



Oregon

Kate Brown, Governor

Department of Administrative Services

Office of the State Chief Information Officer

155 Cottage St NE, 4th Floor

Salem, OR 97301

PHONE: 503-378-3175

FAX: 503-378-3795

27 April 2017

The Honorable Senator James Manning Jr., Co-Chair
The Honorable Representative Greg Smith, Co-Chair
Joint Committee on Ways and Means Subcommittee on General Government
900 Court Street NE
H-178 State Capitol
Salem, OR 97301-4048

RE: Answers to questions asked during public testimony on HB 5002 (2017)

Dear Co-Chairpersons:

The Office of the State CIO (OSCIO) respectfully requests that the Joint Committee on Ways and Means Subcommittee on General Government acknowledge receipt of answers to questions related to the DAS phone transition (Project MUSIC) asked during public testimony on HB 5002 (2017).

Background on Project MUSIC

Project MUSIC (mobilizing unified systems and integrated communications), or the state telephony project was initiated in late 2013—well before the implementation of the Joint LFO/OSCIO Stage Gate review, temporary reassignment of the data center to the State CIO in February of 2015 or passage of HB 3099 (2015). The legacy phone systems served approximately 31,500 stations in more than 600 locations statewide (“on-net” locations). Additionally, there were another 6,000 “off-net” systems located in lower density rural areas that were not served by this system. As described during our presentation, the state’s portfolio of telephone assets included a variety of telephony platforms, including:

- Nortel (Meridian PBX, Norstar, BCM)
- Cisco (VOIP, call centers)
- Avaya (PBX, call centers)
- ROLM/Siemens

Over time, it had become increasingly difficult to support the state’s disparate telephony portfolio as equipment began to fail, qualified technicians left their original vendors or retired and sourcing parts became more and more challenging—at times, it became necessary to source parts through eBay or secondary international markets. In the case of Nortel, the firm went into bankruptcy proceedings in 2009. Under the old contract, maintenance for the old system came to \$22.10 per phone, with \$18.10 going to CenturyLink and \$4.00 going to ETS for administering the contract. While ageing telephony platforms—one system being more than 35 years old—and a lack of modern functionality were long-evident, it took several high-profile outages to galvanize the states’ efforts to transition to a modern voice over internet protocol (VoIP) system. Absent a coordinated effort, individual agencies would have had to have come forward with individual requests to replace more than 100 separate phone systems, a trend evidenced by the Department of Justice’s (DOJ) transition to a new phone system. In the case of DOJ it possessed both the requisite funding and internal capacity to manage the phone migration independently. However, many other agencies were not similarly situated.

Beyond ageing and obsolete equipment, another driving factor for the project was the expiration of a bridge contract for phone services with Century Link on June 30, 2016—later extended to June 30, 2018. The Century Link contract provided services for Meridian and Nortel phones that were no longer vendor-supported. Had this contract expired in the absence of an alternate procurement vehicle, agencies would have no longer been able to obtain support for their telephony services.

Prior to initiation of the procurement, DAS had conducted an extensive VOIP needs analysis and contracted with the Com Group to assess the market and make recommendations. On November 15, 2013, the Com Group, Inc. presented the report "Voice Enterprise Solution Initial Findings Report." In this first report, the Com Group reported on initial findings, survey results, solution requirements, and a gap analysis. In January of 2014, Com Group presented a follow-up report on design and vendor options, in which they reviewed platform alternatives, design considerations, and industry trends. Com Group was later hired to help develop a request for proposals (RFP) on behalf of DAS. The RFP was issued on June 12, 2014.

The telephony RFP closed in July of 2014 and an intent to award was issued in January of 2015. Multiple agency stakeholders as well as the Department of Justice were represented on the negotiation team. The incumbent provider, Century Link, was the highest ranked proposer. However, negotiations failed due to their refusal to meet necessary service level agreement (SLA) requirements. Under the previous contract, Century Link had amassed several million dollars in penalties for failure to meet SLAs and ultimately provided the state of Oregon with a \$4 million credit that was applied to the phone transition. As required, the state then moved on to the next highest ranked proposal and successfully negotiated an agreement with IBM—whereby IBM would act as an end-to-end managed service provider for the Unify phone system.

