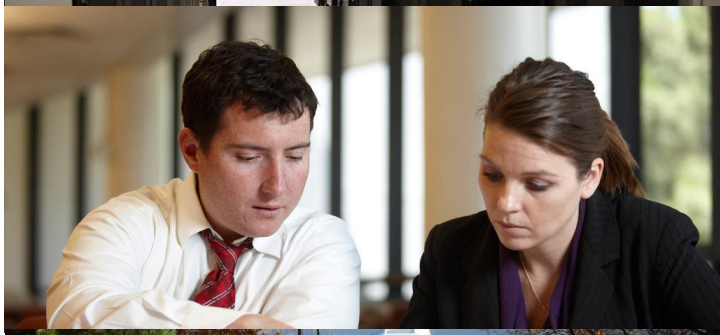
NSHE»SCS

System Computing Services

Connecting NSHE and Nevada through highly valued Shared Digital Services

Shared Digital Service Opportunities

Collaboratively evaluate shared digital service opportunities to increase value to students and institutions.



Background about System Computing Services

Opportunities to Expand Shared Digital Services

Questions and Discussion

Appendices with Additional Information

NSHE Shared Digital Services History

- SCS is the only NSHE central shared service provider
- SCS has provided shared services to NSHE since the early 1980s
- SCS began delivering shared services to the State of Nevada in 1995 as charged by the 68th Legislature

Responsive Reliable Resource

Core Shared Digital Services

NSHE and State of Nevada

- Wide Area Network
- Video Conferencing
- Systems Engineering
- Cybersecurity
- Facility Management

NSHE Institutions

- Event Production
- Student Info System
- Administrative Info System

Board of Regents / SA / SCS

- Endpoint Management
- Desktop Support

SCS Value to NSHE and Nevada

- SCS is Nevada's statewide education network
- SCS delivers the Internet and video conferencing
- SCS hosts and manages information systems
- SCS provides statewide cybersecurity
- SCS negotiates NSHE-wide technology contracts

SCS provisions services more cost-effectively at scale than duplicated at institutions

SCS is Nevada's statewide educational network

We connect NSHE institutions, K12s, rural healthcare, and state agencies.

- National research connectivity for UNLV, UNR, DRI
- Research project endpoints (e.g., seismic sensors, fire cameras)
- Video Conferencing
- Wide Area Network / Internet to 300+ sites
- Intelligent Traffic Signs and Cameras
- Radio Broadcasting Infrastructure
- Domain Name Service (Internet)
- Data Center Management

SCS manages the network for the State and uses NDOT fiber at no cost

Nevada Video Conferencing Customers

- K12 classes
- K12 School Boards
- Parole hearings
- District Court hearings
- Water Resource Management
- State Board of Examiners
- State licensure trainings
- Legislative Counsel Bureau
- Legislative Committees
- Federal Court hearings
- Governor's Office of Economic Development
- State Board of Nursing
- Nevada Nursing and Healthcare Workforce
- US Dept of Agriculture
- US Geological Survey
- US Forest Service
- US Senators
- US Veterans' Affairs

SCS video conferencing precludes NDOC transport

SCS delivers Internet and video conferencing

We provide access for research, distance education, workforce development, healthcare, and rehabilitation at >200 sites.

- 12 of 17 county K12 School Districts at 33 locations
- 11 rural hospitals and clinics
- Nevada Rural Hospital Partners headquarters
- Seismology Fire Cameras at 6 locations
- KUNR Radio Broadcast at 4 locations
- Department of Transportation at 22 locations
- Enterprise IT Services at 20 locations
- Department of Corrections at 26 locations
- Event Production (all NSHE institutions)

SCS Connects NSHE and Nevada

SCS hosts and manages information systems

We support institutional operations for >125,000 students and employees.

- Workday Administrative Information System
- PeopleSoft Student Information System
- Systems and Database Management
- Bank, Scholarship, IRS Transfers
- Single Sign On Architecture and Multi-Factor Authentication
- Disaster Recovery and Data Backup
- Web Hosting
- Multi-Institutional Research Data Warehouse

Institutions run on SCS information systems

SCS negotiates NSHE-wide technology contracts

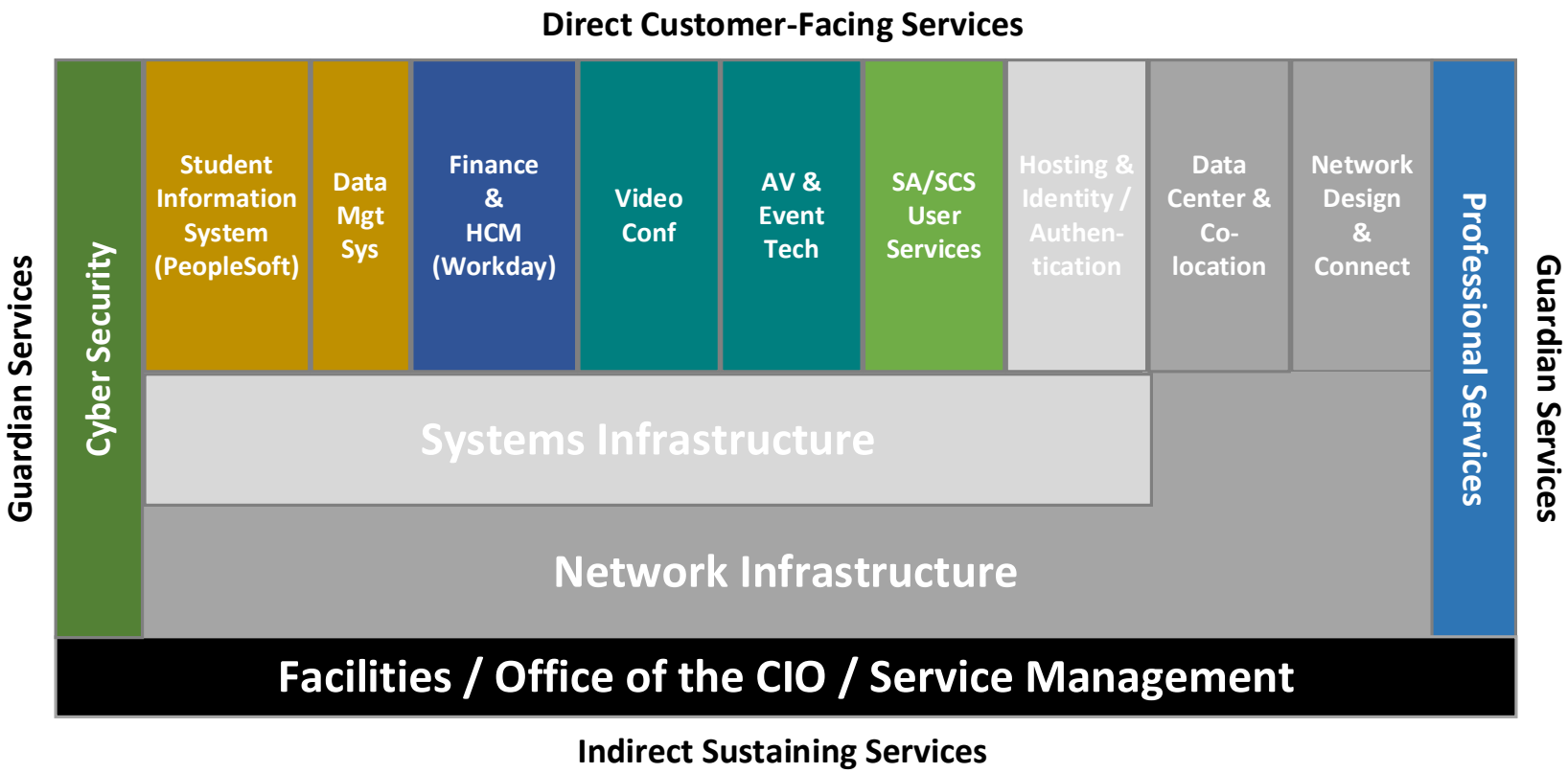
We leverage buying power to reduce institutional costs.

- Adobe
- Microsoft
- Oracle
- Title IX Compliance
- Workday

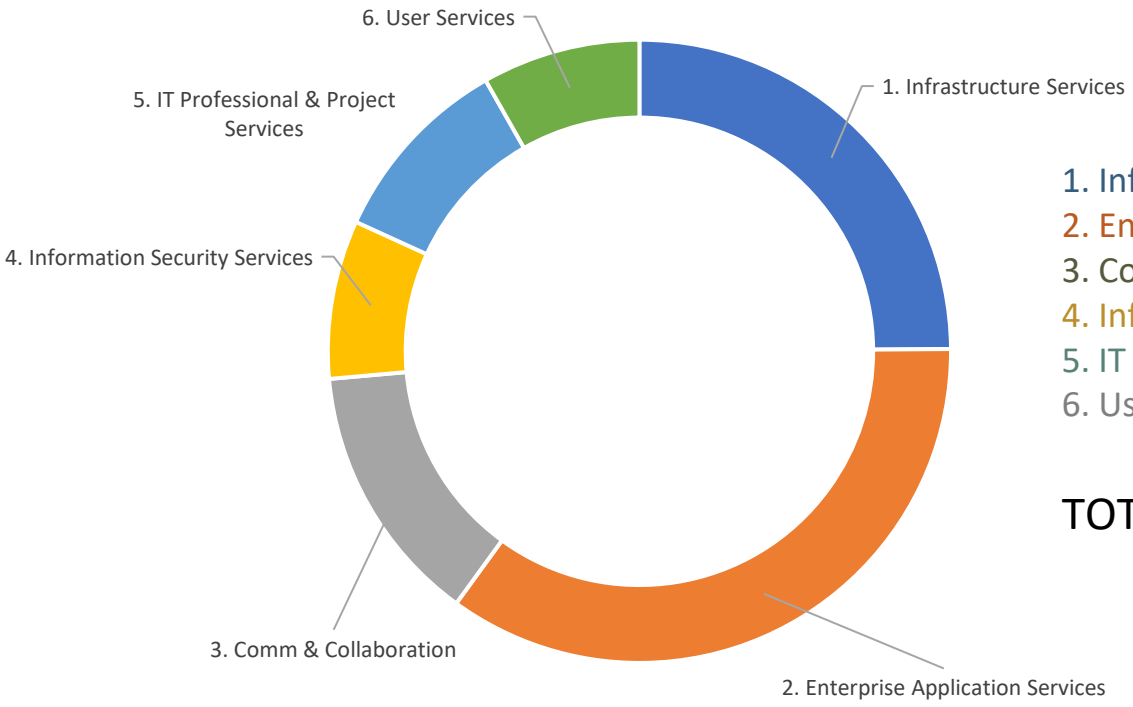
We coordinate NSHE-wide software purchases enabling greater digital capability for smaller institutions.

