11,000 times.

#### *District Perspective –*

- 23% of 265 district respondents report their schools are aware of Calaxy resources.
- 8% of district respondents report their schools using these resources.

#### *Site Perspectives –*

- 17% of 1162 schools report their teachers are aware of Calaxy services.
- 6% report teachers at their school are using the services.

Site Perspectives on Use of K12HSN Supported Resources. School site respondents indicate these uses of the network at their sites:

- 46% of sites – Videostreaming (*Discovery Education, California Streaming*)
- 6% of sites – PORTS (*Parks Online Resources for Teachers & Students*)

Computer Connections. Almost all school site respondents indicate there are computers connected to the network for administrative, management and office functions. About  $\frac{3}{4}$  of school site respondents indicated they and the teachers at their sites are satisfied with the speed of their connections at their sites.

## Evidence – District on Awareness and Use of the Network

**Figure 10a. District Respondents’ Perceptions of Connected Schools’ Awareness and Use of K12HSN Services and Resources**

<i>District Survey Item: Are/Do K12HSN connected schools in your district.</i>	n	<b>District Reporting School Awareness</b>	<b>District Reporting School Use</b>
<i>K12video.org</i>	267	44%	18%
<i>Galaxy</i>	265	23%	8%
Directory of Network Applications (DNA)	265	11%	5%

### District Respondents on How Their Connected Schools Use K12HSN Broadband

In an open-ended response item, district respondents indicated the following ways in which their connected schools are using their K12HSN broadband connection:

- Internet access (68)
- Video/media streaming (61)
- Teacher and student research, internet research (45)
- Web 2.0 tools, web-based resources for teachers & students (39)
- Videoconferencing (28)
- Email (27)
- Business/administrative services (21)
- Lesson planning (16)
- Distance learning, online classes (7)

## Evidence – School Survey Items on Network Services and Resources

**Figure 10b. School Site Respondents’ Perceptions of Teachers’ Awareness and Use of K12HSN Services and Resources**

<i>School Site Survey Item: Are/Do Teachers at your school site...aware/use</i>	<b>School Site Reporting Teacher Awareness</b>		<b>School Site Reporting Teacher Use</b>	
	n	%	n	%
<i>K12video.org</i>	1188	23%	1148	5%
<i>Galaxy</i>	1162	17%	1119	6%
Video streaming (Discovery Education, California Streaming)	1186	67%	1184	46%
PORTS (Parks Online Resources for Teachers & Students)	1178	12%	1131	6%

### Level of Satisfaction with School Site Internet Connection

Of 1,171 school site respondents, 76% indicated they were “Satisfied” or “Very Satisfied” with the speed of their school’s Internet connection. 73% indicated they thought that the teachers at their schools were also “Satisfied” or “Very Satisfied” with it. Some of these respondents indicated their reasons for their responses.

- Of those who were “Very Satisfied” (n=262, 22%), 85 said they had no problems; connection speeds were excellent. Thirty indicated they had issues with speed.
- Of those who were “Satisfied” (n=635, 54%), 244 said their connection speed was good and they had no problems, while 320 indicated they had issues with speed and reliability. Others who said their connections were slow had outdated equipment.
- Of those who were “Dissatisfied” (n=194, 17%), 171 indicated their connection speed was too slow or unreliable, or there were too many users at one time.
- Of those who indicated they were “Very Dissatisfied” (n=80, 7%), 52 indicated their connection was slow or unreliable, too limited bandwidth, or there were too many users at one time.

#### Teacher Work-Arounds for Slow Connectivity

When asked this survey question, “*How do teachers at your school site work around a slow Internet connection?*” school site contacts (n=877) indicated these work-arounds:

- Wait and try again later (341)
- Have alternative plans or download at home, in the lab, or before school (163)
- Work at home (115)
- Ask for help (109)
- By being patient (105)
- They don’t use the internet (100)

**Evaluation Question 11**

What are end-users' perceived benefits of using the Network and its resources?  
(Goal 1, Obj. 4)

**Finding 11: Uses of the Network**

Node Site Responses: Approximately 1/4 of the 69 Node Sites respondents indicated that basic internet access was a way in which their districts or schools were using their broadband connection, and approximately 1/5 indicated videoconferencing use.

School Site Responses: A total of 638 respondents described the ways in which one or more teachers at their schools site use the high-speed Internet connection, which included:

- Video streaming (124)
- Research using the Internet (72)
- Educational websites, e.g. NASA, Brainpop, National Geographic, Discovery Channel (70)

Other uses include: e-mail for teacher and student use (30); videoconferencing (13); Web-based educational programs/software, e.g. Renzulli Learning, Compass Learning (11); Pod-casting (9); online student assessment platforms, e.g. Edusoft, OARS (6); Webquests (5); virtual field-trips (5); YouTube/TeacherTube (4); Blogs (3); and Wikis (3).

**Evidence – Node Survey**

Twenty-three (of 69) Node Site respondents described ways in which their districts or schools are using their broadband connection:

- Basic Internet access (16)
- Videoconferencing (14)
- Web-based content or assessment applications (7)
- Distance learning (7)
- Video streaming (6)
- Teaching (3)
- Professional development (3)
- Email (3)
- Off-site backup services (1)
- Virtual field-trips (1)
- Off-site hosted thin-client services (1)

**Evidence – School Survey**

A total of 638 respondents described the ways in which one or more teachers at their schools site use the high-speed Internet connection. Of the 638 respondents, 355 (56%) identified the following specific ways they believe teachers at their schools use their connection.

- Video streaming (124)
- Research using the Internet (72)
- Educational websites - NASA, Brainpop, National Geographic, Discovery Channel (70)
- Email for teacher and student use (30)
- Videoconferencing (13)
- Web-based educational programs/software - Renzulli Learning, Compass Learning (11)
- Pod-casting (9)
- Online student assessment platforms, e.g. Edusoft, OARS (6)
- Webquests (5)
- Virtual field-trips (5)
- YouTube/TeacherTube (4)
- Blogs (3)
- Wikis (3)

## Goal 2: Coordination of Uses of the Network

Provide statewide coordination of network uses, videoconferencing and related distance learning capabilities to benefit teaching and learning

The K12HSN disseminates information about the network and its resources, primarily to the Node Sites—the strategic access points throughout the state that permit districts and schools to connect to CalREN. Typically, schools connect via their district office connection; therefore K12HSN efforts have focused on helping Node Sites to increase District connections

### Evaluation Question 12

What are trainers', teachers', and administrators' perceived opportunities created by access to videoconferencing?

(Goal 2, Obj. 2)

### Finding 12: Uses of Videoconferencing

Of approximately 1,000 school site respondents, about 1/5 indicated that their school sites have videoconferencing equipment, and about 1/10 reported that their administrators and/or technology leaders use videoconferencing.

Among 245 respondents indicating they have videoconferencing equipment, videoconferencing is used at school sites by,

- 45% of administrators and/or technology leaders. (n=111)
- 29% of teachers. (n=70)
- 16% of students. (n=40)

The approximate 1,000 respondents responding to these survey items, indicated:

- About the administrators and/or technology leaders at their school
  - 5% - received professional development on how to conduct and set-up a videoconference
  - 5% - use videoconferencing for a variety of purposes.
  - 8% - use videoconferencing approximately once per week.
- About the teachers at their schools –
  - 6% - use videoconferencing
  - 3% - received professional development on how to conduct and set-up a videoconference, and that they use it for a variety of purposes, a few times per year.

### Evidence – School Survey items about Videoconferencing Use by Administrators/Technology Leaders, Teachers and Students

#### Videoconferencing Equipment at Schools Sites

Of 1,177 school site respondents, 21% indicated that they have equipment at their school site to conduct videoconferencing.

**Figure 12a. Use of Videoconferencing by Various Role Groups at the School Site**

<i>Survey Item: Do your school Administrators and/or Technology Leaders, Teachers and Students use videoconferencing?</i>			
	<b>Administrators and/or Technology Leaders</b>	<b>Teachers</b>	<b>Students</b>
Base (n)	1192	1183	1192
<b>Yes</b>	111 9%	70 6%	40 3%
<b>No</b>	1081 91%	1113 94%	1152 97%

As a follow up to the survey question above:

- Of the 111 indicating that the administrators and/or teacher leaders at their school site use videoconferencing, 41% (or approximately 5% overall) indicated that the administrators and/or technology leaders had professional development to conduct and set-up a videoconference. They indicate that about half of these administrators use it for meetings and professional development, and about one-fourth use it for instruction. They indicate that about half of these teacher leaders also use it for meetings and professional development, and over one-third use it for instruction. 70% of these respondents (or approximately 5% overall) indicated that administrators and/or technology leaders use it at least weekly
- Of the 70 respondents indicating that teachers at their school site use videoconferencing, 46% (or less than 3% overall) indicated that the teachers leaders had professional development to conduct and set-up a videoconference. They indicate that about two-thirds of these teachers use it for instruction and classroom field trips, and over one-third use it for meetings and professional development. 70% of the 70 respondents (or approximately 5% overall) indicated that teachers use it a few times during the school year. Of the 70 respondents, 86% (or approximately 6% overall) indicated that 5 or fewer teachers at their sites participated in a videoconference in the last 12 months.
- Of the 40 respondents indicating that students at their school site use videoconferencing, 88% (or less than 3% overall) indicated that the students received guidance on how to participate in a videoconference. These respondents indicate that approximately two-thirds of these students use it for distance learning, and over one-half use it for field trips. Only 2 respondents indicated students use it for credit recovery. 63% of the 40 respondents (or approximately 2% overall) indicated that students use it a few time during the school year. Of the 40 respondents, 83% (or approximately 3% overall) indicated that fewer than 200 students participated in videoconference during the last 12 months.



### **Evaluation Question 13**

What are the qualitative differences between non-users, one-time users and repeat-users of videoconferencing?

(Goal 2, Obj. 2)

### **Finding 13: Videoconferencing Users**

Data indicates that the following factors seem to be descriptive of repeat-users of videoconferencing:

- Participating in established programs using videoconferencing
- Aware of resources such as *PORTS*
- Comfortable with the technology or had received professional development

Respondents indicated that repeat-users seem to use videoconferencing for the following functions:

- Student engagement and learning
- Communication – student to students
- Teacher learning and meetings

Limited bandwidth might deter some use, as might the proximity of the location of the videoconferencing equipment.

### **Evidence – School Survey items about Teacher Use of Videoconferencing**

Over 1,000 School Survey respondents were asked to share what they knew about teachers at their school site who have used videoconferencing multiple times. [Full Response Set]

#### Student Engagement and Learning

- *Astronomy/Observatory Project*
- *Use the PORTS program only so far. Would like more info on your videoconferencing programs.*
- *I developed a project for PORTS*
- *They have used it through the PORTS program to add to the curriculum.*
- *Used videoconferencing to talk to NASA engineers.*
- *Virtual field trips, discussions with authors, sharing work with classes in different states, conferences.*
- *We have math, music and science teachers who Skype using their laptops interacting with other classrooms. Kids love it but we can never be sure of connection speed.*
- *The Math teacher and the Science teacher for middle school are involved in on going videoconferencing regarding projects.*
- *The second grade team uses it all the time to talk to each other before and after school.*
- *Social science teachers have used an off-campus site to participate in an online field trip.*
- *NASA lead teachers of set up conferences for students to talk to scientists at JPL and Dryden.*
- *First of all, it should be noted that our videoconferencing equipment is only a month old. The two teachers that have used it have gone on video field trips.*
- *Very enthusiastic about field trips when it works. Last one had to be cancelled and rescheduled due to lack of enough speed. Once it worked (with PORTS) it was very good.*
- *Students have used videoconferencing to work on project with students from other sites.*
- *They enjoyed it very much.*
- *They like it, use it for instruction, provide active opportunities for other students and staff.*

### Communication: Students to Students

- *Participated with two other District Schools in an ongoing series with Vanderbilt Univ.*
- *Students talk to each other with computers in classrooms and between classrooms.*
- *Teachers and their students have conducted videoconferences with other students in places such as Indy, Lebanon, Texas and Boston. The set up team teaching and have students interact.*
- *Our connections are good within the US. We put up questions in advance. We tried to contact Ghana with their dial up with results supplemented by phone.*
- *One teacher uses webcams to communicate with students at other schools.*
- *To talk to other class in different states.*

### Teacher Learning/Meetings

- *Coordinate with our tech dept. and with communications dept for assistance.*
- *Generally at county or district trainings.*
- *One teacher has used it to link with professional to share advice about preparing for the future.*
- *The technology was fine, the content specialist have turned my teachers off to using videoconferencing in the classroom.*
- *We have a network of schools similar to our charter and we use videoconferencing to collaborate with other administrators and teachers at the other sites.*
- *Used to demonstrate new math software.*

### Slow Connection

- *We used videoconferencing for an interview earlier this summer. Although our connection was so slow that we didn't get to finish.*
- *Typically struggle with the connection, QoS has been allocated for that particular connection. However, it doesn't seem to help.*
- *I am the only one who has used it multiple times. Our bandwidth is not large enough to hold successful conferences.*

### Other responses

- *We are just beginning to use this technology and are finding our way thru teachers at other sites who do know where to look and what to do - we are learning as fast as we can.*
- *We just received the equipment a week ago and are making plans to use it frequently.*

### **Evidence – School Survey items about Student Use of Videoconferencing**

Share what you know about students at your school site who have used videoconferencing multiple times.  
(n=22)

- *Content or author/book discussions (6)*
- *Like the technology, found it interesting (5)*
- *Talk to other students (4)*
- *Other (7)*
  - *They had lots of questions and wanted to use it again.*
  - *Students in the Student Council.*
  - *Plays that have life lessons.*
  - *None have used it multiple times.*
  - *Learn about different schools, ideas, and writing strategies.*
  - *It's for the Deaf and Hard of Hearing.*
  - *It is remote teaching from another school, typically lags, and is frustrating for them.*

**Evaluation Question 14**

By what percentage does the number of conducted videoconferences increase annually?  
(Goal 2, Obj. 2)

**Finding 14: K12HSN Videoconferencing Services and Usage**

K12HSN provides these videoconferencing services to California schools at no cost: scheduling using the *K12video.org* system, multipoint bridging, conference recording, and conference streaming. Only videoconferences using the multi-point bridging equipment are scheduled through the *K12video.org* system, with records of the scheduling and use captured by that system. In comparable ten-month periods in 2007 and 2008 respectively, 1,323 and 1,373 multi-point videoconferences were held and scheduled through *K12video.org*, an increase in 2008 of 4% above 2007. Approximately 85% of conferences scheduled on *K12video.org* were actually held each year with 49% used for administrative purposes, 28% for professional development and 23% for classroom instruction. In addition, point-to-point videoconferences were scheduled and held between participants at two sites in each of those years, but data related to those point-to-point videoconferences is not captured through the *K12video.org* system.