During contract negotiations, the state worked to ensure that there were appropriate SLAs to support critical state functions (*i.e.*, life, health and safety), including but not limited to disaster recovery in the event of a statewide emergency or disruption. Another critical point of contract negotiations was the desire to keep the price of the handset at or near the price of \$22.10 per month charged during the 2013-15 biennium, given that agencies had already relied on the DAS pricelist in developing their Agency Request Budgets and had not proposed any policy option packages to accommodate a substantial increase. In seeking to limit per-handset price increases (eventually settling on the figure of \$25.43 per handset), the multi-agency negotiation team opted for a managed service provider (MSP) contract with IBM, an agency-led implementation process and the elimination of any DAS administrative fees to support the migration or to provide vendor management.

Under a MSP contract, IBM assumed full responsibility for managing the down-stream vendor relationships with the hardware provider (Unify), for porting phone numbers to the Unify system in coordination with Century Link, providing helpdesk services and fulfilling the SLAs established in the contract. The contractual arrangement resembles the state of Oregon's MSP contract with IBM for a frame-relay replacement for the Public Safety Access Points (PSAPs)—a project that experienced delays but was ultimately completed within budget. As for the agency-led implementation, the approach presupposed that state agencies possessed the internal capacity and institutional knowledge to complete their migrations in coordination with IBM. Institutional knowledge that encompassed, at a minimum, an up-to-date inventory of all agency phone numbers requiring migration and agency-specific business requirements; *e.g.*, requirements related to agency call centers.

After the IBM contract had been executed, it quickly became clear that an agency-led migration plan was impracticable. Given the age of many of the ageing telephony systems, many agencies simply lacked the institutional knowledge and capacity to be successful. In some cases, the phone systems had been implemented decades earlier by long-since retired staff or outside contractors. Some agencies had particular difficulty providing IBM with up-to-date inventories of phone numbers that needed to be ported to the new system. One proxy for this lack of institutional knowledge is the number of phone lines that have been disconnected during the migration. With 200 sites and 20,037 subscribers having been migrated, the project team has already identified 2,422 phone lines that were no longer needed. By disconnecting these lines, Project MUSIC has already generated an estimated \$397,619 in cumulative savings. Going forward, these disconnections will provide agencies with an estimated monthly savings of \$61,591, generating a combined savings of \$1,478,195 over the 2017-19 biennium. Given that there are 9,363 subscribers who have yet to be migrated, it is reasonable to assume that additional disconnections could increase biennial savings to more than \$2 million.

While it certainly would have been possible to litigate the definition of an MSP under the contract and associated duties related to the proposed migration, our Office instead established a limited-duration project team to assist agencies during the migration. Project assistance has been extended to site inventories,

development of training materials and post-migration assistance. While the expenditure limitation needs were partially met through the transfer of pass through limitation for voice services following the OSCIO realignment, there was a substantial gap requiring our Office to seek additional expenditure limitation during the December 2016 Emergency Board. The increased expenditure limitation of \$6,975,000 Other Funds, enabled Project MUSIC to maintain the implementation timeline, cover one-time implementation costs and provide for additional training and hardware enhancements requested by agencies. The agency-specific needs emerged during the migration process, as agencies became fully aware of their business requirements. By way of reference, the increased limitation request is outlined below:

<i>Item</i>	<i>Description</i>	<i>Budget</i>
<i>Hardware</i>	Agency needs have exceeded the initial estimates for Polycom conference phones and the advanced feature model of phone (IP 55G). Polycom price per unit is \$1,156 and IP 55G price per unit is \$237. The initial estimates were for 512 Polycoms and 2,320 IP 55Gs. Future needs estimated at an additional 900 Polycoms and 2,000 IP 55Gs.	\$ 1,500,000.00
<i>Core Expansion and Upgrade</i>	To accommodate the State of Oregon's future capacity for new applications including web based collaboration and call center screen recordings, the current infrastructure requires expansion. The current SAN has total raw space of 28.8 terabytes. The expansion will add an additional 14.4 terabytes of raw space to support the extremely storage heavy applications listed above.	\$ 500,000.00
<i>Training Videos</i>	Custom eLearning modules for: <ul style="list-style-type: none"> • Basic IP35 G and IP 55G phone use • Xpressions voice mail use • OpenScape Unified Communications Web Client • OpenScape Contact Center 	\$ 100,000.00
<i>Concierge Service</i>	Oregon Commission for the Blind (CFB) currently uses special software (AccessAPhone) on their PCs to control the IP phone and allow the user to manage call control. This is a critical application that requires an equivalent replacement to minimize impact to the user experience. The proposed solution will provide similar functionality to allow visually impaired users access to needed phone functionality on their PC. This solution will be available to CFB and additional licenses may be used by other agencies. Core expansion and upgrade (above) are a prerequisite to the use of this software.	\$ 1,200,000.00
<i>Web Collaboration</i>	Addition of web collaboration to the suite of Unify tools available to state of Oregon agencies. Web collaboration will provide agencies with the capability to communicate via the Internet in real time. Web collaboration offers voice and text chat and the ability to conduct multi-user meetings and training sessions. Web collaboration will be integrated with the existing telephone infrastructure. Core expansion and upgrade (above) are a prerequisite to the use of this software.	\$ 500,000.00
<i>E911 Distinct Notification</i>	Provides additional support in the event of a 911 call. Provides exact location information and notification to key contacts in the agency.	\$ 250,000.00
<i>Network Cabling RFS Approach</i>	Various state agency sites may require remediation of the structured cabling system in order to support the voice over internet protocol (VOIP) solution. IBM will provide labor and materials for the remediation of structured cabling for State of Oregon sites. Work will include cabling for drop locations back to the site's data panel.	\$ 1,000,000.00
<i>Professional Services</i>	Professional services to include: <ul style="list-style-type: none"> • Remediation support and preparation for implementation. Many sites do not have the staff or skill to properly prepare for the installation of the new VOIP system. • Post-migration support. Support would be on-site and provide additional training and troubleshooting. 	\$ 200,000.00

The IBM Contract

Over the 10-year term of the contract, the majority of the costs will be incurred for dial tone and hardware. However, given that it was not feasible to specify the individual requirements associated with nearly 30,000 individual handsets nor the network rewiring and bandwidth upgrades required to ready buildings to support VOIP, the 219-page IBM contract also provided for an optional rate card to address one-time deployment costs. As discussed during the hearing, the IBM contract has specific provisions limiting the amount that can be expended for "Design and Deployment Services" as follows:

5. COMPENSATION.

5.1 Rates and Charges:

5.11 **Maximum Payment Amount for Design and Deployment Services.**
Notwithstanding any other provision of this Contract to the contrary, unless otherwise agreed pursuant to the Contract Amendment procedure in Section 17.15, the maximum, not-to-exceed compensation that DAS will pay to Contractor for the "Design and Deployment Services" is thirty-eight million eight hundred fourteen thousand and five hundred and forty-three Dollars (\$38,814,543.00) (the "Design and Deployment Maximum Not-To-Exceed Compensation"), which includes payment for any allowable expenses for which Contractor may request reimbursement under the Statement of Work for Design and Deployment Services, Exhibit A-1.

Generally, the state has negotiated the inclusion of additional items on the rate card as needed to support agency-specific deployment needs. To date, the state of Oregon has amended the contract three times. First, an amendment adding \$155,220 for wide area network (WAN) connections; and second, an amendment adding \$83,087 for security certifications. Taken together, these two amendments increased the maximum amount not to exceed provision by a total of \$238,307.

Alternatives

As discussed during the hearing, our Office is working in close partnership with IBM to resolve the issues outlined in the "Work Stop" Action List and to develop a revised implementation schedule. That said, should migration of the remaining phones prove impracticable or the state of Oregon need to consider transitioning to an alternative telephony provider, it would be necessary to reopen the original RFP and renew negotiations with Century Link over SLAs. Another alternative would be to simply let individual state agencies go it alone, leaving them with two options; either continued reliance on outdated and fragile phone systems, or the need to conduct agency-specific procurements and have the Legislature make agency-specific funding decisions. However, such contingencies would be in neither parties' interest and would entail transition and additional implementation costs.