SCS reduces cash outlay and redundant time for institutions

Service Architecture



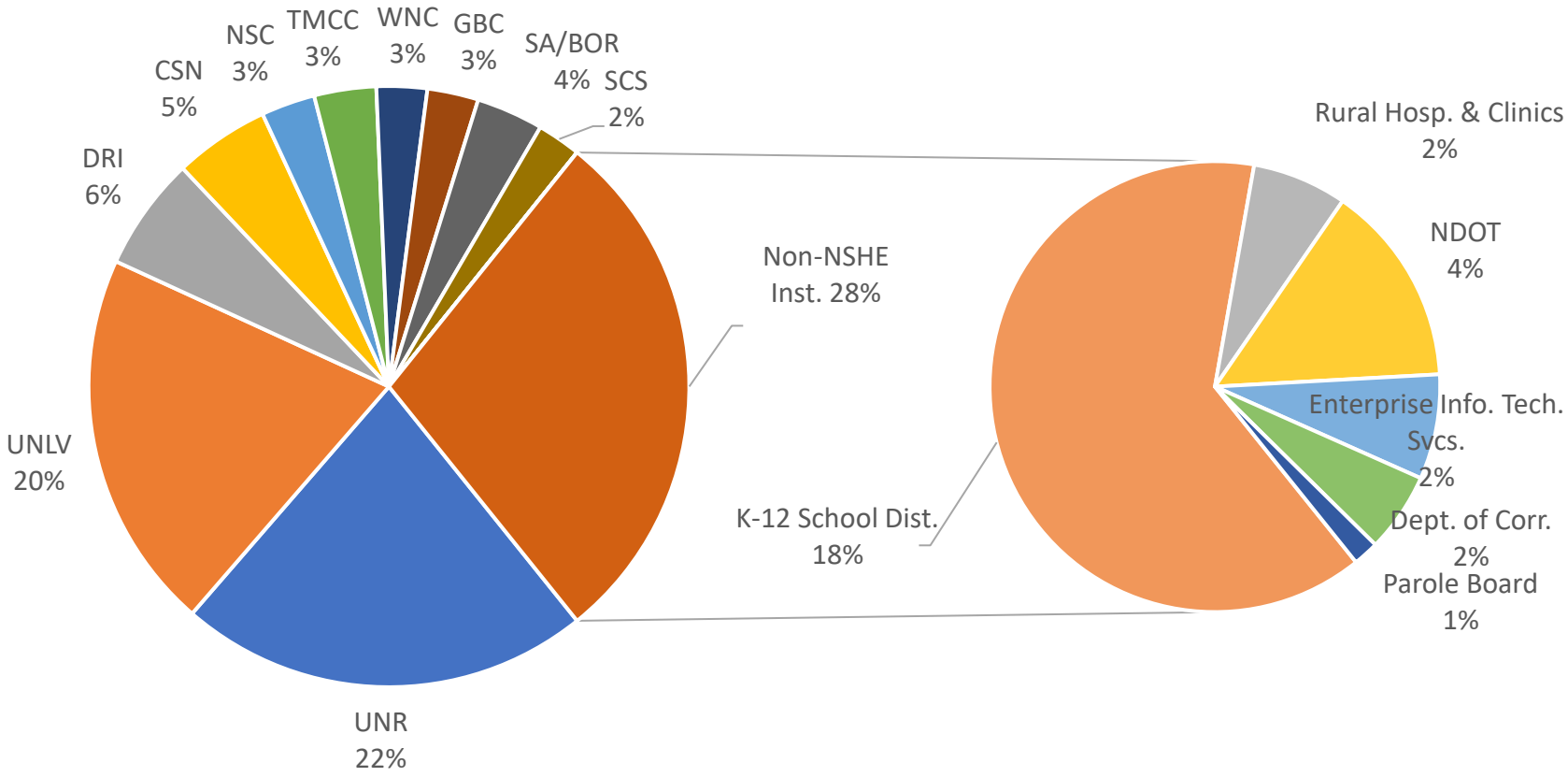
Annual Costs by Service Area



1. Infrastructure Services $5,051,689.56
2. Enterprise App. Svcs. $7,129,235.07
3. Comm. & Collaboration $2,758,332.25
4. Information Security Svcs. $1,670,826.47
5. IT Professional & Project Svcs. $2,023,831.84
6. User Services $1,667,738.36

TOTAL: $19,094,688.73

Network Consumption NSHE / NonNSHE



Funding Sources

Program	Annual Amount	Type	Source
Highway Projects	Varies	Cost recovery by project	NDOT
Correction Services	$ 107,354	Service revenue	NDOC/NPBC
Data Center Colocation	$ 109,326	Service revenue	Institutions
PeopleSoft (Integrate 1)	$ 1,019,536	Cost recovery pass thru	Institutions
Workday (Integrate 2)	$ 3,722,029	Cost recovery pass thru (FY22)	Institutions
Base Funding	$ 16,978,375	State General Fund	NV Legislature

Background about System Computing Services

Opportunities to Expand Shared Digital Services

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Appendices with Additional Information

If you want to go fast, go alone.

If you want to go far, go together.

~Proverb of Unknown Origin

Trusted Mission Partner in shared and digital services

Shared Digital Services Opportunities Matrix

ID	OPPORTUNITY	BENEFIT	ALIGNMENT							INVESTMENT		
	Ideas to evaluate with institutions	*NSHE / NV*	Operational Efficiency	Risk Management	Decision Support	Student Success	Access	Research	Workforce	Complexity of Time & Effort	Additional FTE Needed	Funding Needed
1	Implement employee single sign-on to applications	NSHE	+	+						None	0	0
2	**Extend cybersecurity services**	NSHE	+	+						Low	0	0
3	**Negotiate and review technology contracts**	NSHE	+	+						Low	0	0
4	**Provision additional broadband to community anchors and agencies**	NV	+				+		+	None	0	$
5	Add more K12 school districts to NevadaNet	NV	+				+			None	0	$
6	Administer consolidated file-sharing application	NSHE	+	+						Low	0	$
7	**Administer consolidated e-signature application**	NSHE	+							Low	0	$
8	**Web accessibility support and oversight**	NSHE	+	+						Low	0	$
9	Expand business process training	NSHE	+							Low	0	$
10	Consolidate endpoint purchasing	NSHE	+							Medium	0	$
11	Administer consolidated ticketing system	NSHE	+							Low	0	$
12	Provide community anchor network engineering	NV	+				+		+	None	1-2	$
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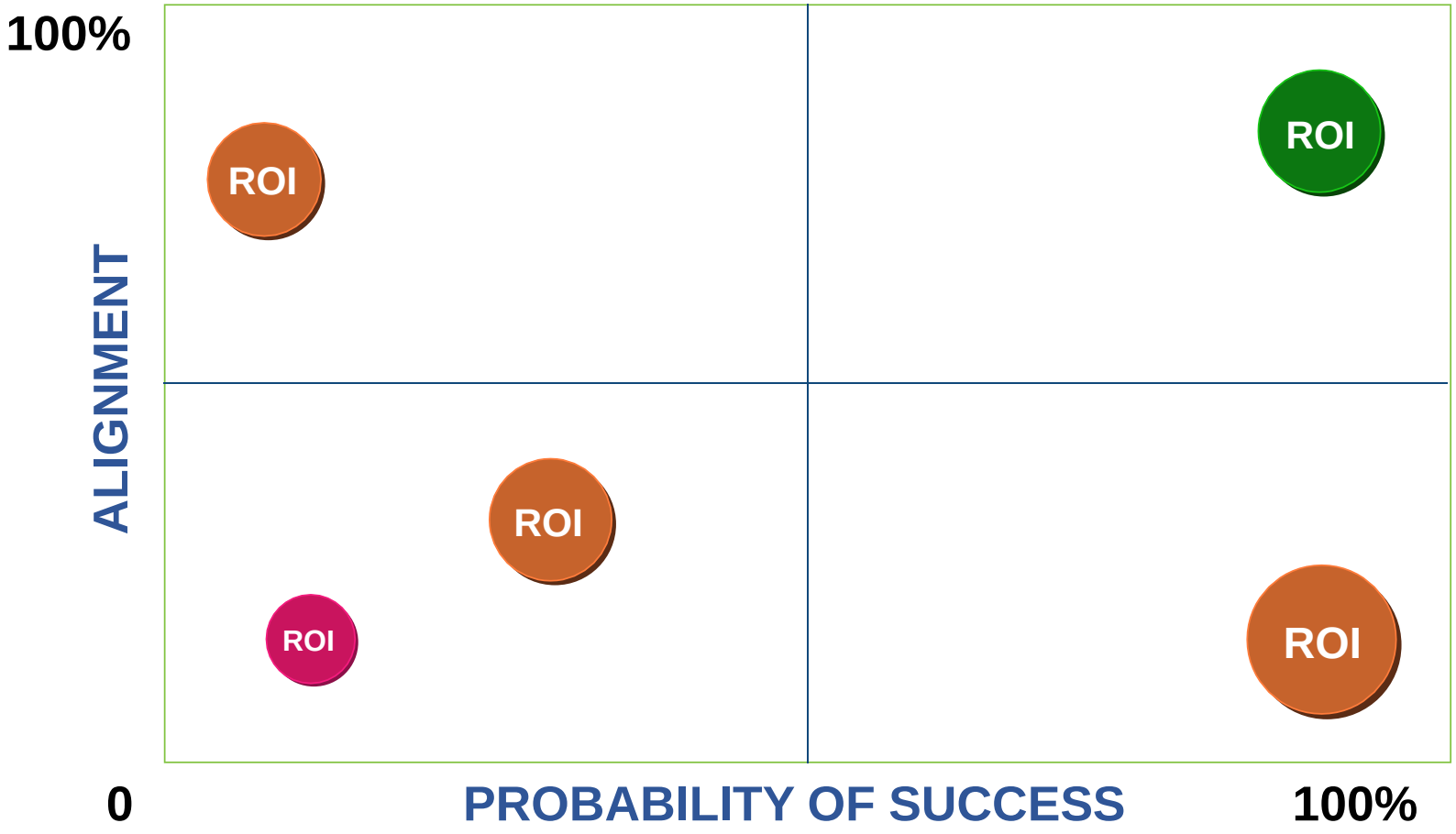
16	**Provide eduroam support for community anchor institutions**	NV	+			+	+			Low	1-2	$$
17	Provide additional SCS-as-Cloud managed hosting services	NSHE	+							Medium	1-2	$$
18	Manage security certificates for NSHE institutions and community anchor institutions	NSHE, NV	+	+						Medium	1-2	$$
19	Staff a consolidated IT call/email center	NSHE	+							Medium	1-2	$$
20	Centrally process PeopleSoft federal financial aid	NSHE	+	+		+				High	1-2	$$
21	Build and support central business intelligence data warehouse	NSHE	+		+					High	1-2	$$
22	Endpoint device remote management	NSHE	+							High	1-2	$$
23	Facilitate research through SW regional network collaboration	NSHE						+		Low	1-2	$$$
24	Support single sign-on for students	NSHE	+	+		+				High	1-2	$$$
25	Standardized student admittance application	NSHE, NV	+			+	+			High	1-2	$$$
26	Consolidate institutional data centers	NSHE	+	+						High	2-3	$$$

Evaluating and Prioritizing



Path Forward

SCS and Institutions

1. Collaborate to evaluate opportunities
2. Present results for prioritization
3. Develop and vet project plans
4. Work together to execute the plans
5. Measure and report on progress

Collaboratively evaluate shared digital services to increase value to students and institutions

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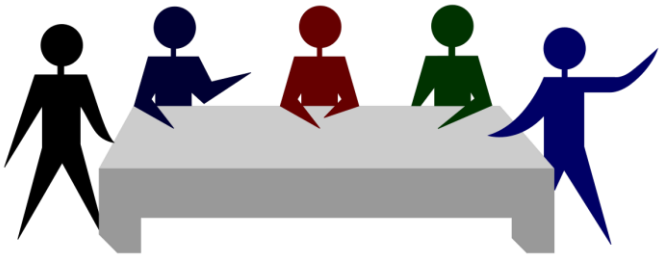
Trusted Mission Partner



Dr. Anne Milkovich, CIO

Background about System Computing Services

Opportunities to Expand Shared Digital Services

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Shared Digital Services Opportunity Methodology

1. Brainstormed wide range of opportunities (26) for new or expanded shared digital services

2. Qualified them according to mission alignment (NSHE and/or NV)

3. Assigned Rough Order of Magnitude (ROM) estimates of Complexity, FTE, Funding from a central point of view.

Each opportunity needs to go through a discovery process with the institutions to evaluate the institutional complexity, benefits, cost, and return on investment

Gartner[1] Research on Shared Services

Rule 0 = That which is shared must be standardized.