**Evidence – Available Videoconferencing Services**

The K12HSN currently provides a variety of videoconferencing services for schools in California. Videoconferencing is a tool that connects two or more locations with interactive voice and video and can be used in a variety of ways, such as: administrative uses; professional development; virtual field trips; and, collaboration and instruction. K12HSN provides the following videoconferencing services to California schools at no cost:

- Scheduling - K12HSN has developed the *K12video.org* scheduling system which allows for the scheduling of point-to-point and multipoint calls.
- Multipoint Bridging - Service that allows 3 or more locations to be in a conference.
- Recording - Conferences can be digitally recorded in real-time for later use with others.
- Streaming - Conferences can be streamed live to participants viewing on their computers.

**Evidence – *K12video.org* Usage Data**

The following Table is the record of videoconferences scheduled through the *K12video.org* system. Others could have been scheduled and held without scheduling through this system, and therefore without any record.

**Figure 14a. Number of Videoconferences Scheduled and Completed via K12video.org: March 2007 – December 2008**

<b>Month</b>	<b>Conferences 2007</b>		<b>Conferences 2008</b>	
	<b>Scheduled</b>	<b>Occurred</b>	<b>Scheduled</b>	<b>Occurred</b>
March	170	153	164	127
April	142	130	144	134
May	162	155	147	136
June	105	108	109	102
July	49	29	65	45
August	129	74	164	99
September	188	153	224	186
October	263	199	240	220
November	206	198	188	166
December	121	124	174	157
Totals	1,535	1,323	1,619	1,372

**Figure 14b. Number of Videoconferences by Purpose Completed via K12video.org: March 2007 – December 2008**

<b>Purpose of Videoconference</b>	<b>March 2007-December 2007</b>		<b>March 2008-December 2008</b>	
	<b>#</b>	<b>%</b>	<b>#</b>	<b>%</b>
Administrative	634	48%	695	51%
Professional Development	390	29%	362	26%
Classroom Instruction	299	23%	315	23%
Totals	1323		1372	

**Evaluation Question 15**

What are trainers', teachers', and administrators' perceived opportunities created by access to broadband-supported tools?

(Goal 2, Obj. 3)

**Finding 15: Broadband Supported Tools**

The largest numbers of school survey respondents indicated these as their perceived opportunities created by access to broadband-supported tools:

- Video and media streaming
- Web-based applications, online resources for teaching and learning
- Videoconferencing
- Google applications: gmail, google earth

**Evidence – School Survey**

School survey respondents (n=1,192) identified the following online resources and services that their teachers would like to access but were unable to due to the Internet speed at their school site:

- Video and media streaming (94)
  - Discovery/United streaming (25), PBS (5), NASA (3)
  - Youtube (13)
- Web-based applications, online resources for teaching and learning (43)
  - Adopted Textbook Online Materials (8)
  - Brain Pop (5)
  - Renaissance Place, Starfall, Lexia, storylineonline.net, Myaccess (4)
  - Renzulli Learning (3)
  - State Assessment Prep Program: Study Island (2)
  - Online CAHSEE materials (2)
- Videoconferencing (12)
- Google applications: gmail, google earth, (10)
- Gaggie (2)
- District website (2)
- Microsoft.com update downloads/ Computer Upgrades (2)
- Calaxy , k12video.org, PORTS (1)
- CLRN (1)

Thirty-one of the respondents indicated that speed was not an issue - district blocks filter sites and resources teachers want to use.

**Evaluation Question 16**

What is the baseline data from the time *Calaxy* (formerly *edZone*) was launched in March through December 2008 for: new users; *Calaxy* traffic; and, creation of blogs and blog posts.  
(Goal 2, Obj. 3)

**Finding 16: Number of *Calaxy* (formerly *edZone*) Log-ins**

Since its launch in March 2008, over 1,500 K-12 classroom teachers, technology specialists and administrators have created 1,509 *Calaxy* accounts and its home page has been viewed over 23,000 times.

**Evidence – *Calaxy* Usage Data**

K12HSN developed a comprehensive set of web-based tools to support teaching and learning in California K-12 classrooms. Developed, powered and maintained by K12HSN, *Calaxy* (formerly *edZone*) is a suite of free Web 2.0 tools that includes blogs, wikis, and a file sharing system where educators can upload videos, podcasts, images and documents. *Calaxy* also supports videoconferencing scheduling through [k12video.org](http://k12video.org). *Calaxy Assets*, an online inventory management system, is another application integrated into *Calaxy* that can be used as a stand-alone solution or tied to *MyTechDesk*, a free work-order management system. In January 2009, Moodle, an online course management system was made available to all California K-12 teachers through *Calaxy*. Additional applications such as instant messaging and social networking are currently being developed and should soon be integrated into *Calaxy*.

The suite of tools is hosted on the K12HSN and provides a safe environment in which teacher and students can share ideas, upload student-learning objects, disseminate best practices and collaborate with others. To address concerns about appropriate content, K12HSN controls those who are given access to create content to verified members of the California K-12 educational system to be allowed to author or access content.

Since its launch in March 2008, over 1,500 K-12 classroom teachers, technology specialists and administrators have created *Calaxy* accounts and its home page has been viewed over 23,000 times.

Following is the available usage data for components that are currently operational.

**Figure 16a. *Calaxy* Summary of New Users by Month for the Period March 2008-December 2008**

[\**Calaxy* launched on 3/8/08]

Month	Number of New Accounts/Users
March 08	162
April 08	92
May 08	125
June08	221
July 08	176
August 08	188
September 08	154
October 08	136
November 08	146
December 08	109
<b>Totals for 2008</b>	<b>1,509</b>

**Figure 16b. *Galaxy* Website Traffic Summary for the  
Period March 2008-December 2008**

<b><i>Galaxy</i> (pages)</b>	<b>March 2008-December 2008</b>		
	<b>Page Views</b>	<b>Unique Page Views</b>	<b>Average Time on Page</b>
Main home page	24542	23820	:52
Login	6125	3302	:50
Blogs	7780	3163	:42
Videos	4924	2691	:39
K12video (scheduler)	3596	2448	1:08
Podcasts	3460	2005	:29

**Evaluation Question 17**

What are examples of value-added teaching and learning activities used by agencies that can only be accessed via broadband?

(Goal 2, Obj. 4)

**Finding 17: Broadband Use of the Network – 3 Examples**

Through their dissemination efforts and conferences and meetings throughout the state, K12HSN staff identified three projects: the Riverside Virtual School, the Elk Grove USD EETT Project, and the Shasta COE Distance Learning Courses. Each of these three projects makes use of their broadband connection in distinct ways, but all focus on the delivery of content via non-traditional methods to students that are not able to access course content in a traditional school setting.

**Evidence – Project Snapshots**

Each year K12HSN identifies sites that are implementing innovative programs that utilize tools and resources that can only be accessed via broadband. Through their dissemination efforts and conferences and meetings throughout the state, K12HSN staff identified three projects: the Riverside Virtual School, the Elk Grove USD EETT Project, and the Shasta COE Distance Learning Courses. Each of these three projects makes use of their broadband connection in distinct ways, but all focus on the delivery of content via non-traditional methods to students that are not able to access course content in a traditional school setting.

Between October and December 2008, Wexford conducted interviews and virtual visits/observations, administered questionnaires, and reviewed documents, for each of the three projects. The project snapshots, which are included in Part 2 of this report, include contextual information about the districts, describe the project and provide examples of resources that student and teachers are using that can only be accessed via broadband.



### **Evaluation Question 18**

What is the process of “information flow” at K-12 Node Sites? Is there anything in the process that is blocking stakeholders’ access to information?

(Goal 2, Obj. 1)

### **Finding 18: Information Flow at K-12 Node Sites**

#### The K12HSN

K12HSN provides support and disseminates information to Node Sites by:

- Quarterly meetings with regional Network Implementation Committee (NIC) members and Application Coordination Committee (ACC) to discuss issues critical to the effectiveness of the network.
- Scheduling regional meetings to relay information and answer questions about Node Sites and the network.

#### Node Sites:

100% of the 22 Node Site representatives responding to a regional meeting survey indicated they were “Satisfied” or “Very Satisfied” with the length, content and relevancy of the regional meetings.

While all 68 Node Site survey respondents were “Satisfied” or “Very Satisfied” with the services they provide for their connected districts, 28 of them offered suggestions for how K12HSN could assist them in providing better support to their districts. Their suggestions fell mostly into these areas: funding; tools; training; and network issues.

#### Districts:

Of the over 200 district respondents for whom these item was relevant, the following were “Satisfied” or “Very Satisfied”

- 89% - with the relevancy of information disseminated to them by their Node Site.
- 88% - with the manner in which their Node Site disseminates information to them about their connection to the network.
- 82% - with the frequency with which their Node Site disseminates information to them about the K12HSN Network.

Of the 267 respondents to the District survey, the following indicated they know who to contact to find out about:

- Over 90% - technical aspects of their district's connection to the network
- Approximately 2/3 - K12HSN online classroom resources and videoconferencing

Approximately one-third of the district respondents reported disseminating information about K12HSN resources to their schools through:

- District-wide meetings/training (38%)
- A designated school site contact (38%)
- Letters to school site administrative/technical staff (33%)

To gather evidence for this question, the following areas were examined to determine how information about the Network and its resources are disseminated by Node Sites to Districts and by Districts to School Sites:

- Summary of Node Sites satisfaction with K12HSN Regional Meetings
- Node Sites level of satisfaction with the support they provide districts
- District awareness of Network services
- Methods districts use to disseminate K12HSN information to schools

## **Evidence - Node Sites Survey Items on Regional Meetings**

In lieu of holding a one-time Node Sites representative meeting, during the spring of 2008, K12HSN held 11 regional meetings. A total of 73 technical and administrative Node Sites contacts participated in these sessions via videoconference. Topics of discussion included,

- Overview of Network upgrades
- Meeting/updating of new Node Sites personnel
- Overview of K12HSN tools/products: Galaxy , Network Diagnostic Service and Solar Winds
- Node Sites updates about changes in connections and build-outs or other planned improvements in local area infrastructure

Of 22 representatives participating and completing an evaluation survey, all indicated they were “Satisfied” or “Very Satisfied” with the length, content and relevancy of the regional meetings. It is important to note that although representatives from each of the 71 Node Sites participated in these meetings, on this survey only 22 respondents indicated attending. This small number of respondents may be attributed to Node Sites survey respondents,

- Misunderstanding the question. Respondents assumed that the term “regional meeting” meant a face-to-face meeting as opposed to the videoconference meetings that they attended.
- Not personally participating in the regional meetings. Since Node Sites have multiple representatives, the representative completing this survey may not have been the representative participating in the videoconference meeting.

100% of the 22 respondents indicated that they were satisfied or very satisfied with:

- Agenda items were relevant to your Node Sites needs
- Length of the meeting
- Content of the meeting met your Node Sites needs

### Node Site Level of Satisfaction with the Support They Provide Their Connected Districts

When asked “How satisfied are you with the support you provide your connected districts?” all 68 respondents indicated they are “Satisfied” or “Very Satisfied” with the support they provide their connected districts. Almost half were “Very Satisfied”.

*How K12HSN Can Help Them Improve Support to Their Connected Districts.* Of those respondents indicating “Satisfied” or “Very Satisfied” with the support they provide Connected Districts, 63 responded to ways in which K12HSN can help their Node Sites improve support to their connected districts:

- Nothing at this time or Satisfied with K12HSN support. (35)
- Funding (7)
- Tools (7)
- Training (5)
- Network (5)
- Increase HSN communication & dissemination of information with connected districts (2)
- Provide more content/continue to develop content (2)
- “Work on the quality of Video Conferencing. At times the quality is not what it needs to be to be consistently used in the classroom.”