Rule 1 = Success depends on trying new things.

Rule 2 = Aim for composable services.

Golden Rule =
Collaborate to define

Silver Rule =
Participants become members of the steering committee

[1] Gartner inquiry with research analyst
Cassio Dreyfus 11/25/2020

NSHE»SCS

System Computing Services

Connecting NSHE and Nevada through highly valued Shared Digital Services

SHARED DIGITAL SERVICES OPPORTUNITY MATRIX

ID	OPPORTUNITY	BENEFIT	ALIGNMENT							INVESTMENT		
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NSHE»SCS

Nevada System of Higher Education
System Computing Services

NSHE
Shared Digital Services
Added Value Opportunities

Prepared by: CIO Milkovich
For: NSHE BOR Fiscal Sustainability Committee
Date: March 18, 2021

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Introduction

This report explains at a high level the opportunities for additional or expanded shared digital services that could support the institutions, especially the smaller ones, more cost-effectively than the current structure. Each suggestion is a conceptual possibility that needs discovery and exploration with the institutions to determine the net cost-effectiveness of implementing it. While we can point out some of the advantages of each one, until we work with the institutions to understand their needs and existing resources in each of these conceptual areas, we cannot accurately project a cost-benefit analysis, and did not attempt to.

Since SCS staffing has been reduced or repurposed over the years, SCS has not been in a position to expand shared digital services. And for the institutions, having local control over digital services is a preference only outweighed by prohibitive costs. Given the current economic climate, it would be to NSHE's advantage to adopt a *Shared First* strategy, where digital services are evaluated first as a shared service. In many cases, a centrally managed shared digital service is not the optimal solution; the cost-benefit-risk analysis may indicate a regional center of excellence solution or an individual-campus solution. Each possible solution must be evaluated on its own merit.

If NSHE institutions, including SCS, consider *Shared First* as the default solution unless a compelling business case indicates otherwise, we will find more opportunities for cost-effectiveness gains than taking the approach of shared when faced with prohibitive cost.

Shared First: Shared Digital Services Added Value Opportunities

Although opportunities have arisen to expand shared digital services in the past decade, few have been pursued. Shared digital services realize economies of scale in the aggregate but can reduce local control. There is a point of diminishing returns in the trade-offs between centralized efficiency (that reduces overall spend but increases the cost of coordination) and local control (that reduces the cost of coordination but increases overall spend).

Since the recession of 2008, SCS staffing has continually been reduced and repurposed, leading to reductions in some shared digital services or little capacity to expand in others. The institutions found a balance with available shared services and their trade-offs.

In today's environment, it is time to adopt the strategy of *Shared First* just like we strategize "Cloud First" when considering new applications and systems. It does not mean every solution must be a centrally managed shared digital service, just like every new application is not necessarily cloud based. But it should be the default unless a well-developed business case indicates otherwise.

Listed below are proposed ways NSHE could strategize *Shared First* by expanding shared digital services to institutions, with descriptions following. Each opportunity needs to be evaluated in collaboration with the institutions to determine the most cost-effective solution. The optimal solution may be a shared digital service, or a regionally shared service, or a continued local service.

We can begin offering most services with existing resources. Until we know the volume of support needed by institutions, we cannot estimate any changes needed to fulfill demand. Cost-benefit analysis can only be completed with assistance from the institutions. If institutions do not buy into additional shared digital services in quantity, benefits will be reduced, which in some cases will change the results of the cost-benefit analysis.

1. Implement employee single sign-on to institutional applications
2. Extend cybersecurity services
3. Negotiate and review technology contracts
4. Provision additional broadband to community anchors and agencies
5. Add more K12 school districts to the network
6. Administer a consolidated file sharing application
7. Administer a consolidated e-signature application
8. Web accessibility support and oversight
9. Expand business process training
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24. Support single sign-on for students
25. Standardize student admittance application
26. Consolidate institutional data centers

Table 1 below qualifies the opportunities with initial information about benefit, alignment, and level of investment needed in time & effort, staffing, and overall funding. Each opportunity must go through a discovery process with the institutions to fully assess and prioritize the risk and return.

Table 1. Shared Digital Services Opportunity Matrix

ID	OPPORTUNITY	BENEFIT	ALIGNMENT							INVESTMENT		
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1 Implement employee single sign-on to institutions' applications

Institutions are interested in extending single sign-on to employees for institution-specific applications, the same way Workday is protected behind the Okta multi-factor authentication application. This increases security and makes it easier for users to sign into various applications.

Operational Efficiency: reduced licensing costs and enhanced user experience

Risk management: increased information security

Complexity	Additional FTE	Funding Needed
None	0	0

Given low complexity and no need for resources, this project is already underway.

2 Extend cybersecurity services

Cybersecurity services protect institutional information, people, and assets to prevent financial or reputational harm. It requires deep expertise on an intermittent basis. These services, some of which are already offered but could be expanded, could include:

- Security Event and Incident Management Services
- Regulatory training, e.g., GLBA, FERPA, PCI, etc.
- Awareness education programs
- Incident response testing and training
- Threat and vulnerability management
- Internal and external network penetration testing
- Risk management tools and metrics

We already offer some of these services to institutions and do not need additional resources to continue expanding the service.

Operational Efficiency: savings in licensing and training

Risk management: increased information security

Complexity	Additional FTE	Funding Needed
Low. Involves collaboration and coordination with institutions.	0	0

3 Negotiate and review technology contracts

Institutions benefit from consolidated procurement and contract management. When all institutions are using the same solutions, this consolidation realizes lower licensing costs and reduces duplication of effort to procure and negotiate licenses. All institutions agree this collaboration has a positive impact.

Institutions also pursue individual contracts for solutions that meet their needs. Establishing a practice where SCS reviews institutional technology contracts and assists with solution research and procurement would improve collective buying power, inform all institutions about opportunities in flight, and also reduce information security risks that can occur in contracts.

Additionally, smaller institutions are sometimes drawn into System-wide higher-end software solutions that are needed by the larger institutions but are more than what smaller institutions need. Monitoring the cost-sharing basis and adding voice to the smaller institutions is a welcome addition to the conversations.

Operational Efficiency: reduced time and effort at institutions, greater leveraging of shared technology solutions, savings in licensing

Risk management: better contract regulatory compliance, better representation of smaller institutions

Complexity	Additional FTE	Funding Needed
Low. Involves collaboration and coordination with institutions.	0	0

4 Provision additional broadband to community anchors and agencies

As the State's Internet2 connector, SCS can connect "community anchor institutions" (CAI) to high-speed Internet service. Internet2 is a second international Internet service whose use is reserved for education and research organizations. Internet2 has extended its service eligibility to community anchor institutions, which they define as any state or municipal agency or any entity that has a research or education component to its mission, such as K12 schools, libraries, museums, hospitals, etc. Connecting community anchor institutions to NevadaNet gives them increased bandwidth with lower latency, usually at lower cost, by paying only for the circuit that connects them to our nearest network node.

It does not impact SCS costs or resources to attach community anchor institutions to our network.

Operational Efficiency: reduced costs for community anchor institutions

Access: improved Internet access for rural communities and students

Workforce: improved Internet access to career retooling and workforce training

Complexity	Additional FTE	Funding Needed
None. Involves collaboration and coordination with CAI on a rolling schedule as current resources permit.	0	$. Small investment may be required for licensing or hardware, possibly on cost recovery.

5 Add more K12 school districts to the network

We currently connect 12 of the 17 school districts to the NevadaNet education network. Connecting to NevadaNet is usually more cost-effective for school districts. Those not on our network have not been evaluated recently to determine the most cost-effective solution for them. SCS could reach out to those school districts, as we are already doing with Clark County School District, to help them reassess their Internet connection costs in comparison to NevadaNet.

Operational Efficiency: reduced Internet costs for K12 school districts, reduced time and effort for their staff

Access: improved Internet access for K12 students

Complexity	Additional FTE	Funding Needed
None. Involves collaboration and coordination with K12s on a rolling schedule as current resources permit.	0	$. Small investment may be required for licensing or hardware, possibly on cost recovery.

6 Administer a consolidated file sharing application

Institutions use multiple cloud-based file-sharing solutions, such as Dropbox, Box, or Google Drive. Some file-sharing solutions are not secure enough to hold sensitive information or are not legally permissible to hold export-controlled data. It is likely that violations are occurring. A standardized solution for file and document sharing would address security and regulatory concerns and provide the convenience that users need. SCS could purchase and administer a secure, standardized cloud solution for file sharing.

Operational Efficiency: reduced duplication of effort across institutions, increased buying power to reduce licensing costs, seamless experience for faculty and staff

Risk management: improved security and regulatory compliance, better representation of smaller institutions

Complexity	Additional FTE	Funding Needed
Low. Involves collaboration and coordination with institutions.	0	$. Investment required for central licensing, possibly with institutional cost-sharing.

7 Administer a consolidated e-signature application

Institutions, including SCS, use different software solutions for electronic signatures. Many documents requiring signatures must go to System Administration for the Chancellor's signature, where documents must be printed for signature and scanned in again, even in cases where wet (ink) signatures are not required. Institutions have requested that NSHE standardize on the same solution to facilitate signature workflow up to System Administration. SCS could administer the central, cloud-based solution.

Operational Efficiency: reduced duplication of effort across institutions, increased buying power to reduce licensing costs, more efficient workflow within institutions and throughout NSHE, reduced time to signature completion, and reduced dependency on paper and physical contact

Complexity	Additional FTE	Funding Needed
Low. Involves collaboration and coordination with institutions. Institutional interest already expressed.	0	$. Investment required for central licensing, possibly with institutional cost-sharing.

8 Web accessibility support and oversight

SCS monitors and maintains accessibility for NSHE System Administration websites to ensure compliance with ADA requirements and universal design standards. SCS could assist with institution efforts in this arena including: administering and supporting accessibility monitoring software, supporting universal design and remediating website accessibility issues, and assistance with captioning and other multimedia accessibility controls.

Operational Efficiency: reduced time and effort at institutions, access to no-cost expertise as needed

Risk management: improved compliance with regulatory accessibility requirements

Complexity	Additional FTE	Funding Needed
Low. Involves collaboration and coordination with institutions. Institutional interest already expressed.	0	$. Investment required for extended licensing, possibly with institutional cost-sharing.

9 Expand business process training

SCS offers Workday business process training and training aids for NSHE System Administration and institutions. This involves learning and explaining a business process in order to train people how to use Workday to complete the process. This service could be extended to incorporate business process analysis, improvement, and standardization across institutions. Additionally, it could be expanded beyond Workday processes to include other training needed by the institutions.

Operational Efficiency: more efficient business processes for reduced time and effort at institutions, shared knowledge of exemplar processes to consider adopting, access to no-cost business process expertise as needed

Complexity	Additional FTE	Funding Needed
Low. Involves collaboration and coordination with institutions. Institutional interest already expressed.	0. Workday trainers are already familiar with institutional processes. Their work could be re-prioritized to include process improvement.	$. Investment required to train existing FTE.

10 Consolidate endpoint purchasing

SCS procures, images, deploys, secures, maintains, and supports endpoint devices (e.g. desktops and laptops) for NSHE System Administration. Each institution does the same. Standardizing endpoint devices and consolidating purchasing would leverage better buying power and lower costs, as discounts increase with the volume of purchasing.

SCS could work with institutions to begin standardizing equipment and consolidating purchases over time, as lifecycles on existing equipment come to a natural end.

Operational Efficiency: greater buying power to reduce hardware costs, reduced time and effort at institutions

Complexity	Additional FTE	Funding Needed
Medium. Requires standardization of equipment across institutions (over time) and considerable coordination effort.	0	$. Initial funding would be needed for bulk purchases.

11 Administer a consolidated ticketing system

SCS administers and uses a modern cloud service management system for generating, tracking, and completing all internal and external request tickets. SCS could assist institutions by designing, administering, and maintaining a ticket system that includes a self-service customer web portal, web and mobile app agent interfaces, automation and ticket routing, escalation and reporting, executive and agent dashboards, and other standard incident management functions for ensuring quality service and support.

Operational Efficiency: reduced time and effort at institutions

Complexity	Additional FTE	Funding Needed
Low. Institutions could opt in as it makes sense for them.	0	$. Investment required for extended licensing, possibly with institutional cost-sharing.

12 Provide community anchor network engineering

Most Community Anchor Institutions (CAI) do not have network engineers on their staff and must hire consultants when engineering work is needed or for high-end tasks such as managing firewalls. Because we run the State network, we have network engineers on staff. SCS used to provide more network services to K12s but had to reduce support for the schools when staffing was reduced around 2008. Resuming some support services for community anchor institutions on a cost-recovery basis would be more cost-effective for the community institutions than relying on consultants.

Operational Efficiency: reduced consulting costs and time and effort for community anchor institutions

Access: higher speed Internet access for students to access educational resources and online learning

Workforce: higher speed Internet access for community members to access career resources and online skills training

Complexity	Additional FTE	Funding Needed
None. CAI can opt in as needed.	1-2. Depending on demand, additional FTE may be needed, possibly on a cost recovery basis at lower rates than what CAI currently pay.	$. Additional operations costs to support added FTE, such as travel costs, equipment and training.

13 Administer office collaboration solutions

All institutions, including SCS, administer and support telephone, email, and various office collaboration systems that are not standardized across NSHE. Standardization could reduce costs. SCS could assist institutions with administration of email or phone systems, consultation and support of any migration planning and deployments, provisioning of user accounts, and/or end user support.

Operational Efficiency: greater buying power to reduce licensing and hardware costs, reduced time and effort at the institutions, easier cross-institution instant messaging and instant audio and video meetings, potential for powerful integrations with other platforms like Workday, file-sharing, and ticket management

Complexity	Additional FTE	Funding Needed
Medium. Depends on scale. Administration alone is low in complexity; support becomes more complex.	1-2. Depends on scale.	$. Higher central licensing; lower institutional costs.

14 Provide audiovisual event technology

SCS provides production and post-production services for remote, onsite, and hybrid events, such as Board meetings and Presidential search meetings. Over time institutions have come to rely on our equipment and support more and more. Equipment to run events is expensive and complex and must interoperate correctly to avoid technical glitches. To mitigate risk, SCS has developed a complete mobile unit that can be deployed for additional meetings as needed by the institutions who have only intermittent needs.

Operational Efficiency: reduced duplication of high-end equipment purchases, higher quality event production, and a more consistent experience for attendees.

Complexity	Additional FTE	Funding Needed
Low. Requires coordination with the institutions. BOR would be sharing AV technology support with non-BOR events.	1-2. Depending on scale and volume additional FTE likely required.	$$. Investment in additional equipment and licensing.

15 Web design and development

SCS builds and maintains websites and web applications for NSHE System Administration and assorted collaborative initiatives. SCS could support institutions with web design and development as well as essential document and graphic design. SCS could train content managers to add and maintain content themselves while providing a secure, modern platform and website solution. Web and document design and development require deep expertise intermittently, making it a good service to provide centrally to multiple institutions.

Operational Efficiency: reduced time and effort at the institutions, access to expertise

Complexity	Additional FTE	Funding Needed
Low. As capacity allows, SCS could begin assisting those institutions who need help.	1-2. Depending on demand, additional FTE may be needed. Web developers at the institutions could also assist other institutions without additional FTE.	$$. Investment in additional licensing and training.

16 Provide eduroam support for community anchor institutions

K12 districts are beginning to implement eduroam, an Internet2 service that allows participants to use their home institution credentials to log into the network of other participating institutions. Other community anchor institutions are also eligible to participate and are likely to do so as it becomes a growing expectation of service. They will likely need assistance to get up and running, which SCS could provide.

Operational Efficiency: reduced time and effort at the community anchor institutions

Student Success: easier transition from high school network to college network reducing obstacles

Access: increased ability for community members to access educational resources

Workforce: increased ability for community members to access career resources

Complexity	Additional FTE	Funding Needed
Low. As capacity allows work with K12s and other CAI to get them implemented on eduroam.	1-2. Depending on ongoing demand for support, additional FTE may be needed.	$$. Investment in licensing, training, and travel to support communities.

17 Provide additional SCS-as-Cloud managed hosting services

"Cloud hosting" means running your software solutions on a platform of servers and operating systems located in a secured, environmentally controlled data center. Commercial cloud hosting offerings, such as Microsoft Azure or Amazon Web Services, are still in early-adopter stages and are not yet price competitive for the majority of higher ed institutions. The industry will mature and stabilize at more affordable prices eventually.

SCS could provide additional managed application hosting for institutions as a more cost-effective solution than current market prices and adoption rates.

Operational Efficiency: reduced hardware purchasing and maintenance and reduced time and effort for the institutions

Risk Management: better security and environmental controls for institutional applications, built-in disaster recovery

Complexity	Additional FTE	Funding Needed
Medium. Migrating applications can be complex and time consuming.	1-2. Depending on demand, additional FTE may be needed.	$$. Investment in additional licensing and hardware costs offset by institutional savings.

18 Manage security certificates for NSHE institutions and community anchor institutions

SCS currently provides and manages security certificates to encrypt Internet traffic and verify server identity for several SCS/SA entities. The service can be expanded to provide security certificate management for community anchor institutions and NSHE institutions.

Operational Efficiency: reduced time and effort for the institutions and community anchor institutions

Risk Management: better maintenance of security certificates to prevent interoperability errors

Complexity	Additional FTE	Funding Needed
Medium. Requires coordination with multiple institutions.	1-2. Depending on demand, additional FTE may be needed.	$$. Investment in security certificates required, which could be offset by savings at institutions or on a cost recovery basis.

19 Staff a consolidated IT call/email center

SCS staffs a Service Desk that accepts, triages, and routes phone calls, emails, and web form ticket requests, as do the institutions. The service desk software and business processes could be centralized to support the smaller institutions and automated with artificial intelligence, such as a chatbot, context-sensitive help, etc.

Operational Efficiency: reduced duplication of systems, greater buying power to reduce licensing costs, and reduced time and effort at the institutions

Complexity	Additional FTE	Funding Needed
Medium. Participating institutions would need to standardize on a common platform.	1-2. Depending on demand, additional FTE may be needed.	$$. Investment in a common platform and licensing, potentially offset by institutional savings.

20 Centrally process PeopleSoft federal financial aid

Federal financial aid data processing is the same for all institutions. Currently each institution in the PeopleSoft shared instance processes their federal financial aid data files independently, consuming time and effort in their respective financial aid offices. Federal financial aid data processing could be administered centrally, in a single effort rather than multiplying the same effort 7 times.

Central processing would free up resources in financial aid offices to focus on their own value-add responsibilities in better support for students. It would protect the institutions from federal violations, which have significant financial repercussions.

Operational Efficiency: reduced time and effort for the institutions in the shared instance

Risk Management: improved regulatory compliance

Student Success: time previously spent on processing federal updates could be redirected to support students' financial aid needs

Complexity	Additional FTE	Funding Needed
High. Multiple institutions would need to plan and execute a new implementation of financial aid processing.	1-2. Would require additional central FTE, depending on complexity of processing.	$$. Additional funding for consulting, training, and operations likely needed.

21 Build and support central business intelligence data warehouse

Currently some institutions are building separate parallel data warehouses for reporting purposes while some institutions have none. An integrated data warehouse using a standard, shared set of tools would benefit all institutions and support unified reporting for NSHE. SCS would coordinate campus resources and prioritize needs to make sure the highest priorities are met for all. The repository would include System-wide and institution-specific reports across existing information systems, e.g. Workday, PeopleSoft, Anaplan. This would be a collaborative effort to leverage existing expertise and resources across the System rather than in isolation.

To accomplish this would require SCS staff time, central licensing costs, and time contributed from institutional experts, sometimes on behalf of their own institutions and sometimes on behalf of others.

Operational Efficiency: reduced time and effort for the institutions currently without a business intelligence data warehouse

Decision Support: improved System-wide reporting to inform decisions

Complexity	Additional FTE	Funding Needed
High. Developing a data warehouse is time consuming and challenging.	1-2. Additional FTE would be needed to build and maintain a data warehouse.	$$. Funding needed for licensing and possibly consulting.

22 Endpoint device remote management

On behalf of institutions, in addition to procuring standardized and consolidated endpoint purchases, SCS could image, deploy, and maintain security on desktops and laptops.

Operational Efficiency: reduced time and effort at the institutions

Complexity	Additional FTE	Funding Needed
High. Considerable planning would be needed upfront with ongoing coordination across institutions.	1-2. Additional central FTE would be needed, potentially offset by savings at the institutions.	$$. Investment needed in licensing and some initial hardware.