## **Evidence - District Survey**

### District Contact Knowledge of Who to Contact for Network Assistance

When asked, “Do you know whom to contact in the following situations?” of 267 respondents:

- 93% knew who to contact if they had a question about technical aspects of their district's connection to the network
- 67% knew if they had questions about videoconferencing
- 64% knew if they had questions about K12HSN online classroom resources

### Methods District Use to Disseminate K12HSN Resource Information to Connected Schools

When asked, “Do you/your district do any of the following to inform your connected schools about K12HSN resources?” of 264 district respondents:

- 38% used district-wide meetings/training
- 38% used a designated school site contact
- 33% used letters to school site administrative/technology staff
- 25% used district website announcements
- 14% used district-wide newsletter for teachers

## **Evidence – K12HSN Staff Summary of Dissemination Efforts**

Between March 2007 and December 2008, K12HSN staff has disseminated information about the Network and its resources in the following ways:

- Presentations at state and local conferences: California Educational Technology Professionals Association Conference (CETPA) 2007 and 2008, Computer Users in Education (CUE) Conference 2008
- Information booths at national, state and local conferences: CETPA Conference 2007 and 2008, Innovative Learning Conference 2008, CUE Conference 2008
- Workshops or training on K12HSN resources and tools, both face to face and virtual: 11 Galaxy and videoconferencing workshops
- Presentations at local county offices of education or regional meetings: 11 regional Node Site meetings, 8 Advisory Board meetings, 12 ACC/NIC meetings,
- Listserv/email to targeted groups of stakeholders throughout the state with 1,827 recipients. Quarterly program updates via email; Weekly and monthly emails highlighting K12HSN news and educational technology news. E-Rate information is distributed to an additional 1,257 recipients through a separate listserv that is maintained by CDE.
- Articles in Journals and newsletters about K12HSN resources: TechSETS newsletter, CTAP and CDE newsletter

**Table 18a. Contact Hours by Dissemination Activity Type  
March 2007-December 2008**

<b>Dissemination Type</b>	<b>#</b>	<b>Total Contact Hours</b>
Presentations at state and local conferences	3	18 hours (Six one-hour presentations per conference)
Information booths at national, state and local conferences	4	84 hours (multiple days, 6 hrs per day)
Workshops or training on K12HSN resources and tools, both face to face and virtual	32	32 hours (1 hour in length each)
Presentations at local county offices of education and other meetings	8	8 hours (1 hour in length each)
Node Site Regional Meetings	12	19 hours (1.5 hrs in length each)
Advisory Board Meetings	7	28 hours (4 hours in length each)
ACC and NIC Meetings (videoconference and face-to-face)	12	36 hours (3 hours in length each)

**Evaluation Question 19**

What are the essential conditions that facilitate the transition from awareness to use of resources on the Network?

(Goal 2, Obj. 1)

**Finding 19: Sharing of Information on Network Resources**

Almost half of the 1,192 respondents shared information about K12HSN resources with their school staffs at staff meetings. About 1/3 used email. Almost half said they haven't shared information with their school staffs.

Almost all of the respondents said they knew whom to contact at their district office if they had a question about technical aspects of their connection. Less than half knew whom to contact if they had a question about K12HSN online classroom resources (e.g., Galaxy).

**Evidence - School Site Survey**Sharing Information about the K12HSN Resources

One thousand one hundred ninety-two individuals responded to the school site survey, 43% indicated they had not yet shared information. Those who had indicated they shared information about K12HSN resources with their school staff through these methods:

- Staff Meeting (49%)
- Email (27%)
- Newsletter/flyer (8%)
- School website (6%)
- Other (approximately 12%)
  - Informal sharing, word of mouth
  - School-wide in-service/professional development
  - Designated teacher on staff shares with others
  - District-wide training
  - Staff bulletin board
  - District website (4)
  - Was not aware of the resources listed above (18)

School Contact Knowledge of Who to Contact for Network Assistance

When asked, "Do you know whom to contact in the following situations?" of 1,190 school site respondents:

- 96% knew who to contact at the District office if they had a question about technical aspects of their connection
- 41% knew who to contact if they had a question about K12HSN online classroom resources (e.g., Galaxy)

### **Goal 3: Awareness and Dissemination of Network Resources**

K12HSN Goal 3: Build awareness and promote network connectivity to maximize benefits to California, K-12

Raising awareness and dissemination of network resources are crucial to the overall vision of the K12HSN and use of the bandwidth accessibility, tools, resources and applications. The Advisory Board and strategic partners play critical roles in this effort.

#### **Evaluation Question 20**

How do Advisory Board members perceive their roles? What recommendations do they have regarding the role of broadband in K-12 education in California?

(Goal 3, Obj. 1)

#### **Finding 20: Advisory Board Role**

The Advisory Board members described their role as responsibilities related to communication, accountability, policy guidance, advocacy, and providing a forum to discuss challenges and barriers around the following areas:

- Support of the K12HSN Effort to Increase Connectivity Statewide
- Support of the K12HSN Efforts to Increase/Promote the Use of Technology for Teaching and Learning Statewide

The Advisory Board made recommendations on their future responsibilities or initiatives and they made seven policy recommendations.

#### **Evidence**

All 11 K12HSN Advisory Board Members completed an online questionnaire during the month of November 2008. They responded to three open-ended questions about their perceptions of the Advisory Board's role in support of K12HSN's work to increase connectivity and technology use statewide.

#### Advisory Board Support of the K12HSN Effort to Increase Connectivity Statewide

##### *Communication*

- Between Advisory Board Members and K12HSN staff – updates, discussions
- Link between districts, K12HSN and CDE
- Ensure we have accurate and current data on the status of connectivity statewide.

##### *Accountability, Policy Guidance, Advocacy*

- Oversee and ensure HSN priorities are met and activities are on track
- Ensures that public schools increase their potential for affordable connectivity
- Background and expertise are vital to ensure the legislature is kept advised and encouraged to support the program Advocate for the priorities of the client districts and counties - costs, services, and future plans are discussed.

#### *Discussion of Connectivity Challenges and Barriers*

The Advisory Board promotes a timely and on-going conversation on connectivity needs of rural, urban, and suburban regions, districts, and school sites, including discussions to:

- Identify and discuss reasons for the lack of connectivity
- Identify strategies and avenues to advocate for connectivity to all who desire it and makes fiscal sense
- Find solutions for "Last mile" challenges of connecting all of California's students to the high-speed network
- Consistently review connectivity percentages of all school districts and county office of educations and suggest/support aggressive pursuit of high-speed connectivity for all of California's public school students and employees
- Solve unique problems that can face a school district or site with connection to the Internet, to CDE and CSIS for providing and analyzing student data
- Increase instructional programs and learning opportunities for K-12 students in California
- Identify new applications and resources

#### Advisory Board Support of the K12HSN Efforts to Increase/Promote the Use of Technology for Teaching and Learning Statewide

"Given the amazing projects that the K12HSN has had up and running in a remarkably short time (i.e., Calaxy), the Advisory Board serves as a network to promote their work at a regional, district, and site level."

The Advisory Council seeks various programs known to be effective with students and supports and advocates them, such as:

- Calaxy in particular is an example of a "forward-thinking" initiative.
- 21st Century Skills and ways to promote classroom access to web-based resources
- Brokers of Expertise

"The Advisory Board provides policy leadership and oversight to the Network's ability to highlight and promote educational technology; as both an instructional tool (online AP coursework, student technological show cases) and a research forum. By helping public schools maintain high bandwidth Internet access, the Board allows a greater number of California's students to take advantage of all the educational potential of Web2.0 learning opportunities."

"The Advisory Board has adopted positions, which are presented to the State Superintendent and /or State Board. We are one of few state organizations focused on expanding 21st Century teaching and learning. As a district superintendent I am able to bring to the Board specific examples of what is working and what is not. Recently K12HSN has expanded to include services for classroom teacher. The potential is great, although there is much work to be done to complete these services. Our Board has reviewed these digital resources and provided needed feedback before they have gone live statewide."

#### Advisory Board Recommendations on their Additional Roles, Responsibilities, or Initiatives

- Advocating for state funding for technology in the classroom, for CDE and HSN to make this a priority.
- Connectivity, resources, and promoting instructional strategies that address students' learning for the 21st Century.
- Being a strong voice for the complete infusion of technology *into classrooms and student learning.*

- Partnering with CETC and CCSESA's C & I 's state committee, ACSA as well as CDE's efforts around curriculum best practices in technology integration and application to student learning.
- Providing a bridge for videoconferencing, a dynamic social networking venue (Galaxy), and Brokers of Expertise.
- Attracting and developing effective applications intended to support K-12 professional development, direct instruction.
- Promoting the program more effectively - considering the new challenges associated with competitive rate bidding on ISP services to districts now being conducted (increasingly) by cable companies.
- Those identified in the approved annual goals.

### **Evidence – K12HSN Advisory Board Education Policy Recommendations**

Beginning in November 2007, the K12HSN Advisory Board Members discussed and drafted a set of policy recommendations for the Superintendent and K12HSN (defined as one of their specific duties in Education Code Section 11800).

#### **Summary of Board Actions:**

- November 2007 – Begin discussions for policy recommendations, drafted six recommendations
- March & May 2008 – Continue discussions and revisions of the November 2007 draft
- July 2008 – Seven recommendations are finalized and approved by the Board
- October 2008 – Plans are made to mail the document (with introductory letter and supplemental documents as needed) to the State Superintendent of Public Instruction O'Connell and set up a meeting to discuss the recommendations.

K12HSN Advisory Board finalized the following seven policy recommendations,

- Create a Statewide e-learning council.
- Provide access to online courses for all students in California, in support of state and federal mandates.
- Ensure all adopted textbooks and related materials are available to schools in electronic format.
- Formally embrace the 21<sup>st</sup> Century Learning Framework by joining the current list of states actively participating in the Partnership.
- Develop policies to ensure that all students are afforded the opportunity to have a successful online experience at least once before graduating.
- Support staff development opportunities to ensure all staff are fully prepared to support student learning in an online environment.
- Identify any K-12 sites that do not have sufficient network access or bandwidth, determine the reason for lack of access and develop a plan to remedy the situation by January 1, 2010.



**Evaluation Question 2 I:**

What strategic partnerships have been established annually with technology industry leaders, content providers and other stakeholders to address specific needs?

(Goal 3, Obj. 2)

**Finding 2 I: Strategic Partnerships**

Seven organizations have established partnerships with K12HSN since 2006: Discovery Education; AT&T and CENIC; Netcordia; Polycom; Codian and, Thinkfinity/Verizon Foundation. These partnerships support specific work related to the gaps in the network, providing network diagnosis equipment; enhancing videoconferencing, providing content via videostreaming; and, hosting a content repository on the network.

**Evidence**

Seven public and private organizations have established partnerships with K12HSN to support the connectivity and technical needs of K-12 districts and schools in California. See Part 6, page 31 for the summary that documents the partnerships formed during the last two years of the K12HSN. The summary provides the name of the organization offering to collaborate with K12HSN, the year the partnership was established, and the impact or way in which the partnership benefited connected districts and schools. [Source: K12HSN Staff interviews]

# PART 9

## EVALUATION DESIGN

This part provides a description of these components of the evaluation design:

- Evaluation Frameworks and Questions
- Methodology
- Data Collection
- Summary of Potential Limitations of the Evaluation
- K12HSN Project Frameworks

### Evaluation Frameworks and Questions

The evaluation is framed by the K12HSN: Legislative Purposes and Activities (Page 83); 2008-2009 Goals and Objectives (Page 84); and, Performance Measures developed by the K12HSN Advisory Board (Page 85). Twenty-one evaluation questions were identified to address those three areas and form the basis of the evaluation design (Page 76). See *Appendix A: Evaluation Design* for the full design.

The evaluation was designed to answer three overarching questions:

1. To what degree has ICOE grown the capacity of the K12HSN and is the current bandwidth adequate for how K12 educators want to use the Network?
2. How are educators using the Network?
3. How is information about HSN being disseminated and what else needs to be done to increase best practices in using the Network?

Twenty-one evaluation sub-questions, related to the three overarching questions and the project frameworks, were developed to guide the evaluation. See Chart 13 on the following page.