23 Facilitate research through southwest regional collaboration

The Southwest State Research Networks are currently experiencing a limited amount of regional network capacity and a lack of diverse routes in and out of the states. As a large and sparsely populated region, all connected communities require higher network capacities and route diversity to grow and expand the local economies, improve research capacities, improve digital equity, and maintain consistent service and uptime. We will be working to connect NevadaNet to the state networks in California, Utah, and Arizona at high bandwidth speeds using diverse fiber paths at an estimated cost of $2.5M.

Research universities in the intermountain/southwest region would use this science-driven network as an investment to:

- Increase research income and impact
- Solve unique local or regional science and environmental problems
- Provide a testbed for innovative, next-generation networking experiments by our regional and state providers

Research: next-generation regional network to facilitate large-scale research and education opportunities.

Complexity	Additional FTE	Funding Needed
Low. Requires doing on a larger scale that which we already do.	1-2. Development and ongoing support of a larger scale network would require us to fill existing vacancies.	$$$. Significant investment needed in infrastructure equipment and fiber lines to build out the network.

24 Support single sign-on for students

At some institutions, students must manage multiple sets of credentials to log into different systems. SCS could provide institutions with a standardized platform and guidance to implement federated NSHE-wide authentication for students to applications they use (i.e., Peoplesoft, campus-specific applications, Internet2 cloud services and applications, etc.)

Operational Efficiency: better buying power to reduce licensing costs

Risk Management: better identity management to meet audits, increased security through multifactor authentication

Student Success: improved student experience resulting in fewer obstacles to success

Complexity	Additional FTE	Funding Needed
High. Would require considerable planning and coordination among institutions.	1-2. Additional FTE would be required to support the platform and process.	$$$. Investment needed to implement large-scale single sign-on

25 Standardized student admittance application

Institution across NSHE use a range of student admittance application forms and/or systems. Students need to complete different applications to apply to different institutions within NSHE, some of which are easier to complete than others. This creates confusion and frustration for the student.

Each institution implements the application to meet their needs, within the range of possible options available to them depending on the system. Systems with greater variability of customization are generally more expensive to purchase and to maintain.

Varying systems also creates technical difficulties with the variety of data entering the shared instance and reduced efficiency in removing duplicate records.

A common application used throughout NSHE would reduce the confusion for students attempting to enter their chosen institution and improve efficiency for institutions.

Operational Efficiency: reduced time and effort at the institutions, reduced time and effort to remove duplicate records

Student Success: improved student experience resulting in fewer obstacles to success

Access: improved student experience resulting in fewer obstacles to access

Complexity	Additional FTE	Funding Needed
High. Developing and implementing a common student admittance application would require process re-engineering into a shared instance for all degree-granting institutions.	1-2. Additional FTE required to develop and maintain a shared system.	$$$. Upfront and ongoing investment in time and effort, coordination, possibly consulting, and licensing.

26 Consolidate institutional data centers

Institutions maintain multiple data centers that hold their central computing systems and applications. In the past, IT staff needed physical proximity to the computing systems to restart or repair them on short notice. That need does not occur as much with modern technology and when it does, SCS data centers in the north, east, and south are in reasonable proximity to any campus.

Operational Efficiency: reduced space and power consumption on campuses, reduced time and effort at the institutions

Risk Management: improved redundancy, security, and environmental controls; simplified disaster recovery management

Complexity	Additional FTE	Funding Needed
High. Moving complex architected systems from one location to another is extremely detailed and complex as well as high risk of system failure or long-term outages.	2-3. Additional FTE would be needed to maintain additional data center installations	$$$. Considerable upfront and ongoing investment would be needed in consulting, planning, and additional hardware.

Conclusion

SCS welcomes the opportunity to improve our transparency with stakeholders by answering questions and providing information thoroughly and completely. The staff at SCS have been working quietly and diligently over the years in service to NSHE and Nevada, but their story has not been told. It is a story of ongoing transformation, modernization, and stewardship of resources led by a team of servant leaders I am honored to work with. They care deeply about cost-effective delivery of education, research, and workforce development to the State of Nevada.

Shared digital services lower the costs for the entire State of Nevada, while offering a broader range of affordable services to NSHE institutions and to State agencies. We collaborate with the institutions and State agencies to prioritize, plan, implement, manage, and support services and initiatives that are of greatest need for them and we seek opportunities to expand shared digital services to greater serve NSHE and Nevada, within our capacity.

Stakeholders, Regents, and the public have vested interest in the success of our shared digital services. Additional information is available upon request, as much as desired, until all of our stakeholders feel well informed.

NSHE»SCS
Nevada System of Higher Education
System Computing Services

Response to Regent Questions
from the System Computing Services Assessment
Agenda Item #18 of the September 10, 2020 Board Meeting

Prepared by: CIO Milkovich
For: NSHE Board of Regents
Date: December 11, 2020

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Introduction

This report answers questions and adds clarification in follow up to questions from Regents at the September 11 Quarterly Board meeting. A separate report and presentation addresses additional opportunities for shared digital services in support of student and institutional success.

With the exception of the data center alternatives modeling, which was analyzed and presented by the Huron Consulting Group, the analysis provided in this report is the work of SCS staff, or in some cases the System Administration Finance Office. Where information came from sources other than SCS, it is noted.

The charts provided in this report are based on spreadsheet models that are more complex to absorb. The source spreadsheets can be provided for those readers who are interested in that level of detail.

Answers and Clarifications

This section addresses the questions posed by the Regents during the September 10, 2020 Board of Regents meeting regarding item #18, the System Computing Services Assessment. It also includes answers to follow-up questions and provides clarification on some of the meeting discussion points.

Has the Huron contract been fulfilled and paid?

Yes. The scope for the assessment engagement was written in February of 2019 and published with the RFP. The scope was broad and comprehensive. Many detailed questions that are relevant today were not considered in February of 2019. The assessment was focused on the portfolio of services that SCS should (or should not) be providing, the resources needed, and the optimal location. As Huron was presenting their final report in October 2019, the steering committee requested additional work that was out of scope. The additional work was completed by Huron in January of 2020, at no additional charge. The contract was paid in full.

What were the limitations of the study?

As noted during the presentation, a limitation of the study is that the analysis is based on information provided by SCS. That is true of all outside assessments. They are not conducted as a research study would be, where one would define limitations. Consultants, even in the higher ed market, are typically not experienced in research methods; they are experienced as expert practitioners.

Assessments such as these are similar to audits. The consultants ask questions and gather information from the organization through interviews, observations, or data compiled and provided by the staff. The consultants, like auditors, validate that information against a standard. In the case of an assessment, the standards are industry knowledge, comparison to similar institutions, comparison to established best practices, and professional judgment.

The value of using an external source is in the validation of the information provided by a neutral third party. In the case of the Huron Assessment of 2019, the Huron consultants gathered information from a wide range of sources in addition to the information provided by SCS.

What cost savings approaches have been used to reduce costs?

SCS uses a variety of strategies for controlling the costs of equipment, including:

- Purchasing through state contracts wherever possible
- Purchasing with volume discount pricing
- Purchasing with extended warranties to for maximum lifespan most cost-effectively
- Receipt of project funding from the State on new buildouts
- Use of NDOT fiber for network circuits, wherever available, at no cost.

Do the business centers have Workday analysts?

All institutions have Workday users, and many have "power users" with more advanced skills. They do not perform the functions of the central Workday Business Analysts. We are exploring ways to leverage the advanced skillsets at institutions to greater advantage working with our central Business Analysts.

Why does the data center analysis lack equipment savings?

Co-location is different from cloud computing service, such as Amazon Web Services or Microsoft Azure, where the storage hardware is included in the service. Moving to a co-location site, such as Switch, is equivalent to packing up your personal property and moving to a different apartment. For example:

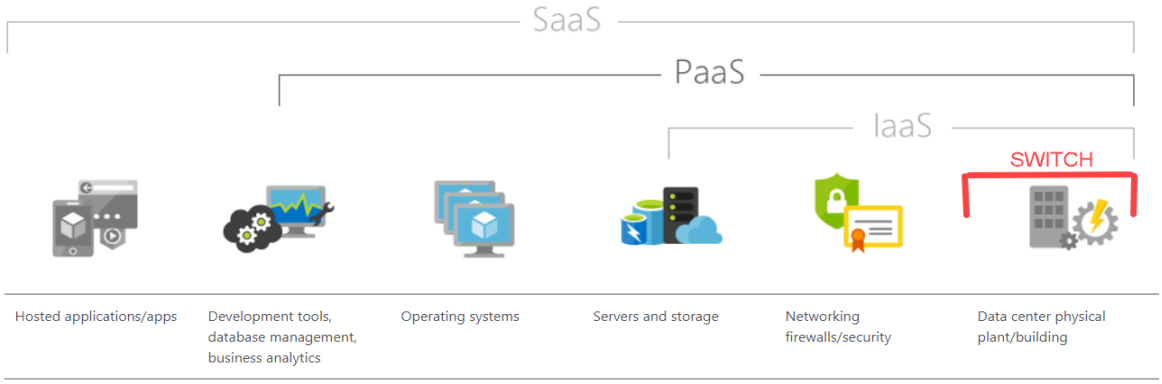
- Moving to a higher-rent location does not save money. A higher-rent apartment gives you better features that might be worth the higher rent, such as better air conditioning, security guards, or room to expand.
- Moving to a different location does not increase or decrease the volume of your personal property, although it might give you room to add more stuff later.
- A different location does not reduce the cost to take care of your personal property. Only the building changes; equipment and staffing do not change.

The term "cloud" is often used interchangeably to refer to different offerings that include:

- Software-as-a-Service (SaaS)
- Platform-as-a-Service (PaaS)
- Infrastructure-as-a-Service (IaaS)
- And sometimes Co-Location (co-lo)

Fundamentally, all of them refer to some form of storing information, applications, and services in someone else's location. The only difference is how much you store, how far away it is, and how much it costs. Figure 1 below illustrates the differences in the categories of cloud services.

Figure 1. Co-Location compared to cloud services



What is PaaS? Microsoft Azure. https://azure.microsoft.com/en-us/overview/what-is-paas/. [Switch callout added.] Accessed 9/21/2020.

Software-as-a-Service (SaaS), such as Workday, authorizes you to use their software from your remote location. Included in the service is the application you're using, plus the underlying middleware, operating system, hardware, and physical data center.

Platform-as-a-Service (PaaS), provides a solution, located in the vendor's data center, on which to create and develop software. It includes physical hardware (servers, networking equipment, storage), operating systems, and development tools. Amazon, Microsoft, and Google all offer PaaS solutions. Organizations opting for PaaS must provide their own staff to develop and maintain the software running on the rented platform.

Infrastructure-as-a-Service (IaaS) provides the physical hardware (servers, networking equipment, storage) in a commercial data center. Amazon, Microsoft, and Google all offer IaaS solutions as well. Companies using IaaS move their applications to a remote infrastructure. An advantage of IaaS is the ability to rapidly scale to meet growth demands. Staffing is still required to manage the cloud service itself and the applications and services running on it.