**Chart 13: Evaluation Sub-Questions**

<b>Management of the K12HSN and Development of the Capacity of the K12HSN</b>	
	<ol style="list-style-type: none"> <li>1. What is the footprint of the K12HSN, including numbers of agencies that are part of and connected to the Network, and what are their connection speeds?</li> <li>2. To what K-12 entities, agencies and institutions do the respective Node Sites provide services? What support do Node Sites provide?</li> <li>3. How satisfied are Node Sites with K12HSN's efforts to meet their bandwidth needs?</li> <li>4. How much of their available bandwidth are Node Sites using?</li> <li>5. How satisfied are districts with Node Sites efforts to meet their bandwidth and technical support needs?</li> <li>6. What are the site-based circumstances that distinguish connected versus non-connected sites and what are the change agents that move a site from non-connected to connected?</li> <li>7. How satisfied are participants of the E-Rate application training?</li> <li>8. What are CDEs technical support needs related to E-Rate; how satisfied are they these needs are being met?</li> <li>9. By what percentage does California's share of overall E-Rate funding increase annually compared to national E-Rate totals/funds?</li> <li>10. Across available bandwidth levels of connectivity, what Network resources do sites use and for what purpose?</li> <li>11. What are end-users' perceived benefits of using the Network and its resources?</li> </ol>
<b>Coordination of Uses of the Network</b>	
	<ol style="list-style-type: none"> <li>12. What are trainers', teachers', and administrators' perceived opportunities created by access to videoconferencing?</li> <li>13. What are the qualitative differences between non-users, one-time users, and repeat users of videoconferencing?</li> <li>14. By what percentage does the number of conducted videoconferences increase annually?</li> <li>15. What are trainers', teachers', and administrators' perceived opportunities created by access to broadband-supported tools?</li> <li>16. What is the baseline data from the time <i>Galaxy</i> was launched in March through December 2008 for: new users; <i>Galaxy</i> traffic; and, creation of blogs and blog posts</li> <li>17. What are examples of value-added teaching and learning activities used by agencies that can only be accessed via broadband?</li> <li>18. What is the process of "information flow" at K-12 Node Sites? Is there anything in the process that is blocking stakeholders' access to information?</li> <li>19. What are the essential conditions that facilitate the transition from awareness to use of resources on the Network?</li> </ol>
<b>Awareness &amp; Dissemination of Network Resources</b>	
	<ol style="list-style-type: none"> <li>20. How do Advisory Board members perceive their roles? What recommendations do they have regarding the role of broadband in education?</li> <li>21. What strategic partnerships were established annually with technology industry leaders, content providers and other stakeholders to address specific needs?</li> </ol>

## **Methodology**

### The Mixed Methods Design

This evaluation is based on a Mixed Methods Design – using both a Multi-Point Methodology and a Single-Point Methodology. With the Multiple-Point Methodology, two or more data points are available for comparisons over time. For this evaluation, evaluators used existing data as baseline data in as many cases as possible. The Single-Point Methodology uses one data point, and the data from that data collection is compared to a standard or criteria. For this evaluation, the evaluators have used the legislated activities, goals and objectives, and advisory board criteria to provide some indicators of success. In many ways, a Single Data Point Methodology is much like a snapshot in time, with limitations to fully understanding context, relationships, trends, and impacts. However, often a Single-Point Methodology identifies additional factors or data sources that could be beneficial to explore more fully in subsequent data collection.

### Multi-Point Data

Earlier K12HSN footprint data, including connected agencies and bandwidths, was provided by the March 2007 K12HSN Legislative Report. Current 2008 data was used as comparison data. Project records provided baseline data on California E-Rate funding and current funding.

### Single-Point Data

Current 2008 data was used to provide an accurate snapshot of the K12HSN, and identify agency contacts that will be data sources for the three surveys described below. Footprint descriptive data includes:

- The names of the Node Site agencies, connected districts and connected schools
- The number of Node Sites, connected districts and connected school sites
- The bandwidth availability across the network

### Data from Three Constituent Groups

Survey data from contacts at Node Sites, connected districts and connected schools is used to provide a full picture of their perceptions related to the evaluation questions. No baseline data was available. Survey data is triangulated to compare the perspectives of the three constituent groups. Data on perceptions of contacts at each level (Node Site, district and school) was collected through a survey to each group with items related to 20 of the 21 evaluation questions.

*Node Site Contact Survey.* This is a 24-item survey administered to 110 contacts at 71 Node Sites. Contact list was taken from the May 2008 K12HSN Node Site Administrative and Technical Contact Database. A survey was sent to both the Node Site administrative and technical contacts at each site. In some sites they are the same person. In some sites they jointly completed the survey and in only two sites there were two respondents. The survey asked for the Node Site contact's perspectives on connectivity, bandwidth, services, resources, and dissemination of information.

*District Contact Survey.* This is a 28-item survey administered to 783 district contacts (of the 852 connected Districts) that evaluators could reach through email or phone. Connected district contacts were taken from the 2008 California Schools Technology Survey (CSTS) information. One survey was sent to each connected district contact. The survey asked for the district contact's perspectives on connectivity, bandwidth, services, resources, and dissemination of information.

*School Site Contact Survey.* This is a 35-item survey administered to 4,791 contacts. Using information from K12HSN's dataLINK, a sample size equal to 60% of connected schools for each county service region was calculated. Using the 2008 California Schools Technology Survey (CSTS) information as a full set of K-12 schools in the state, connected schools were coded and sorted by the 11 county service regions. Schools were then randomly selected from each county service region using the pre-calculated sample size for each. One survey was sent to the contact at each selected school site. The survey asked for the school site contact's perspectives on connectivity, bandwidth, services, resources, and dissemination of information.

#### E-Rate Support and Services

Data was collected from participants in E-Rate trainings, and from one CDE staff member.

*E-Rate Training Participant Survey.* This is an 11-item survey administered to 409 contacts who had participated in the E-Rate Training.

*CDE Staff Member.* One staff member at the CDE who works directly with K12HSN to support the State, district and schools related to E-Rate issues completed a short questionnaire about CDE's satisfaction with the K12HSN support.

#### Project Snapshots

Each year K12HSN staff identifies sites that are implementing value-added teaching and learning activities that can only be accessed by broadband. Between October and December, Wexford interviewed, conducted virtual visits and observations, reviewed documents and administered questionnaires to staff and administrators at three distinct sites to provide a snapshot of the broadband use at each of the three sites.

#### K12HSN Information from Project Records and Advisory Board Feedback

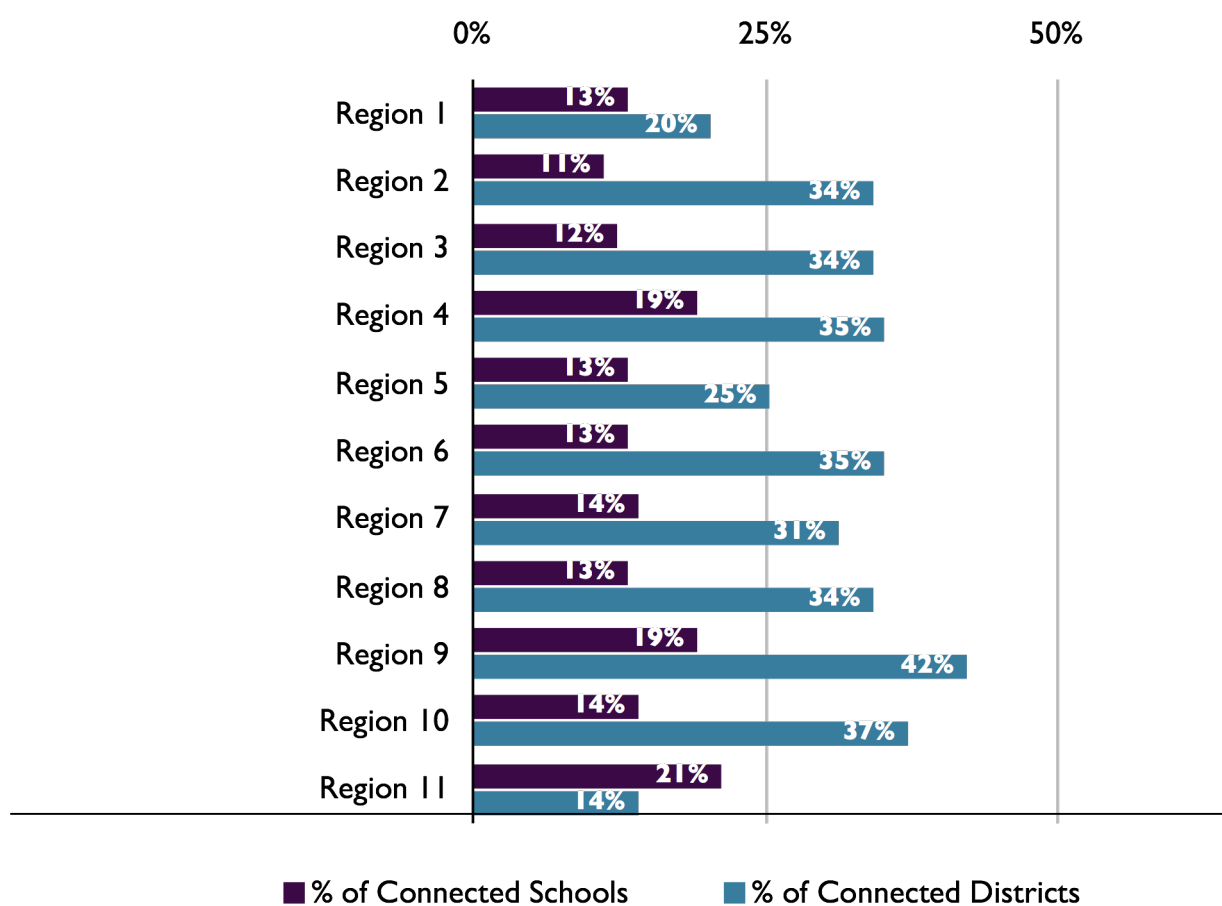
Project records were used to provide data on K12HSN's work to connect non-connected districts. To determine the type and level of activities, resources and recommendations produced by the K12HSN and its Advisory Board, evaluators organized and analyzed information from available K12HSN website and documents, such as meeting schedules, meeting agendas and participant and usage records, web resources, videoconferencing schedules. Advisory Board members also completed a survey to gain their perceptions on their roles as Advisory Board members in support of increasing K12HSN connectivity and technology use statewide.

## Data Collection

Data for this evaluation report was collected from more than 1,600 Node Site, district and school site contacts across the state of California, CDE staff, and K12HSN staff Advisory Board members.

Chart 14, below, shows the connected-schools and connected-districts survey response rates, by county service region.

**Chart 14: Connected Schools and Connected Districts Survey Response Rates**



## Summary of Potential Limitations of the Evaluation

This study of the K12HSN was potentially limited by 10 factors, which are very typical of this type of evaluation and data collection parameters:

- Lack of primary data sources
- Respondent apprehension
- Selection bias
- Possible factors decreasing the response rate
- Evaluation schedule
- Variability on teacher experience with technology
- Variability of bandwidth at schools
- Fluctuation of numbers of districts and schools
- Off-point responses
- Survey responses related to factors other than K12HSN services and activities

Following is a brief description of each.

1. *Lack of primary data sources* – Because there was no existing data for many of the factors the evaluation required, the data from the Node Site, District and School Site Surveys included questions for which the respondent may have had no data, but only their estimates or perspectives on issues (such as how often teachers at the connected sites used videoconferencing or whether or not teachers were satisfied with bandwidth). There was not enough time or funding to directly collect quantitative data on each of the identified variables. Therefore, some of the findings are based on perspectives of contacts that may or may not have had accurate data as a basis for their responses, or may not have been familiar or knowledgeable about a specific question.
2. *Respondent apprehension* – It is possible that respondents may have responded as they thought they were expected to respond and were not accurate in their assessment of their node, district or school site situation in terms of connectivity and usage of the connection. To reduce this possibility, surveys were administered confidentially and towards the end of the school year so that respondents would construct their responses based on current school year experiences.
3. *Selection bias* – Contact lists for all three surveys were derived from the California State Technology Survey (CSTS) 2008 surveys. The evaluator made every effort to communicate with districts via email or by phone to ensure that the survey was completed by the appropriate node, district or school site representative. However, in some cases:
  - Respondents did not have sufficient knowledge about their Node Site, district connection, or school site usage of the connection.
  - In a number of instances, one individual was listed for multiple numbers of schools. The evaluators contacted these individuals and requested that “technology teachers/leaders” at each school site complete the survey, however there was no

- way of verifying if school sites had unique survey respondents with the appropriate knowledge about their school site's connectivity to answer the questions.
- Survey completion was voluntary therefore there is not a 1 to 1 correspondence between district respondents and school respondents. There may be some districts that had no school surveys submitted, and there may be some school surveys for which there was no corresponding district survey submitted.
4. *Possible factors decreasing the response rate* – The following factors may have decreased the response-rate for the Node Site, District and School Site Surveys:
- Some potential respondents for each of the three surveys could not be reached, despite evaluator efforts to reach them, due to the following reasons-
    - Firewalls and spam filters that may have kept the surveys from reaching the intended respondents
    - Personnel changes
    - Incorrect email addresses
  - Timing - contacts were sent the survey request and URL between May and July. Some districts were already done with the school year and others were just getting started.
  - Voluntary survey completion - neither the external evaluators nor K12HSN had any authority to require Node Site, district or school respondents to complete the survey.
  - Administrators or other staff, who were not familiar with the connectivity, completed surveys and technology uses at their district or school site.
  - Online survey opt-out – Several district administrators had 'opted-out' from receiving and completing the survey through an online system.
  - Online survey collector - The use of an online survey collector helped to ensure the quality of the data collected. However, this may have been a factor that may have decreased the response rate, due to firewall issues in some cases or browser issues that may have prevented respondents from accessing the survey.
5. *Evaluation schedule* – The evaluation contract began in February 2008. By May, evaluators had reviewed project information and completed the evaluation design and instrumentation. Surveys were administered from the beginning in May through the end of July. Because of the summer breaks for many respondents, it took evaluators longer to try to get new email addresses for any email requests that did not "go through" to the intended contacts. Data review and analysis were completed in the fall, with limited time to clarify disparate data, or follow-up on new questions that arose from the data.
6. *Variability on teacher experience with technology* – Teachers were limited by their experience and knowledge of use of technology to answer questions related to their satisfaction with services and bandwidth, and to identify network resources they've used, satisfaction with bandwidth, and how they would like to use the network if there were greater bandwidth.