Institutions that have moved to Amazon, for example, have had to hire consultants on a permanent basis to manage it for them. In either a PaaS or IaaS solution, some on-premises equipment is still needed for integrations with systems that cannot move to the cloud platform, which in turn requires staffing to maintain the on-premises hardware, software, and integrations. Network equipment—such as that running NevadaNet—is needed to connect to the cloud solution but cannot be moved to the cloud solution. In fact, connecting to the cloud solution often requires increased bandwidth, and therefore networking equipment, to meet increased network traffic.

Finally, a co-location service, such as Switch, provides a highly secured building space to rent with a controlled and reliable environment (e.g. air conditioning, steady power supply, etc.). Companies using a co-location service move their equipment to the commercial facility and manage everything themselves, except for the building security, physical maintenance, and utilities. Advantages of co-location include not having to maintain the building and having the capacity to add more equipment if needed. It does not change the cost of equipment or the staffing to run the equipment, applications, and services.

In our case, we cannot move the Reno data center entirely to Switch, because a network node needs to be maintained on the UNR campus to connect UNR to the Internet. The same is true for a data center move off the UNLV campus. They still need a network node to connect the UNLV campus to the Internet. In addition to moving the hub and circuits to a new location, we would also need to add the campus as a network node, requiring additional equipment while maintaining the same facility. A move to Switch would not decrease the major costs of the data center; instead, it would increase our network equipment requirements to support the additional node(s).

There are good reasons to move to a higher-rent apartment that make it worth the higher cost. There are also good reasons to move to a co-location facility even though the rent is higher. Different circumstances result in different answers for optimal location of equipment. Institutions have good reasons for choosing different locations for different needs. Their circumstances are not

the same as SCS circumstances. Each situation must be evaluated on its own merit to determine the optimal solution. Several factors need to be considered:

- UNLV and UNR have institutional equipment in a commercial co-location facility.
- UNLV and UNR have their Student Information Systems in the SCS data centers because it is more cost-effective to share the hardware platform with other NSHE institutions than to replicate the entire hardware platform at another location for themselves alone.
- UNLV and UNR still maintain equipment in their own data centers, where proximity is important.
- The Student Information System for the community colleges and state college are run by SCS.
- None of the institutions run wide area network hubs.
- Moving an entire network hub, along with the enterprise hardware platform and cloud integrations, is a larger scale of complexity and cost from moving institutional equipment.

The SCS leadership team toured Switch in December of 2018 and obtained quotes on the cost of the space we would need. Table 1 below is the summary analysis conducted by the Huron Consulting Group on the options to migrate the data center on the UN Reno campus to Switch in Reno, as a proof of concept. They also analyzed the options to migrate the SCS data center to the UNR Knowledge Center or to shrink the SCS data center footprint and move personnel out of the building into commercial office space somewhere in Reno (Option 2) so that UNR could move their employees into the SCS building.

The information collected as part of the analysis came from Switch quotes as well as Zayo and CenturyLink, as competitive alternatives to Switch. UNR provided information on costs to remain in the data center, opportunity costs for use of the data center, and rates and availability of commercial office space. SCS provided information about the equipment in the data center that would need to be moved. Table 1 projected the total costs annualized over a 10-year projection window.

Table 1. Cost comparison of data center location options

Cost Comparison (Total over 10 years*)

	Option 0 Migrate SCS Data Center to Switch	Option 1 Migrate SCS Data Center to UNR Knowledge Center	Option 2 Shrink SCS Data Center
Cost of each option	$15,223,147	$9,273,895	$5,550,700
Less Value of Alternate use of Reno Location	($5,022,757)	($5,022,757)	($4,568,079)
Net cost of Option	$10,200,391	$4,251,139	$982,622
Cost of Base Scenario (Status Quo)	$5,463,928	$5,463,928	$5,463,928
Benefit / (Cost)	***($4,736,462)***	***$1,212,790***	***$4,481,307***

All options considered assume that SCS Staff move to an alternate location

Other Data Center options considered and abandoned:

1. *Century Link - does not have the capacity to accomodate SCS footprint*
2. *Zayo - Facility is environmentally Inadequate and does not have capacity to accommodate SCS footprint*

Analysis conducted by Huron Consulting Group as part of the SCS Assessment 2019

As better monitoring technologies enter the market, we continually reduce our dependency on human monitoring, which in turn allows us to repurpose positions to higher priorities. The cost savings and position repurposing, both already realized and still projected, are independent of a data center move and accordingly are not included in the analysis. Systems monitoring is needed regardless of location. A commercial co-location facility only provides physical monitoring, not system monitoring. Physical monitoring is not a significant difference in cost between our current location compared to a commercial location.

Where is the equipment inventory?

The scope of the Huron assessment excluded a full equipment inventory; the scope was defined at a higher level about service portfolio, delivery, funding, and location. While equipment operating in the data center has an impact on data center cost in terms of the volume of space to rent and the cost to move or replicate the equipment, equipment operating in the data center does not have an impact on lifecycle replacement. The equipment still needs to be replaced on the same schedule regardless of the location where it resides. Furthermore, a data center move does not have any impact on the networking equipment distributed at >200 network nodes throughout the state.

NevadaNet equipment has a total estimated value of $8,157,000 and an average lifespan of 8 years. Every year, on a rolling schedule, we replace equipment as it reaches end of life to maintain warranty and security.

Additionally, SCS replaces infrastructure equipment for Facilities, Systems, Endpoints (desktops, laptops, printers, phones, video conference units, etc.) and audio-visual event technology on a lifecycle schedule. Annually, the total lifecycle replacement schedule runs between $1.7M—$3.2M. We continually manage and massage the replacement schedule as circumstances change and to reduce any unusual projected outlays.

Figure 2. Lifecycle replacement costs for FY21-FY30 graphed

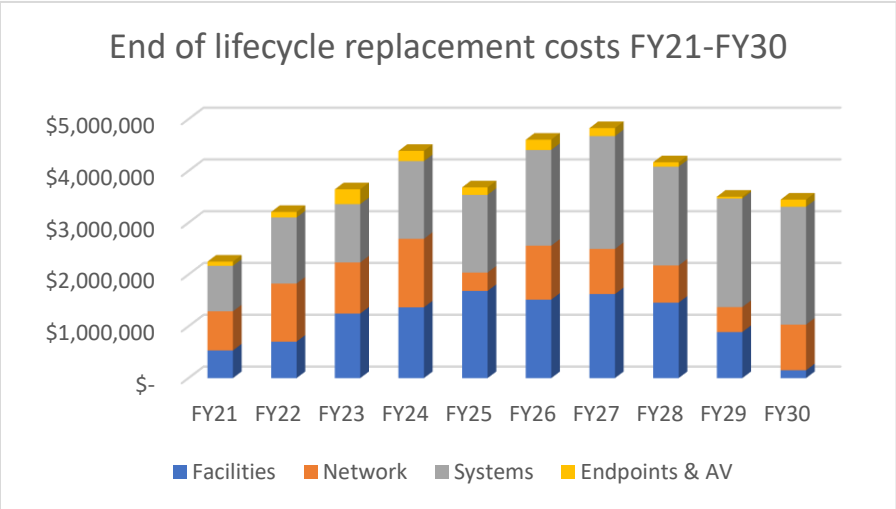


Table 2. Lifecycle replacement costs for FY21-FY30 tabulated

CATEGORY	FY21	FY22	FY23	FY24	FY25	FY26	FY27	FY28	FY29	FY30
Facilities	$ 535,830	$ 704,509	$ 1,246,205	$ 1,367,999	$ 1,683,691	$ 1,516,143	$ 1,623,148	$ 1,458,041	$ 890,524	$ 151,957
Network	$ 754,000	$ 1,122,000	$ 987,000	$ 1,322,000	$ 354,000	$ 1,042,000	$ 872,000	$ 717,000	$ 482,000	$ 882,000
Systems	$ 879,511	$ 1,276,686	$ 1,126,856	$ 1,500,549	$ 1,500,939	$ 1,847,482	$ 2,178,189	$ 1,907,767	$ 2,096,860	$ 2,275,599
Endpoints & AV	$ 80,595	$ 105,315	$ 286,494	$ 197,452	$ 145,254	$ 199,216	$ 154,974	$ 84,739	$ 34,773	$ 138,519
TOTALS	**$ 1,714,105**	**$ 2,504,001**	**$ 2,400,350**	**$ 3,020,000**	**$ 2,000,193**	**$ 3,088,698**	**$ 3,205,164**	**$ 2,709,506**	**$ 2,613,633**	**$ 3,296,118**

Moving to a co-location facility has no impact on Systems or Endpoint annual equipment replacement costs. The Systems equipment are moved to the new location as is and the Endpoints are not moved.

Because a sizeable network node must be maintained on the campus (to connect the campus to the Internet), equipment would need to be added. Moving to a co-location facility would increase Network annual equipment replacement costs. Because the campus network node must be maintained in an environmentally controlled and secured data center, Facilities annual equipment replacement costs would not substantially change.

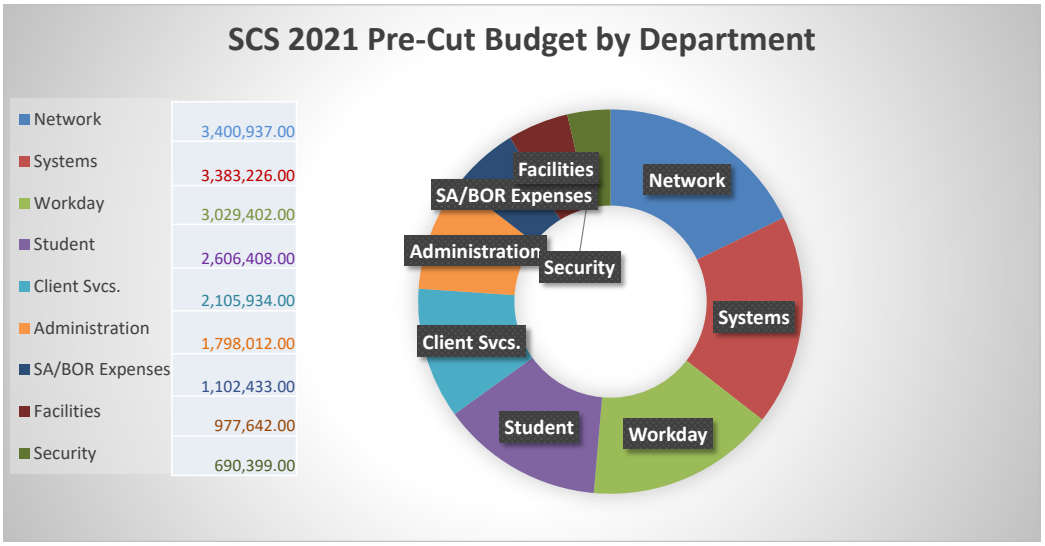
The difference in Facilities and Network costs were incorporated into the data center location analysis conducted by Huron and presented in Table 1 above.

How and where is the budget spent?

A Cost of Services model illustrates how state resources are spent on services. The scope of the Huron assessment excluded a cost-of-services breakdown. They reviewed number of staff per service category and unit budgets for purposes of understanding available resources and recommending more or fewer staffing where appropriate. They reviewed the service portfolio to determine if services were needed or unnecessary, and based on staffing counts, benchmarking, and customer feedback, whether they were delivered effectively and efficiently.

The distribution of state funding among SCS units, which largely correspond to service categories, was included in the Board presentation of September 6 and is presented again here as Figure 3 below. This is a high-level summary of unit budgets—which is close to, but not exactly the same as, calculations of actual costs of services.

Figure 3. SCS budget by unit FY21 pre budget cut presented to BOR



As part of our effort to improve transparency, SCS also created a Cost-of-Services model that analyzes and summarizes the actual spend of state resources distributed across service categories.

Methodology: To compile our Cost-of-Services model, we created a service catalog of 25 services that are either direct customer-facing services or indirect sustaining services. Those 25 services are grouped into seven categories: Student Information Systems and Data Management (PeopleSoft), Finance and Human Capital Management (Workday), Video and Audio-Visual services, SA/SCS User Services, Systems and Network Infrastructure, Professional Services, and Information Security. Staff estimated their annual percentage of time spent on each of the 25 services. Salary + benefits were calculated for each employee and distributed as costs for each service, according to the distribution of time. Salary + benefits for time spent on indirect sustaining services was allocated evenly across direct customer-facing services. Operations budgets were allocated using the same distribution as time.

Limitation: SCS has minimal experience in developing a cost of services model. This is an analysis for directional purposes only. To develop an expert, robust cost of services model would require investment in another consulting engagement. We reviewed this model and methodology with Gartner, a leading firm in business and technology research, as a reasonable and valid approach.

Figure 4 below, included in the Board presentation on September 10, illustrates how the direct customer-facing services are dependent on the underlying, indirect sustaining services.

Figure 4. SCS service architecture

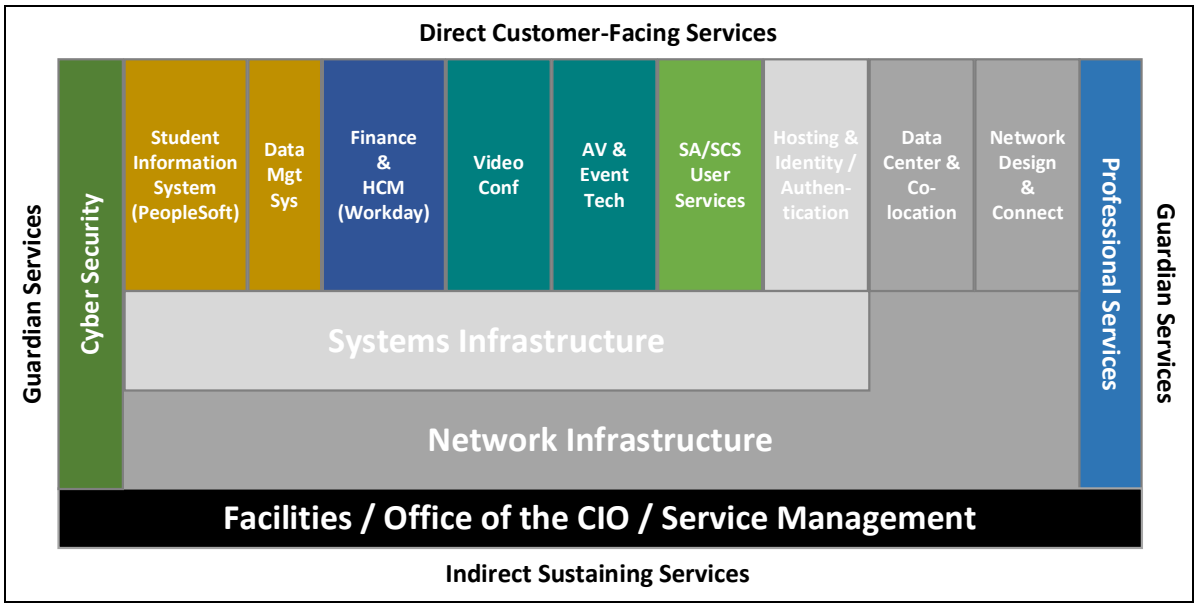


Figure 5 below illustrates the distribution of time against the seven service categories, with the associated percentage values.

Figure 5. Annual distribution of employee time against service categories

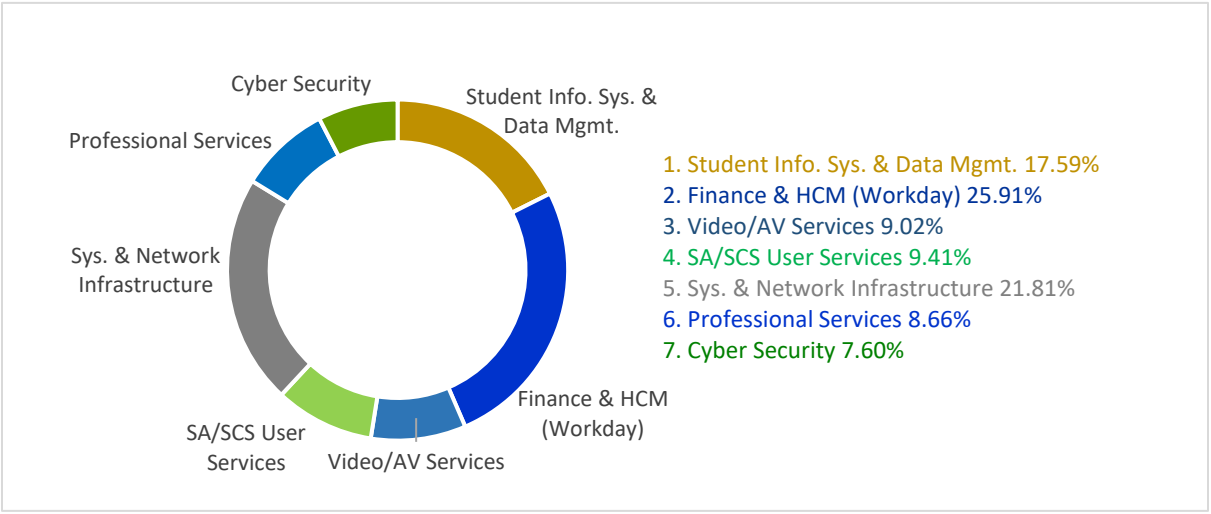
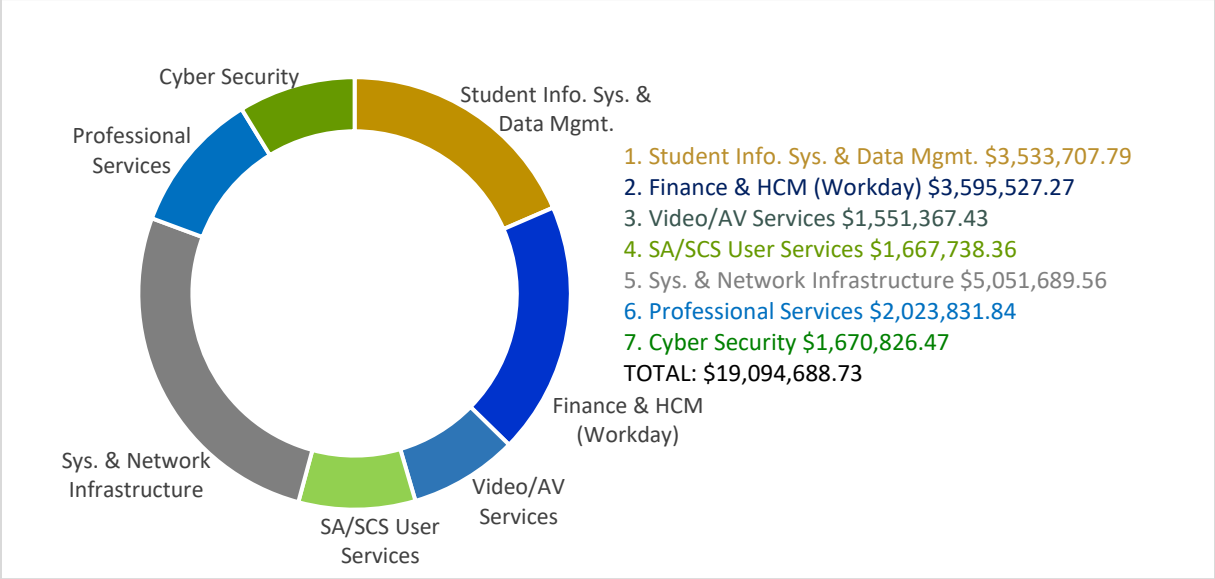


Figure 6 below illustrates the distribution of total costs against the service categories using the same distribution as employee time.

Figure 6. Annual distribution of total costs against service categories



Are student fees used to support PeopleSoft or other SCS services?

The student information system (PeopleSoft) is used to process student related institutional operations, such as admitting students, registering students, packaging financial aid, advising students, producing grades and transcripts, and billing students. When the legacy student information systems were migrated into three instances of PeopleSoft (now known as iNtegrate1), SCS provided the central staffing and the institutions were charged a cost-shared allocation to cover the licensing. SCS continues to pay the licensing and recharge the institutions. Institutions implemented a special technology fee to cover their costs, as presented in Table 3 below.

Table 3. Student fees in support of PeopleSoft

	UNLV	UNR	NSC	CSN	GBC	TMCC	WNC
Technology Fee – Regular	8.00/cr.	6.00/cr.	6.00/cr.	7.00/cr.	6.00/cr.	7.00/cr.	7.00/cr.
Technology Fee – iNtegrate	3.00/cr.	3.00/cr.	1.50/cr.	1.50/cr.	1.50/cr.	1.50/cr.	1.50/cr.

Provided by System Administration Finance Office 9/30/2020.

Each year, institutions apply student technology fees to varying needs, usually determined in collaboration with student government. Table 4 below summarizes the contributions to SCS services that were funded by institutions' student technology fees in FY20.

Table 4. Institutional application of student technology fees to SCS services

Use of Student Fees In Funding SCS Services in FY 2020	
Use of Student Fees May/Will Change Each Fiscal Year	
October 13, 2020	
	Sum of Amount
Student Fees	**1,317,596.42**
Blue Jeans Video Conference Software Licensing	5,824.98
Budget Planning System (Anaplan)	11,063.00
Datacenter Colocation Services	78,615.07
iNtegrate1 (PeopleSoft)	1,009,536.15
iNtegrate2 (Workday)	26,197.50
NSHE-wide Software Licensing and Maintenance	175,764.25
UNLV Oracle Data Integrator LPARs	10,595.47
Grand Total	**1,317,596.42**

Provided by System Administration Finance Office 10/15/2020.

What is the customer distribution of network consumption?

NevadaNet serves all NSHE institutions and many of their remote sites, such as Cooperative Extension and field research locations. NevadaNet also serves 12 of the 17 K12 school districts. We are beginning to work with the remaining school districts to re-evaluate the cost benefit of their joining NevadaNet versus staying on their existing Internet connections. NevadaNet also serves rural hospitals and clinics, Nevada Department of Transportation (NDOT), Nevada Department of Corrections (NDOC), Nevada Parole and Probation (Parole Board), and Enterprise Information Technology Services (EITS) for the State of Nevada.