7. *Variability of bandwidth at school sites* – The differences in bandwidth at schools, over which K12HSN has no control, limits the use of various resources at schools with less bandwidth, and therefore limits the number of respondents indicating they've used the resources, and responses related to usefulness of those resources.
8. *Fluctuation in number of districts and sites* – From year to year, the number of districts and sites changes in California, as districts unify and school configurations change. Therefore, the database of all districts and schools changes and the target number of districts and schools to be connected to the network changes. This makes it difficult to use any previous data to identify growth trends with the data available from K12HSN.
9. *Off-point responses* – On certain items, the answers provided by the respondents were somewhat off-point or did not fully or thoughtfully answer the question.
10. *Survey responses related to factors out of the realms of K12HSN services and activities* – On certain items, the answers or suggestions provided by the respondents were outside of the scope of work of the K12HSN.

## K12HSN Project Frameworks

Following are the three project frameworks that guide the project and that formed the basis for many of the evaluation questions: the Legislative Activities, Goals and Objectives, and the Advisory Board Performance Measures.

### K12HSN Legislative Purposes and Activities

The legislative purpose of the K12HSN is to enrich pupil educational experiences and improve pupil academic performance by providing high-speed, high-bandwidth Internet connectivity. The Legislative activities include: Goals and Objectives; services; administration; oversight; and ICOE Requirements for All ICOE Contracts (See K12HSN Legislative Activities Chart below).

**Chart 15: K12HSN Legislative Activities**

<b>Goals and Objectives</b>
<ul style="list-style-type: none"><li>➤ Defines high-level goals and objectives and requires the advisory board to define evaluation criteria for HSN</li><li>➤ Requires implementation of videoconferencing</li><li>➤ Authorizes ICOE to oversee content and applications grants as well as grants to connect unconnected schools</li><li>➤ Directs ICOE to coordinate network use to benefit teaching and learning</li></ul>
<b>Administration</b>
<ul style="list-style-type: none"><li>➤ A competitively selected local educational agency (LEA) administers the network on behalf of the Superintendent of Public Instruction</li><li>➤ An advisory board, primarily composed of county and school district representatives, will meet quarterly to provide policy and operational guidance</li></ul>
<b>Oversight</b>
<ul style="list-style-type: none"><li>➤ Fiscal oversight provided by an annual independent audit</li><li>➤ Technical oversight provided by an independent evaluation to be completed by March 1, 2009</li></ul>
<b>Services</b>
<ul style="list-style-type: none"><li>➤ Internet service</li><li>➤ Interconnectivity among K-12 entities</li><li>➤ Connection to higher education institutes, and state and local agencies</li><li>➤ Videoconferencing and distance learning tools</li><li>➤ Statewide coordination of network use</li></ul>
<b>ICOE Requirements for All ICOE Contracts</b>
<ul style="list-style-type: none"><li>➤ A service level agreement</li><li>➤ Protection of intellectual property ownership rights, and asset protection</li><li>➤ Documentation of appropriate fee structures</li><li>➤ Assurance that any interest earned on state funds are used to the benefit of the project</li></ul>

## K12HSN Goals and Objectives

In carrying out the legislative activities for the K12HSN, ICOE has identified and worked toward the following three goals and related objectives for 2008-2009.

**Chart 16: K12HSN Goals and Objectives**

<b>Goal 1</b> Provide reliable and secure inter-connectivity among K-12 entities, IHEs, and state and local agencies to facilitate efficient interaction, and reliable and cost-effective Internet service, including transmission of data.	
	Objective 1.1: Ensure appropriate connectivity and support for K-12 Node Sites across CA to adequately deliver services to schools as measured by the Node Site Survey (specifically referencing capacity at the Node Sites and in districts).
	Objective 1.2: Support and leverage CA participation in the E-Rate discount program as evidenced by a 10% increase in CA K-12's share of overall E-Rate program funding by June 2009.
	Objective 1.3: Increase utilization of the available network through increasing the number of sites connected and the capacity with which they connect as evidenced by identified benchmarks.
<b>Goal 2</b> To provide statewide coordination of network uses, videoconferencing, and related distance learning capabilities to benefit teaching and learning.	
	Objective 2.1: Increase awareness of appropriate high-quality educational resources and applications that teachers, students and administrators can access on the Network by 30% by June 2009 as measured by teacher and administrator survey.
	Objective 2.2: Expand videoconferencing use and other related tools in support of professional development, teaching and learning, and administrative efficiencies by 10% each year.
	Objective 2.3: Identify and disseminate an in depth look at a minimum of 3 projects and best practices annually that demonstrate how broadband is impacting classroom experiences.
<b>Goal 3</b> Build awareness and promote network connectivity to maximize benefits to CA K-12.	
	Objective 3.1: Provide a structure for continual information flow to the educational community and statewide technology leadership as measured by the successful implementation of the Advisory Board.
	Objective 3.2: Establish a common understanding of the role of broadband in education and related policy issues in CA by March 2009.
	Objective 3.3: Explore and develop a minimum of 3 strategic partnerships annually with technology industry leaders, content providers and other stakeholders to address specific needs.

### Advisory Board Measures of Success

In 2007, the Advisory Board, as mandated in the K12HSN legislation in the legislative activities, created the following performance measures,

#### **Chart 17: K12HSN Advisory Board Performance Measures**

<b>Network Oversight, Monitoring and Accountability</b>
<ul style="list-style-type: none"><li>➤ Establishment of a sound management and governance structure – includes governing body and a management organization to carry out its directives.</li><li>➤ Clear and specific service level agreement with contractor – Services to the K12HSN established under contract from CENIC with a service level agreement to detail services to be provided.</li><li>➤ Independent audit of financial operations and network performance – Financial audits to ensure the proper expenditure of public funds, and performance audits to identify operational shortcomings, and highlight areas of network vulnerabilities and strengths.</li><li>➤ Long-term strategic plan for network operations – The vision for the network and related investment, necessary infrastructure replaced/upgraded, and cost estimates for each phase of its implementation.</li><li>➤ Protection of the state's investment – Accountability to include an assurance that balances and interest earned on account balances held by all parties will ultimately fund services and infrastructure improvements for the K12HSN.</li></ul>
<b>Network Operations</b>
<ul style="list-style-type: none"><li>➤ Connection to the network: percent of county offices of education, school districts, and school sites connected to the network – A detailed presentation of connections to the network for all K-12 educational institutions since the inception of the program.</li><li>➤ Quality of the connections to the network – The demand for higher bandwidth resulting from more data intensive applications and more users.</li><li>➤ Initiatives to connect unconnected sites – Initiatives to bring these agencies to the network, and identification of impediments to making these connections.</li></ul>
<b>Use of the Network to Improve Learning</b>
<ul style="list-style-type: none"><li>➤ Development of academic content and applications for use on the network –An inventory of applications available on the network as an indicator of how this technology is used to improve student performance.</li><li>➤ Showcasing exemplary applications – Proactive measures to showcase exemplary programs and market their availability</li><li>➤ Provision of videoconferencing services - The number of videoconferencing services provided since the inception of the program, a projection of future demand, and the number of workshops on effective use of videoconferencing services</li></ul>

**CALIFORNIA K12HSN EVALUATION**

**APPENDIX A**

**EVALUATION DESIGN**



# Design for Conducting the Evaluation of the California High Speed Network



**Evaluation Conducted from April 2008 to January 2009**

**Submitted to Todd Finnell, CEO  
California K-12 High Speed Network**

**Submitted by Sheila Cassidy, Executive Director  
Wexford Institute  
April 30, 2008**



# Design for Conducting the Evaluation of the California High Speed Network

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## Design for Conducting the Evaluation of the California High Speed Network

### Table of Deliverables

April 24, 2008	Evaluation Design and Data Collection Plan
May 7, 2008	Update for Advisory Committee Meeting In Sacramento
May 15, 2008	Initial Data Collection Surveys to HSN Staff for Review
May 8-30, 2008	Administration of Surveys
May 21, 2008	Meet with CTAP Directors and Directors of SETS Projects
May 31, 2008	Monthly Progress Update on Data Collection
June 2008, TBA	Attend NIC/ACC Videoconference
June 2-10, 2008	Phone Interviews with 25% random sample of Node Site Survey Takers
June 30, 2008	Monthly Progress Update on Data Collection and Summaries
July 7-31, 2008	Phone Interviews with NIC/ACC Committee members
July 31, 2008	Monthly Progress Update on Data Summaries and Analysis
August 20, 2008	Initial Data Summaries for Review by HSN Staff and Planning for Fall Data Collection
August 31, 2008	Monthly Progress Update on Follow-up from Retreat
September 15, 2008	Begin Conducting Fall Data Collection
September 31, 2008	Monthly Progress Update on Fall Data Collection
October 31, 2008	Monthly Progress Update on Completion of Fall Data Collection, Summaries and Report Outline
November 31, 2008	Monthly Progress Update on Data Summaries, Analysis, and Report
December 15, 2008	Initial Draft of Report to CAHSN Staff
January 15, 2009	Final Report to CAHSN Staff





## Design for Conducting the Evaluation of the California High Speed Network

### Evaluation Team

The evaluation team is comprised of 5 evaluation staff/consultants and 5 support staff, with total staff time allocated to project at 2.5 f.t.e from initial planning through final reporting. Following are staff/consultant on the team, along with their estimated full-time-equivalent status on the project from February 2008 through January 2009 and a brief description of their backgrounds and expertise are:

Sheila Cassidy .3 fte  
Executive Director

Education: Bachelor's: Math and History, USC  
Master's: Education and Mathematics, Temple University, Philadelphia  
Doctoral Coursework: Curriculum and Evaluation, USC  
Credentials: Mathematics, History, and Administrative Services  
Expertise: Research, evaluation, design and development; Mathematics education; Effective practices for English Learners and students from low income families; Technology and distance learning

Rachel Saldivar .6 fte  
Director, Advanced Technologies for Education and Evaluation

Education: Bachelor's: Public Administration, USC  
Master's: Educational administration, University of LaVerne  
Credential: Educational administration  
Expertise: Evaluation; Technical support; Grant development; Technology integration; Data systems; Arts education; Effective programs for ELs



## Design for Conducting the Evaluation of the California High Speed Network

Lisa Evans  
Director of Research

.3 fte

Education: Bachelor's: Psychology, UCLA  
Master's: Educational communication and technology, NYU  
Ph.D.: Instructional Technology, University of Virginia  
Expertise: Research and evaluation; Technology integration; Online professional communities;  
Human subjects protection in research

Roger Salinas  
Director, School and Community Leadership

.2 fte

Education: Bachelor's: Eastern Illinois University  
Master's: Education, Whittier College  
Expertise: Evaluation; Project development; School administration; Community relations; Parent  
and community programs; School reform

Selma Sax  
Strategic Planning and Evaluation Associate

.1 fte

Education: Bachelor's: Education, University of Massachusetts  
Master's: Education, CSULA  
Credentials: Teaching, Pupil personnel, in California and Massachusetts  
Expertise: Evaluation; Strategic planning; Policy initiatives; Technology and distance learning



# Design for Conducting the Evaluation of the California High Speed Network

## Framework for the Evaluation

The California K-12 High Speed Network (K12HSN) is a network of node sites in all 58 counties through which public K-12 education entities in California connect to each other. The K12HSN also connects to CalREN, which enables K-12 entities to connect to higher education institutes, the Internet, Internet2, and other organizations. For K-12 students, and staff, these networks provide services ranging from basic Internet connectivity to the advanced high-speed networking to support administrative, instructional and professional development activities.

The evaluation of the California K-12 High Speed Network (K12HSN) is framed by:

- its legislated purpose
- its legislated activities
- its goals, objectives and milestones
- performance measures developed by its Advisory Board.

## Evaluating Progress Toward the Legislated Purpose of the K12HSN

The legislated purpose of the K12HSN is to enrich pupil educational experiences and improve pupil academic performance by providing high-speed, high-bandwidth Internet connectivity. In evaluating progress toward the legislated purpose of the K12HSN, we must identify benchmarks that would lead to the purpose. These benchmarks would include the goals and objectives and performance measures, but would also include benchmarks related to creating the systemic change of establishing and using the statewide network, as

well as those related to dissemination, and enriching educational experiences and improving academic performance.

### Systemic Change

Systemic change is comprehensive, with a fundamental change in one aspect of the system requiring fundamental changes in other aspects in order for it to be successful (Banathy, 1991; Reigeluth and Garfinkle, 1994). In education, the change must pervade all levels of the system: classroom, building, district, community, state government, and federal government. It must include the nature of the learning experiences, the administrative system that supports the instructional system, and the governance system that governs the whole educational system. These are key underpinnings necessary for systemic reform to occur (Ellsworth, 2000):

- Involve stakeholder--ensuring that everyone affected has input
- Coordinate efforts and work as a team – avoiding “us vs. them” syndrome
- Design for the ideal (challenging old assumptions)
- Re-examine obstacles and research solutions
- Understand interrelationships
- (Re)create a viable system – making sure the end result works as a coherent whole

In synthesizing change research, five main functions came to the forefront that are necessary for creating systemic change. They are not meant to be prescriptive or a linear progression. The synthesis is summarized in the chart below.



# Design for Conducting the Evaluation of the California High Speed Network

Function	Systemic Change Elements
Involve Stakeholders and Networks	<ol style="list-style-type: none"> <li>1. Bring stakeholders to the table</li> <li>2. Explore possible solutions</li> <li>3. Create a shared vision</li> <li>4. Involve additional networks of stakeholders/participants</li> <li>5. Gain support for the changes</li> </ol>
Use Data	<ol style="list-style-type: none"> <li>1. Identify the problem – see the need</li> <li>2. Create greater understanding of the problem and need</li> <li>3. Monitor progress, seek input, evaluate, adjust, hold accountable</li> </ol>
Share and Use Knowledge	<ol style="list-style-type: none"> <li>1. Use research to identify possible and best solutions</li> <li>2. Develop a change plan guided by change theory</li> <li>3. Use available research to guide Implementation of solutions</li> </ol>
Build System Capacity	<ol style="list-style-type: none"> <li>1. Create distributed leadership to carry out the plan</li> <li>2. Adjust policies, practices, roles and responsibilities to support the plan</li> <li>3. Provide training and resources to institute the plan</li> <li>4. Utilize telecommunications and technology to support the change</li> </ol>
Build the Capacities of the Individuals to Carry Out the Change	<ol style="list-style-type: none"> <li>1. Identify needs and concerns of individuals</li> <li>2. Provide support, incentives, rewards</li> <li>3. Support at all levels of use</li> <li>4. Ensure they have opportunities to participate in planning, monitoring evaluating</li> </ol>

## Dissemination

A definition of dissemination developed by Hutchinson and Huberman (1993) is “the transfer of knowledge with and across settings, with the expectation that the knowledge will be ‘used’ conceptually or instrumentally.” Westbrook and Boethel (1997) found that successful dissemination systems:

- Include both proactive and reactive dissemination channels - information that users have identified as important, and information that users may not know to request, but that they are likely to need. Clear channels

are established for users to make their needs and priorities known to the disseminating agency.

- Draw upon existing resources, relationships, and networks to the maximum extent possible while building new resources as needed by users.

A review of the literature reveals five areas in which there are practices that either facilitate or hinder dissemination, and are identified in the chart below (Owens, 2001).

Areas	Dissemination Facilitators	Barriers
Information users	<ul style="list-style-type: none"> <li>• Understand characteristics of the users</li> <li>• Use preferred language style of the users</li> </ul>	<ul style="list-style-type: none"> <li>• Poorly targeted groups</li> <li>• Inadequate information about the users</li> </ul>
Information	<ul style="list-style-type: none"> <li>• Timely</li> <li>• Comprehensive</li> <li>• Accessible</li> <li>• Validated materials/practices</li> </ul>	<ul style="list-style-type: none"> <li>• Insufficient evaluation of the materials to be disseminated</li> <li>• Low quality materials/practices</li> </ul>
Adaptability	<ul style="list-style-type: none"> <li>• Users can easily adapt materials to their needs</li> <li>• Materials are seen as meeting the users’ needs and concerns</li> </ul>	<ul style="list-style-type: none"> <li>• Lack of attention to the need for users to want to adapt materials/ practices to their local settings</li> </ul>
Diverse modes	<ul style="list-style-type: none"> <li>• Includes electronic, print, and person-to-person communications</li> <li>• Interactive</li> </ul>	<ul style="list-style-type: none"> <li>• Only one mode used</li> <li>• Reliance on one-way communication</li> </ul>
Support for utilization	<ul style="list-style-type: none"> <li>• Ongoing interactions with users</li> <li>• Dissemination is integrated with other R&amp;D functions</li> <li>• Uses networks for dissemination</li> <li>• Has training and technical assistance to match user needs</li> </ul>	<ul style="list-style-type: none"> <li>• Limited local development and training</li> <li>• Inadequate structure for between-group sharing</li> </ul>



## Design for Conducting the Evaluation of the California High Speed Network

A shift has occurred in the conceptualization of dissemination away from thinking of the flow of knowledge as a one-way process that does not take into account the motivations, contexts, and realities of the intended users. Hutchinson and Huberman (1993) described the shift from the one-way flow models to a perspective in which “the user acts upon information by relating it to existing knowledge, imposing meaning and organization on experience and, in many cases, monitoring understanding throughout the process. This casts the user as an active problem-solver.” Two concepts from e-commerce are part of an emerging reconceptualization of dissemination. These two concepts are: *integrated solutions providers* and *customer relationship management*. In this reconceptualization, dissemination is “the process of knowing your clients and systematically providing them, either directly or in partnership with other organizations, knowledge, strategies, products and support that can enable them to better solve their problems and enhance their delivery of effective education.” (Owens, 2001)

### Enriching Pupil Educational Experiences and Improving Pupil Academic Performance

A summary of recent research on factors related to improved student achievement showed the following factors to be related.

#### *High Expectations, Rigorous Curriculum and Engaging Instruction*

- focus on high achievement
- curriculum was aligned to standards and assessments
- focus on the future – college and career prep
- remove barriers to taking higher-level coursework
- student engagement
- immediate support rather than remediation

#### *Resource Allocation*

- equitable resources -- for instruction and for facilities
- allocation to struggling students
- class sizes geared toward need rather than uniform

#### *Use of Data*

- to improve curriculum and instruction and to understand need for differential instruction and not just for tracking student performance over time
- using assessment data from multiple sources to evaluate teachers’ practices and identify teachers who need instructional improvement,
- development of strategies to follow up on the progress of selected students,
- evaluation of principals based on student achievement
- support for site-level planning related to improving achievement

#### *Teacher Quality*

- high level of instruction
- support through school and district professional community, collaboration, connect development to student needs
- new teacher induction

#### *School Culture*

- goals were consistent and consistently understood;
- educators accept responsibility for student success and collaborate often
- safe and orderly
- morale and climate were positive in the school, and adults felt that they had influence on decisions;
- personalization for students



# Design for Conducting the Evaluation of the California High Speed Network

## Evaluating Progress Toward the Legislated Activities of the K12HSN

Legislated activities include:

- Goals and Objectives
  - defines high-level goals and objectives and requires the advisory board to define evaluation criteria for HSN
  - requires implementation of videoconferencing
  - authorizes ICOE to oversee use grants as well as grants to connect unconnected schools
  - directs ICOE to coordinate network use to benefit teaching and learning.
- Services
  - Internet service
  - interconnectivity among K-12 entities
  - connection to higher education institutes
  - connections to state and local agencies
  - videoconferencing,
  - distance learning tools; and,
  - statewide coordination of network use.
- Administration:
  - a competitively selected local educational agency (LEA) administers the network on behalf of the Superintendent of Public Instruction
  - an advisory board, primarily composed of county and school district representatives, will meet quarterly to provide policy and operational guidance
- Oversight
  - fiscal oversight provided by an annual independent audit.
  - technical oversight provided by an independent evaluation to be completed by March 1, 2009
- ICOE Requirements for All ICOE Contracts
  - a service level agreement
  - protection of intellectual property ownership rights
  - asset protection
  - documentation of appropriate fee structures
  - assurance that any interest earned on state funds are used to the benefit of the project



## Design for Conducting the Evaluation of the California High Speed Network

### Evaluating Progress Toward the K12HSN Goals and Objectives

Wexford has considered the K12HSN Goals and Objectives, as well as milestones that were developed during 2007.

Goal 1: Provide reliable and secure inter-connectivity among K-12 entities, IHEs, and state and local agencies to facilitate efficient interaction, and reliable and cost-effective Internet service, including transmission of data.

Objective 1.1: Ensure appropriate connectivity and support for K-12 Node Sites across CA to adequately deliver services to schools as measured by the Node Site Survey (specifically referencing capacity at the node sites and in districts).

Objective 1.2: Support and leverage CA participation in the E-rate discount program as evidenced by a 10% increase in CA K-12's share of overall E-rate program funding by June 2009.

Objective 1.3: Increase utilization of the available network through increasing the number of sites connected and the capacity with which they connect as evidenced by identified benchmarks.

Goal 2: To provide statewide coordination of network uses, video-conferencing, and related distance learning capabilities to benefit teaching and learning.

Objective 2.1: Increase awareness of appropriate high-quality educational resources and applications that teachers, students and administrators can access on the Network by 30% by June 2009 as measured by teacher and administrator survey.

Objective 2.2: Expand videoconferencing use and other related tools in support of professional development, teaching and learning, and administrative efficiencies by 10% each year.

Objective 2.3: Identify and disseminate an in depth look at a minimum of 3 projects and best practices annually that demonstrate how broadband is impacting classroom experiences.

Goal 3: Build awareness and promote network connectivity to maximize benefits to CA K-12.

Objective 3.1: Provide a structure for continual information flow to the educational community and statewide technology leadership as measured by the successful implementation of the Advisory Board.

Objective 3.2: Establish a common understanding of the role of broadband in education and related policy issues in CA by March 2009.

Objective 3.3: Explore and develop a minimum of 3 strategic partnerships annually with technology industry leaders, content providers and other stakeholders to address specific needs.





# Design for Conducting the Evaluation of the California High Speed Network

## Evaluating Progress Toward Performance Measures Developed by the K12HSN Advisory Board

In 2007, the Advisory Board, as mandated in the K12HSN legislation, created these performance measures,

### *Network Oversight, Monitoring and Accountability*

- *Establishment of a sound management and governance structure* – includes governing body and a management organization to carry out its directives.
- *Clear and specific service level agreement with contractor* – Services to the K12HSN established under contract from CENIC with a service level agreement to detail services to be provided.
- *Independent audit of financial operations and network performance* – Financial audits to ensure the proper expenditure of public funds, and performance audits to identify operational shortcomings, and highlight areas of network vulnerabilities and strengths.
- *Long-term strategic plan for network operations* – The vision for the network and related investment, necessary infrastructure replaced/upgraded, and cost estimates for each phase of its implementation.
- *Protection of the state's investment* – Accountability to include an assurance that balances and interest earned on account balances held by all parties will ultimately fund services and infrastructure improvements for the K12HSN.

### *Network Operations*

- *Connection to the network: percent of county offices of education, school districts, and school sites connected to the network* – A detailed presentation of connections to the network for all K-12 educational institutions since the inception of the program
- *Quality of the connections to the network* -- The demand for higher bandwidth resulting from more data intensive applications and more users
- *Initiatives to connect unconnected sites* – Initiatives to bring these agencies to the network, and identification of impediments to making these connections

### *Use of the Network to Improve Learning*

- *Development of academic content and applications for use on the network* –An inventory of applications available on the network as an indicator of how this technology is used to improve student performance.
- *Showcasing exemplary applications* – Proactive measures to showcase exemplary programs and market their availability
- *Provision of videoconferencing services* - The number of videoconferencing services provided since the inception of the program, a projection of future demand, and the number of workshops on effective use of videoconferencing services





# Design for Conducting the Evaluation of the California High Speed Network

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Full Summary: [http://connectcenter.net/message\\_center/uploads/105/88.pdf](http://connectcenter.net/message_center/uploads/105/88.pdf)

## Evaluation Questions

The evaluation questions that guide the evaluation process for the California K-12 High Speed Network and form the basis of the evaluation design fall into these categories:

1. Who is using the K12HSN and how?
2. How have various functions of the K12HS been carried out?
3. What progress has been made on the K12HSN goals and objectives?
4. What progress has been made on the performance indicators identified by the Advisory Board?
5. What progress has been made on the legislated functions of the K12HS?

The following charts provide all of the detailed evaluation questions related to the categories above as part of the evaluation design.