Table 5 below lists the customers of NevadaNet and the number of sites each has. In this context, a site refers to a location with a building or where customer activity occurs, such as field research. Additional connections exist across the state to connect everything together, and outside the state, to connect to the Internet and Internet2 backbones. For a complete list of connections, please see Table 6 at the end of this section.

Table 5. List of NevadaNet customers and the number of their sites on the network

NevadaNet Customers and Distribution of Sites	Number of Sites Per Customer
NSHE Customers	
University of Nevada Reno	26
University of Nevada Las Vegas	2
Desert Research Institute	3
College of Southern Nevada	3
Nevada State College	1
Truckee Meadows Community College	2
Western Nevada College	5
Great Basin College	8
System Administration / Board of Regents	2
System Computing Services	3
Total	**55**
Non-NSHE Customers	
K-12 School Districts	27
Rural Hospitals and Clinics	16
Nevada Department of Transportation	16
NV Enterprise Information Technology Services	11
Nevada Department of Corrections	13
Nevada Parole Board	2
Total	**85**

The number of sites on the network is not the only driver of network costs and consumption. Additional cost drivers include:

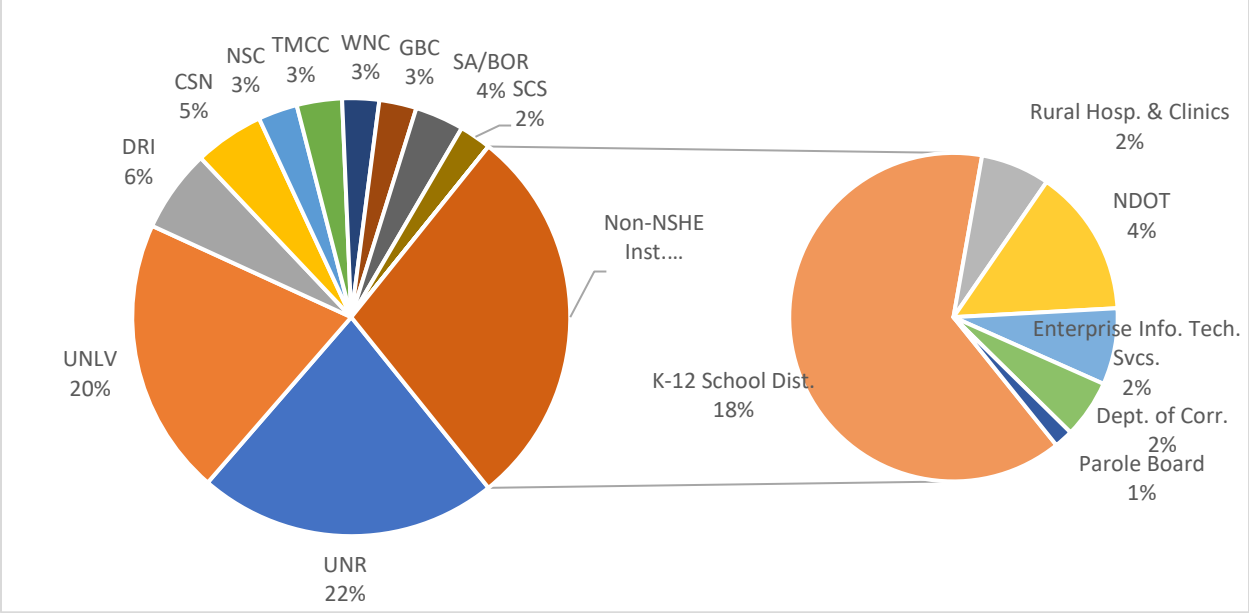
- Volume of traffic
- Distribution of traffic between commodity Internet (higher cost) and Internet2 (lower cost, but restricted to research and education traffic only)
- Cost of leasing circuits from commercial carriers, where NDOT fiber is not available
- Cost of travel to maintain sites

NSHE institutions, K-12 school districts, rural hospitals and clinics do not contribute any funds to SCS for use of the network. Nevada state agencies (NDOT, EITS, NDOC, Parole Board) contribute funds to cover their use of the network. By written agreements, NDOT and EITS each pay one third of the maintenance on the equipment they use as well as contributing upfront funds for special projects and buildouts. Corrections and Parole Board are assessed the cost of services based on the number of video sites they have. When compared to actual network consumption using the cost drivers listed above, the contributions of the state agencies are usually net positive compared to

consumption, whereas NSHE, K12s, and rural healthcare consume without contributing. The cooperative relationship of NDOT, EITS, and NSHE also realizes extensive cost savings for NSHE through no-cost use of hundreds of miles of NDOT fiber and the contributions for projects that benefit NSHE.

Figure 9 below illustrates the distribution of network costs between NSHE institutions and non-NSHE customers when all factors are considered.

Figure 7. Distribution of network consumption between NSHE institutions and non-NSHE customers



Annual cost to run the network, including salary and fringe, ranges $4M-$6M, depending on major equipment upgrades and replacements that cause expenditures to vary widely.

Table 6 below provides a list of all the connection points on NevadaNet.

Table 6. List of NevadaNet Connections

NEVADA SYSTEM OF HIGHER EDUCATION

University of Nevada Reno (Main Campus, Redfield Campus)
University of Nevada Las Vegas (Main Campus, Shadow Lane Campus)
College of Southern Nevada (North Las Vegas, Charleston, Henderson)
Nevada State College
Truckee Meadows Community College (Main Campus, Redfield Campus)
Western Nevada College (Carson City, Fernley, Fallon, Yerington, Douglas)
Great Basin College (Elko, Ely, Winnemucca, Battle Mountain, Lovelock, Eureka, Tonopah, Pahrump)
Desert Research Institute (Reno, Las Vegas, Boulder City)
System Administration (Reno, Las Vegas)
System Computing Services (Reno, Las Vegas, Elko)

UNIVERSITY OF NEVADA COOPERATIVE EXTENSION SITES

Reno
Carson City
Gardnerville
Yerington
Tonopah
Pahrump
Las Vegas
Lovelock
Winnemucca
Battle Mountain
Elko
Eureka

COMMUNITY HEALTHCARE FACILITIES

UNR School of Medicine
UNLV School of Medicine
Nevada Rural Hospitals Partners
Battle Mountain General Hospital
Grover C. Dils Medical Center, Caliente
Humboldt General Hospital, Winnemucca
Pershing General Hospital, Lovelock
William Bee Ririe Hospital, Ely
Carson Valley Clinic
Eureka Clinic
Mt Grant Hospital, Hawthorne
Northeastern NV Regional Hospital, Elko
NV Area Health Education Center, Elko Clinic
Elko Family Medical & Dental Center Owyhee
Community Health Facility

COUNTY SCHOOL DISTRICTS

Carson City (Carson City)
Elko (Elko, Wells, Wendover)
Esmeralda (Dyer, Goldfield, Silver Peak)
Eureka (Eureka, Crescent Valley) **Douglas** (Minden, Gardnerville)
Humboldt (Winnemucca)
Lander (Austin, Battle Mountain)
Lincoln (Panaca, Alamo, Caliente, C.O. Bastian, Pahranagat Valley, Pioche)
Nye (Pahrump, Amargosa, Beatty, Duckwater, Gabbs, Round Mountain, Tonopah)
Pershing (Lovelock)
Washoe (Reno, Davidson Academy)
White Pine (Ely, Lund)

GOVERNMENT AGENCY VIDEO CONFERENCING SERVICES

Legislative Council Bureau
Governor's Advisory Council
Governor's Office of Economic Development
Governor's Office of Workforce Development
State Board of Examiners
State Board of Museums
State Division of Housing
State Public Employee Benefits Program
State Dept. of Emp., Trng. and Rehabilitation
State Health Division
Dept. of Health and Human Services
Aging and Disability Services Division
Substance Abuse Prevention and Treatment
State Dept. of Tourism
State Dept. of Gaming
State Dept. of Agriculture
State Veterans Affairs
State United Veterans Legislators
State Division of Business & Industry
State Dept. of Education
State Dept. of Water Resources
State Dept. of Administration
State Dept. of Transportation
State Dept. of Environmental Protection
State Board of Nursing
State Attorney General's Office
State Dept. of Public Safety
State Dept. of Wildlife
Nevada State Supreme Court
Clark County Regional Justice Center Justice Courts throughout Nevada
US District Courts in Reno and Las Vegas
State of NV – Enterprise IT Services (EITS)

NEVADA DEPT OF CORRECTIONS

Carlin Correctional Center
Carson City Board of Parole Commissioners
Northern Nevada Correctional Center
Stewart Admin & Correctional Center
Warm Springs Correctional Center
Casa Grande Transitional Center
Ely Correctional Center
Ely State Prison
Florence McClure Correctional Center
High Desert State Prison
Humboldt Correctional Center
Jean Correctional Center
Las Vegas Board of Parole Commissioners
Lovelock State Prison
Pioche Correctional Center
Reno Northern Nevada Restitution Center
Southern Desert Correctional Center
Tonopah Correctional Center
Wells Correctional Center
Eureka Medical Center

JOINT USE FIBER OPTIC NETWORK – NSHE/NDOT/EITS

SCS Reno (SCS/UNR)
NDOT Galletti Way (Sparks)
NVEnergy GOB (Reno)
Zayo Point of Presence (Reno)
Level3 Point of Presence (Reno)
NDOT CCHQ
NDOT Hot Springs (Carson City)
EITS Carson City Facility
Fallon
Fernley
Lovelock
Winnemucca (NDOT)
Carlin Tunnel
Elko (GBC)
Wells
Wendover
Eureka
Ely
Cold Springs
Austin

INTERAGENCY CONNECTIONS

SCS LV (SCS/UNLV) to NDOT TMC
SCS LV (SCS/UNLV) to EITS Grant Sawyer
SCS Reno (SCS/UNR) to NDOT Galletti Way
UNR Redfield to NDOT SR431 fiber hub
GBC Elko to NDOT Elko
GBC Elko to EITS Elko communication shelter

INTERNET BACKBONE CONNECTIONS

Zayo Commodity Las Vegas, NV
Zayo Commodity San Francisco
CenturyLink Commodity Sacramento, CA
Internet2 Commodity Reno, NV
Internet2 Commodity Las Vegas, NV
Internet2 R&E Reno, NV
Internet2 R&E Las Vegas, NV

Conclusion

SCS welcomes the opportunity to improve our transparency with stakeholders by answering questions and providing information thoroughly and completely. The staff at SCS have been working quietly and diligently over the years in service to NSHE and Nevada, but their story has not been told. It is a story of ongoing transformation, modernization, and stewardship of resources led by a team of servant leaders I am honored to work with. They care deeply about cost-effective delivery of education, research, and workforce development to the State of Nevada.

Shared digital services lower the costs for the entire State of Nevada, while offering a broader range of affordable services to NSHE institutions and to State agencies. We collaborate with the institutions and State agencies to prioritize, plan, implement, manage, and support services and initiatives that are of greatest need for them and we seek opportunities to expand shared digital services to greater serve NSHE and Nevada, within our capacity.

Stakeholders, Regents, and the public have vested interest in the success of our shared digital services. Additional information is available upon request, as much as desired, until all of our stakeholders feel well informed.