## Design for Conducting the Evaluation of the California High Speed Network

### Use of the K12HSN Network

Type	Evaluation Questions	Data Sources
<b>Users</b>	1) What baseline data exist on current Network users? 2) What reports can be generated from existing data to document and describe the extent to which services, at varying capacity levels, are being offered and to whom?	K12HSN Staff
<b>Types of Uses</b>	1) What data can profile the typical uses of the Network and its resources?	K12HSN Staff

### Functions of the K12HSN Network

Type	Evaluation Questions	Data Sources
<b>Awareness of the Network</b>	1) What strategies have been used to create awareness of the Network and its associated resources? 2) To whom and with what frequency has information been disseminated?	K12HSN Staff
<b>Technical Support</b>	1) How are Node Site support needs identified?	K12HSN Staff



# Design for Conducting the Evaluation of the California High Speed Network

## Evaluation of Progress Toward Goals and Objectives: *Goal 1*

<b>Goal 1: Provide reliable and secure inter-connectivity among K-12 entities, IHEs, and state and local agencies to facilitate efficient interaction, and reliable and cost-effective Internet service, including transmission of data.</b>		
<b>Objective</b>	<b>Evaluation Questions</b>	<b>Data Sources</b>
<b>Obj. 1.1:</b> Ensure appropriate connectivity and support for K-12 Node Sites across CA to adequately deliver services to schools as measured by the Node Site Survey (specifically referencing capacity at the node sites and in districts).	<ol style="list-style-type: none"> <li>1) How satisfied are Node Sites with K12HSN's efforts to meet their capacity (bandwidth) needs?</li> <li>2) How satisfied are districts with Node Site efforts to meet their capacity (bandwidth, technical support) needs?</li> </ol>	Document Review Footprint Interviews Node Site Survey Client Satisfaction Survey
<b>Obj. 1.2:</b> Ensure appropriate Node Site support to K-12 districts and school sites across CA as measured by the Client Satisfaction Survey.	<ol style="list-style-type: none"> <li>1) What services do respective Node Sites provide and at what level of connectivity?               <ul style="list-style-type: none"> <li>o To what K-12 entities, agencies and institutions do the respective Node Sites provide services?</li> <li>o What is the footprint of the K12HSN, including numbers of agencies that are part of and connected to the Network, and what are their connection speeds?</li> </ul> </li> </ol>	Node Site Survey Client Satisfaction Survey
<b>Obj. 1.3:</b> Support and leverage CA participation in the E-rate discount program as evidenced by a 10% increase in CA K-12's share of overall E-rate program funding by June 2009.	<ol style="list-style-type: none"> <li>1) How satisfied are participants of the E-rate application training?</li> <li>2) What are CDEs technical support needs related to E-rate and how satisfied are they that these needs are being met?</li> <li>3) By what percentage does California's share of overall E-rate funding increase annually compared to national E-rate totals/funds?</li> </ol>	Training Participant Satisfaction Survey Document and website Review
<b>Obj. 1.4:</b> Increase utilization of the available network through increasing the number of sites connected and the capacity with which they connect.	<ol style="list-style-type: none"> <li>1) What are the site-based circumstances that distinguish connected versus non-connected sites? What are the change agents that move a site from non-connected to connected?</li> <li>2) Across available bandwidth levels of connectivity, what Network resources are sites using, when, and for what purpose?</li> <li>3) What are end-users' perceived benefits of using the Network and its resources?</li> <li>4) How much of their available bandwidth are Node Sites using?</li> </ol>	Node Site Survey Connected Site Survey Client Satisfaction Survey Review Connectivity Database Interviews



# Design for Conducting the Evaluation of the California High Speed Network

## Evaluation of Progress Toward Goals and Objectives: *Goal 2*

<b>Goal 2: Provide statewide coordination of network uses, video-conferencing, and related distance learning capabilities to benefit teaching and learning</b>		
<b>Objective</b>	<b>Evaluation Questions</b>	<b>Data Sources</b>
<b>Obj. 2.1:</b> Generate awareness of appropriate high-quality educational resources and applications that teachers, students and administrators can access on the Network.	1) What is the process of “information flow” at K-12 Node Sites? Is there anything in the process that is blocking stakeholders’ access to information? 2) What are the essential conditions that facilitate the transition from awareness to use of resources on the Network?	Node Site Survey ACC/NIC member Interviews Document and Website Review CSTS Survey
<b>Obj. 2.2:</b> In response to targeted dissemination efforts, expand videoconferencing use and other related tools in support of professional development, teaching and learning, and administrative efficiencies by 10% each year.	1) What are trainers’, teachers’, and administrators’ perceived opportunities created by access to videoconferencing? 2) What are the qualitative differences between non-users, one-time users, and repeat users of videoconferencing? 3) By what percentage does the number of conducted videoconferences increase annually?	ACC/NIC member Interviews Review Utilization database & reports Connected Site CSTS Survey
<b>Obj. 2.3</b> In response to targeted dissemination efforts, EdZone users, visitors, and new logins will increase annually.	1) What are trainers’, teachers’, and administrators’ perceived opportunities created by access to broadband-supported tools? 2) What is the baseline data from th time edZone was luanched in May through December 2008 (new users, edZone site traffic, blogs created, etc.)?	Review Utilization database & reports Connected Site Survey CSTS Survey
<b>Obj. 2.4:</b> Identify and disseminate an in depth look at a minimum of 3 projects and best practices annually that demonstrate how broadband is impacting classroom experiences.	1) What are examples of value-added teaching and learning activities used by agencies that can only be accessed via broadband?	Terri to generate list of possible sites Site Visits



## Design for Conducting the Evaluation of the California High Speed Network

### Evaluation of Progress Toward Goals and Objectives: *Goal 3*

<b>Goal 3: Provide statewide coordination of Ed Tech policy leadership efforts to maximize benefits to CA K-12.</b>		
<b>Objective</b>	<b>Evaluation Activity to support Internal Evaluation</b>	<b>Data Sources</b>
<b>Obj. 3.1:</b> The Advisory Board will identify key strategies for minimizing barriers to educational delivery of online learning for CA K-12 students.	1) How do Advisory Board members perceive their roles? What recommendations do they have regarding the role of broadband in education? <ul style="list-style-type: none"><li>• Review agendas, meeting materials, and minutes.</li><li>• Document recommendations from Advisory Board members and track action items related to and progress towards addressing those recommendations.</li></ul>	Document Review
<b>Obj. 3.2:</b> Explore and develop a minimum of 3 strategic partnerships annually with technology industry leaders, content providers and other stakeholders to address specific needs.	1) What strategic partnerships were established annually with technology industry leaders, content providers and other stakeholders to address specific needs? <ul style="list-style-type: none"><li>• Document the number of strategic partnerships established each year.</li><li>• Document the extent to which the partnerships have an impact on Network users by summarizing efforts to meet the technical needs of K12 districts and schools.</li></ul>	Survey



# Design for Conducting the Evaluation of the California High Speed Network

## Data Collection Plan: *Use of the K12HSN*

Evaluation Question	Information Source	Information Needed	Instruments/Process	Who is Responsible	Data collection Timeline
<p>What baseline data exist on the current Network users and typical uses of the network?</p> <p>What reports can be generated from existing data to document and describe the extent to which services, at varying capacity levels, are being offered and to whom?</p>	Teri/Alan	<p>What does HSN already know about current users and uses of the network?</p> <p>What reports does HSN already generate from their databases?</p>	<p>Interview/Mtg with HSN staff</p> <p>Review databases and HSN generated reports</p> <p>Process: HSN/Teri to generate list of end-users</p> <p>Process: Recommend additional reports as needed</p>	<p>Wexford HSN</p> <p>Wexford to access and review HSN databases and reports</p>	April 21-22, on-going
What data can be used to profile the typical uses of the Network and its associated resources?	Teri	HSN to generate a baseline report of videoconferencing (Mar '07-Mar '08) and EdZone use (beginning Mar 6, '08)	<p>Interview/Mtg with HSN staff</p> <p>Process: Review databases and reports</p>	Wexford	April 21-22, on-going



# Design for Conducting the Evaluation of the California High Speed Network

## Data Collection Plan: *Functions of the K12HSN Network*

Evaluation Question	Information Source	Information Needed	Instruments/Process	Who is Responsible	Data collection Timeline
<p>What strategies have been used to create awareness of the Network and its associated resources?</p> <p>To whom and with what frequency has information been disseminated?</p>	Teri/Alan	HSN to document dissemination efforts (who, how, frequency)	<p>Wexford to provide HSN with a template to documenting their dissemination efforts.</p> <p>Wexford summarizes HSNs documentation</p>	HSN Wexford	April 21-22, on-going
How are Node Site support needs identified?	Teri/Alan	<p>How does HSN identify node site tech support needs?</p> <p>HSN to document their review and action process.</p>	<p>Wexford to provide HSN with a template to document HSN review and action process</p> <p>Interview/Mtg with HSN staff</p>	Wexford	April 21-22, on-going



# Design for Conducting the Evaluation of the California High Speed Network

## Data Collection Plan: Goal 1

Evaluation Question	Information Source	Information Needed	Instruments/Process	Who is Responsible	Data collection Timeline
How satisfied are Node Sites with K12HSN's efforts to meet their bandwidth needs?	Node Site Clients: District Admin.	Node site satisfaction with HSN	Node Site Survey (Admin and Tech)	Wexford	May
How satisfied are districts with Node Site efforts to meet their bandwidth and technical support needs?	Node Site Clients: District Admin.	District satisfaction with Node Site services	Client Satisfaction Survey (District user)	Wexford	May
What is the footprint of the K12HSN? To what K-12 entities, agencies and institutions do the respective Node Sites provide services?	Todd/Teri	Connected Districts & Connected Schools list (numbers of agencies that are part of and connected to the Network and their connection speeds)	N/A	Existing document already delivered to Wexford by HSN	N/A
What support do Node Sites provide?	Node Sites (NIC & ACC) Node Site Clients: District Admin.	District satisfaction with Node Site services	Instruments: Node Site Survey (Admin and Tech) Client Satisfaction Survey (District user)	Wexford	May
How satisfied are participants of the E-rate application training?	E-rate Training Participants	What E-rate technical support is HSN providing? (Number of people trained each year; Level of participant satisfaction with E-rate training.) What is the level/frequency of E-rate technical assistance provided to Districts?	Process: Review E-Rate training materials (online)  Instrument: E-rate Training Participant Survey	Wexford will review and/or add survey items  Russ/HSN is conducting survey	April - May
What are CDE's technical support needs related to E-rate and how satisfied are they that these needs are being met?	Barbara Thalacker	What is CDE's level of satisfaction with the technical assistance HSN is providing? What specific technical support needs does CDE have?	Instrument: Interview Protocol	Wexford	June
By what percentage does California's share of overall E-rate funding increase annually compared to national E-rate totals/funds?	Russ	Analysis of data conducted by Russ and Barbara Thalacker	Process: Review of Russ' data analysis  Interview CDE Staff	Wexford	May – August





# Design for Conducting the Evaluation of the California High Speed Network

## Data Collection Plan: Goal 1

Evaluation Question	Information Source	Information Needed	Instruments/Process	Who is Responsible	Data collection Timeline
What are the site-based circumstances that distinguish connected versus non-connected sites?	Connectivity Database (Jeff) Identified Connected Sites (Admin and Tech contacts)	Summary of characteristics for connected and non-connected sites What prevents sites from connecting to the Network? Summary of barriers & challenges to become a connected site	Process: Review Connectivity Database Instruments: Connected Site Interview Protocols	Wexford: Summary and analysis  HSN/Jeff: Continue data collection	June - August
What are the change agents that move a site from non-connected to connected?	Connectivity Database (Jeff)  Identified Connected Sites (Admin and Tech contacts)	Identify factors that facilitated connection for a site	Instruments: Node Site Survey (Admin and Tech) Client Satisfaction Survey (District user) Connected Site Interview Protocols		
Across available bandwidth levels of connectivity, what Network resources are sites using, when, and for what purpose?	Random sample of Node Site Survey takers	What Network resources do Node sites report end-users are using (frequency and purpose)? What Network resources are end-users (teachers and administrators) report they are using (frequency and purpose)?	Instruments: Client Satisfaction Survey (Districts) Connected Site Survey District/School Interview Protocols Success Case Site Interview Protocol	Wexford	June (survey) October (interviews)
What are end-users' perceived benefits of using the Network and its associated resources?	Regionally stratified sample of connected users (administrators and teachers)	Summary of end-users (teachers and administrators) use of the network and its resources	Instruments: Connected Site Survey Interview Protocol	Wexford	May
How much of their available bandwidth are Node Sites using?	NIC/ACC	Self-reported bandwidth use at each node site.	Instruments: Node Site Survey (Admin and Tech)	Wexford	May



# Design for Conducting the Evaluation of the California High Speed Network

## Data Collection Plan: Goal 2

Evaluation Question	Information Source	Information Needed	Instruments/Process	Who is Responsible	Data collection Timeline
What is the process of “information flow” at K-12 Node Sites? Is there anything in the process that is blocking stakeholders’ access to information?	Regionally stratified sample of connected users (administrators and teachers)	From whom do users at various levels get their information about the HSN and its related services? To whom do they share information about the HSN?	Instrument: Node Site Survey (Admin and Tech) Client Satisfaction Survey (Districts) Connected Site Survey	Wexford	May
What are the essential conditions that facilitate the transition from awareness to use of resources on the Network?	Random sample of Connected Site Survey takers	Site-based context related to connectivity and use of the HSN. How do site-based goals affect levels and frequency of use?	Instrument: Connected Site Survey Telephone Interview protocol generated from first line analysis of survey data	Wexford	May (survey) Fall (interviews)
What are trainers’, teachers’, and administrators’ perceived opportunities created by access to videoconferencing?	Random sample of people who have used videoconferencing services at least once (Alan’s database)	Summary of videoconference use experience (planning, technical support, implementation)	Instrument: Client Satisfaction Survey (Districts) Connected Site Survey Telephone Interview protocol generated from first line analysis of survey data	Wexford	May (survey) June (interviews)
What are the qualitative differences between non-users, one-time users, and repeat users of videoconferencing?	Random sample of people who have used videoconferencing services at least once (Alan’s database)	Summary of videoconference use experience (planning, technical support, implementation)	Instrument: Client Satisfaction Survey (Districts) Connected Site Survey Telephone Interview protocol generated from first line analysis of survey data	Wexford	October
By what percentage does the number of conducted videoconferences increase annually?	Alan to provide baseline videoconference use	Frequency and percent of sampled survey takers who know about Network resources.	Instrument: Client Satisfaction Survey (Districts)	Wexford	May
What are trainers’, teachers’, and administrators’ perceived opportunities created by access to broadband-supported tools?	Random sample of people who have used EdZone services at least once (Alan’s database)	Summary of EdZone experience	Instrument: Connected Site Survey	Wexford	Fall ‘08
What is the baseline data from the time edZone was launched in March 2008 through December 2008? (new users, site traffic, blogs created, etc)	Alan’s database	Document new logins, unique contributions, and new users as of March 6, 2008-December 6, 2008.	Process: Analyze data	Wexford	Fall ‘08
What are examples of value added teaching and learning activities used by agencies that can only be accessed through broadband?	Teri to generate “success case” school site list.	Document a minimum of three projects using broadband.	Instrument: Interview Protocol Site Visits (observation protocol)	Wexford	Spring ‘08/Fall ‘08



## Design for Conducting the Evaluation of the California High Speed Network

### Data Collection Plan: Goal 3

Evaluation Question/Activity	Information Source	Information Needed	Instruments/Process	Who is Responsible	Data collection Timeline
How do Advisory Board members perceive their roles? What recommendations do they have regarding the role of broadband in education?  Review agendas, meeting materials, and minutes	Teri	Electronic access to documents	Process: Review and summarize	Wexford	Ongoing
Document recommendations from Advisory Board members and track action items related to and progress towards addressing those recommendations	Teri	Document summary	Process: Incorporate document summary information into report	Wexford	Ongoing
What strategic partnerships were established annually with technology industry leaders, content providers and other stakeholders to address specific needs?  Document the number of strategic partnerships established each year	Teri/Todd/Alan	Partner name, contact, and description of services	Process: Summarize nature and levels of partnerships	Teri	
Document the extent to which the partnership had an impact on Network users	Teri		Data summary	Wexford	Fall 2008

**CALIFORNIA K12HSN EVALUATION**

**APPENDIX B**

**K12HSN NODE SITES**

## Node Sites - December 2008

	Node Site	Districts Connected	Schools Connected	Peak Bandwidth Usage*
1	Alameda COE	86% (19 of 22)	70% (277 of 393)	232 Mbps
2	Alpine COE	100% (1 of 1)	71% (5 of 7)	7.12 Mbps
3	Amador COE	100% (1 of 1)	86% (12 of 14)	4.93 Mbps
4	Butte COE	100% (14 of 14)	97% (88 of 91)	74 Mbps
5	Calaveras COE	100% (4 of 4)	97% (29 of 30)	14 Mbps
6	Colusa COE	100% (4 of 4)	95% (20 of 21)	16 Mbps
7	Contra Costa COE	100% (18 of 18)	98% (265 of 271)	286 Mbps
8	Del Norte COE	100% (1 of 1)	89% (16 of 18)	20 Mbps
9	Fresno COE	94% (32 of 34)	92% (296 of 322)	266 Mbps
10	Glenn COE	78% (7 of 9)	65% (24 of 37)	19 Mbps
11	Imperial COE	100% (16 of 16)	96% (65 of 68)	320 Mbps
12	Inyo COE-Bishop Union ESD	100% (7 of 7)	93% (27 of 29)	21 Mbps
13	Kern Cty Superintendent of Schools	83% (40 of 48)	73% (196 of 268)	93 Mbps
14	Kings COE	100% (14 of 14)	94% (58 of 62)	129 Mbps
15	Lake COE	100% (7 of 7)	98% (45 of 46)	32 Mbps
16	Lassen COE	100% (10 of 10)	94% (33 of 35)	12 Mbps
17	Madera COE	67% (6 of 9)	88% (69 of 78)	22 Mbps
18	Marin COE	100% (19 of 19)	100% (78 of 78)	88 Mbps
19	Mariposa COE	100% (1 of 1)	100% (18 of 18)	8.25 Mbps
20	Mono COE	100% (2 of 2)	83% (19 of 23)	12 Mbps
21	Monterey COE	92% (22 of 24)	95% (123 of 129)	29 Mbps
22	Napa Valley USD	100% (5 of 5)	96% (45 of 47)	39 Mbps
23	Nevada Jt UHSD	90% (9 of 10)	73% (40 of 55)	26 Mbps
24	Orange CDE	93% (25 of 27)	84% (513 of 608)	591 Mbps
25	Plumas COE	100% (1 of 1)	64% (9 of 14)	21 Mbps
26	Sacramento COE	89% (16 of 18)	83% (316 of 381)	417 Mbps
27	San Benito COE	55% (6 of 11)	69% (18 of 26)	51 Mbps
28	San Diego COE	88% (37 of 42)	79% (556 of 705)	648 Mbps
29	San Francisco COE	50% (1 of 2)	95% (104 of 109)	183 Mbps
30	San Joaquin COE	67% (10 of 15)	23% (51 of 219)	84 Mbps
31	San Luis Obispo COE	100% (10 of 10)	99% (84 of 85)	59 Mbps
32	San Mateo COE	58% (14 of 24)	62% (107 of 172)	328 Mbps
33	Santa Barbara COE	26% (6 of 23)	11% (13 of 118)	24 Mbps
34	Santa Clara COE	81% (26 of 32)	73% (277 of 379)	46 Mbps
35	Santa Cruz COE	100% (11 of 11)	93% (65 of 70)	118 Mbps
36	Shasta COE	76% (19 of 25)	67% (66 of 99)	72 Mbps
37	Siskiyou COE	100% (29 of 29)	99% (68 of 69)	28 Mbps
38	Solano COE	67% (4 of 6)	64% (66 of 103)	72 Mbps
39	Sonoma COE	98% (39 of 40)	96% (158 of 164)	128 Mbps
40	Stanislaus COE	81% (21 of 26)	64% (111 of 174)	106 Mbps
41	Sutter COE	100% (12 of 12)	93% (41 of 44)	15 Mbps
42	Red Bluff Joint UHSD	100% (18 of 18)	92% (47 of 51)	40 Mbps
43	Trinity COE	67% (8 of 12)	68% (19 of 28)	8.21 Mbps
44	Tulare COE	80% (37 of 36)	78% (149 of 190)	132 Mbps
45	Tuolumne COE	100% (12 of 12)	84% (38 of 45)	18 Mbps
46	Ventura COE	100% (20 of 20)	99% (213 of 216)	111 Mbps
47	Yolo COE	100% (5 of 5)	100% (66 of 66)	40 Mbps
48	Yuba COE	100% (5 of 5)	97% (35 of 36)	57 Mbps

**Node Sites (December 2008) (continued)**

*Note: School connectivity data was not available for these Node Sites. These sites connect schools in more than one county or counties. Node sites listing n/a for districts connected are single sites that are within a district or that service schools directly.*

	<b>Node Site</b>	<b>Districts Connected</b>	<b>Peak Bandwidth Usage</b>
49	El Dorado COE	100% (14 of 14)	50 Mbps
50	Lake Tahoe USD	100% (1 of 1)	19 Mbps
51	Humboldt COE	88% (27 of 31)	42 Mbps
52	Northern Humboldt UHSD	100% (1 of 1)	8.56 Mbps
53	Los Angeles COE	75% (63 of 84)	210 Mbps
54	Los Angeles USD	100% (1 of 1)	607 Mbps
55	Madera COE-Discovery Secondary	100% (3 of 3)	22 Mbps
56	Mendocino COE	92% (10 of 11)	43 Mbps
57	Mendocino-Fort Bragg	100% (1 of 1)	Data not available
58	Merced COE	90% (18 of 20)	84 Mbps
59	Merced-Dos Palos-Ora Loma Jt. USD	100% (1 of 1)	13 Mbps
60	Modoc COE	50% (1 of 2)	12 Mbps
61	Modoc-Tulake Basin Jt. USD	100% (1 of 1)	17 Mbps
62	Placer COE	100% (17 of 17)	73 Mbps
63	Tahoe-Truckee USD	100% (1 of 1)	16 Mbps
64	Riverside COE	67% (5 of 13)	167 Mbps
65	Indio UHSD	100% (10 of 10)	Data not available
66	San Bernardino Cty Superintendent of Schools	85% (17 of 20)	420 Mbps
67	Chaffey Joint USD	100% (6 of 6)	157 Mbps
68	Victor Valley Community College	66% (4 of 6)	16 Mbps
69	Sierra COE	100% (1 of 1)	5.2 Mbps
70	Sierra-Loyalton HS	100% (1 of 1)	19 Mbps
71	California Department of Education	100% (1 of 1)	24 Mbps

**About Peak Bandwidth Usage**

Node Sites and districts are asked to self-report their connectivity data to K12HSN on an annual basis. Bandwidth utilization is captured by K12HSN using monitoring software and equipment and is reviewed in a proactive manner for program decisions and node site service levels. K12HSN uses the reports of utilization and information collected from node sites related to planned bandwidth growth by the node site or the districts it serves, to anticipate future bandwidth needs. Due to E-rate bidding requirements, these growth projections are made as far as 18 months in advance of the need.

On one day in December 2008, node site peak bandwidth usage varied between 4.9 Mbps to 648 Mbps. The number and size of districts and schools that each node site connects to the network, and the uses or applications that those “clients” employ determine the amount of bandwidth used at each node site. The time and date for which data is reported was chosen because of the robust usage that was observed for the network in general at that point in time.

### Number of Districts and Schools Connected, By County (December 2008)

County	Districts Connected	Schools Connected	County	Districts Connected	Schools Connected
Alameda	86% (19 of 22)	70% (277 of 393)	Orange	93% (25 of 27)	84% (513 of 608)
Alpine	100% (1 of 1)	71% (5 of 7)	Placer	100% (17 of 17)	93% (108 of 116)
Amador	100% (1 of 1)	86% (12 of 14)	Plumas	100% (1 of 1)	64% (9 of 14)
Butte	100% (14 of 14)	97% (88 of 91)	Riverside	67% (16 of 24)	58% (273 of 472)
Calaveras	100% (4 of 4)	97% (29 of 30)	Sacramento	89% (16 of 18)	83% (316 of 381)
Colusa	100% (4 of 4)	95% (20 of 21)	San Benito	55% (6 of 11)	69% (18 of 26)
Contra Costa	100% (18 of 18)	98% (265 of 271)	San Bernardino	85% (28 of 33)	76% (413 of 545)
Del Norte	100% (1 of 1)	89% (16 of 18)	San Diego	88% (37 of 42)	79% (556 of 705)
El Dorado	100% (15 of 15)	97% (65 of 67)	San Francisco	50% (1 of 2)	95% (104 of 109)
Fresno	94% (32 of 34)	92% (296 of 322)	San Joaquin	67% (10 of 15)	23% (51 of 219)
Glenn	78% (7 of 9)	65% (24 of 37)	San Luis Obispo	100% (10 of 10)	99% (84 of 85)
Humboldt	88% (28 of 32)	59% (52 of 88)	San Mateo	58% (14 of 24)	62% (107 of 172)
Imperial	100% (16 of 16)	96% (65 of 68)	Santa Barbara	26% (6 of 23)	11% (13 of 118)
Inyo	100% (7 of 7)	93% (27 of 29)	Santa Clara	81% (26 of 32)	73% (277 of 379)
Kern	83% (40 of 48)	73% (196 of 268)	Santa Cruz	100% (11 of 11)	93% (65 of 70)
Kings	100% (14 of 14)	94% (58 of 62)	Shasta	76% (19 of 25)	67% (66 of 99)
Lake	100% (7 of 7)	98% (45 of 46)	Sierra	100% (1 of 1)	88% (7 of 8)
Lassen	100% (10 of 10)	94% (33 of 35)	Siskiyou	100% (29 of 29)	99% (68 of 69)
Los Angeles	75% (64 of 85)	84% (1655 of 1973)	Solano	67% (4 of 6)	64% (66 of 103)
Madera	100% (9 of 9)	88% (69 of 78)	Sonoma	98% (39 of 40)	96% (158 of 164)
Marin	100% (19 of 19)	100% (78 of 78)	Stanislaus	81% (21 of 26)	64% (111 of 174)
Mariposa	100% (1 of 1)	100% (18 of 18)	Sutter	100% (12 of 12)	93% (41 of 44)
Mendocino	92% (11 of 12)	81% (60 of 74)	Tehama	100% (18 of 18)	92% (47 of 51)
Merced	95% (19 of 20)	88% (92 of 104)	Trinity	67% (8 of 12)	68% (19 of 28)
Modoc	67% (2 of 3)	75% (18 of 24)	Tulare	80% (37 of 36)	78% (149 of 190)
Mono	100% (2 of 2)	83% (19 of 23)	Tuolumne	100% (12 of 12)	84% (38 of 45)
Monterey	92% (22 of 24)	95% (123 of 129)	Ventura	100% (20 of 20)	99% (213 of 216)
Napa	100% (5 of 5)	96% (45 of 47)	Yolo	100% (5 of 5)	100% (66 of 66)
Nevada	90% (9 of 10)	73% (40 of 55)	Yuba	100% (5 of 5)	97% (35 of 36)

**Totals:**

86% (855 of 994) of Districts Connected

80 % (7781 of 9782) of Schools Connected