Off-Net

After the migration of the 27,000 on-net users, the IBM contract provides the option to migrate any additional off-net systems onto the VoIP solution—the solution is designed so that it can be scaled to serve up to 50,000 users. However, the ability to implement the IBM/Unify managed service solution for off-net sites may, in some cases, be constrained by current bandwidth limitations. The network bandwidth at each location is set to reserve 30% of the available WAN bandwidth at a time for voice. Consequently, we do not specify minimum bandwidth requirements as it would depend on how much traffic an agency has running across their network at any given time.

To break it down a little more, if at an agency site is currently maxing out their bandwidth usage on a consistent basis, they would need to increase their bandwidth in order to move to VoIP or risk impacting their current non-VoIP data traffic—particularly, if they receive a high volume of phone calls at that particular site. The configuration of quality of service (QoS) settings on their network allows 30% of the voice traffic to take priority over any non-VoIP data traffic. Suffice to say, in the case of remote field offices for natural resource agencies and the Department of Transportation, implementation of the IBM/Unify solution given the current cost and availability of bandwidth. In these instances, the cost for a single circuit can exceed a \$1,000 per month for bandwidth that is little better than dial-up. Needless to say, the current bandwidth available to

off-net locations coupled with the current model of provisioning broadband services may leave many off-net sites behind.

Putting aside potential bandwidth limitations, there has been interest from several agencies looking to migrate their off-net phone systems to the IBM/Unify solution, including:

- Department of Human Services (DHS)
- Oregon Health Authority (OHA)
- Oregon Department of Transportation (ODOT)
- Oregon State Police (OSP)
- Oregon Youth Authority (OYA)
- Department of Corrections (DOC)
- Oregon Correction Enterprises (OCE)
- Public Employee Retirement System (PERS)

Additionally, Project MUSIC has already migrated several failing off-net sites for DHS where bandwidth limitations were not an issue. However, it is important to note that the implementation costs associated with migrating off-net locations are outside the scope of the migration costs incurred to date, including the limited-duration project team.

Agency Dissatisfaction and Continuous Improvement

As with any major technical implementation, Project MUSIC has experienced challenges given the complexity of migrating of 27,000 phones onto a modern VoIP platform. As discussed during the hearing, the project team has continually sought agency feedback through post-migration surveys and made continuous improvement—applying lessons learned from each migration to the next. Some of these improvements are summarized below:

- **Increased Follow-up.** Additional communications to the agency site contacts at the 90-day, 30-day and 10-day marks. These communications include a checklist to help the agency communicate special circumstances to the project installation team.
- **Templates.** Communication templates for end users. Agency project managers can customize these for communications to each of their sites.
- **On-Site Meetings.** Additional in-person meetings are now being held with agency leadership, project managers and site contacts.
- **Reference Materials.** Short “tips and tricks” cards are being printed as a fast start tool for common functions for new users
- **Training.** The project team contracted for the development of just-in-time videos to train on key phone functions.

While the project team has worked to improve agency migration support, training and end-user satisfaction, it has also confronted major technical challenges, including: porting issues; choppy voice; and issues associated with soft phones and uncoordinated change “control.”

Porting Issues

Early in the project, there were many issues relating to porting orders that caused migrations to be canceled, delayed or implemented prior to the planned migration date. Port orders are sent from IBM to CenturyLink and as the process progressed, CenturyLink required increasingly rigorous requirements for their port orders. One incorrect phone number within a port order could result in the whole order being rejected. Ultimately, the project team worked with DOJ to escalate the recurrent porting issues to the Federal Communications Commission. Additionally, the project team has implemented standard processes to ensure the accuracy of porting orders and manage the complexity of porting coordination.

In one case, after the Oregon Department of Fish and Wildlife (ODFW), Clackamas Headquarters (HQ) was ported on September 1st 2016, translations by the Local Exchange Carrier (LEC) were not completed, causing calls from non-migrated State of Oregon sites to route to the legacy system instead of the new system. Once they ported, the software defined long-distance network for ODFW off-net sites were not able to call the Clackamas HQ. In troubleshooting with CenturyLink, it was determined that the private SDN voice network

was not updated on the routing change for the Clackamas number that ported, because it is a private dial plan managed directly by AT&T for the State of Oregon. Once an AT&T technician looked at the issue, they were able to modify their plan so Clackamas HQ numbers were reachable on the AT&T Voice SDN from ODFW off-net sites.

Choppy Voice

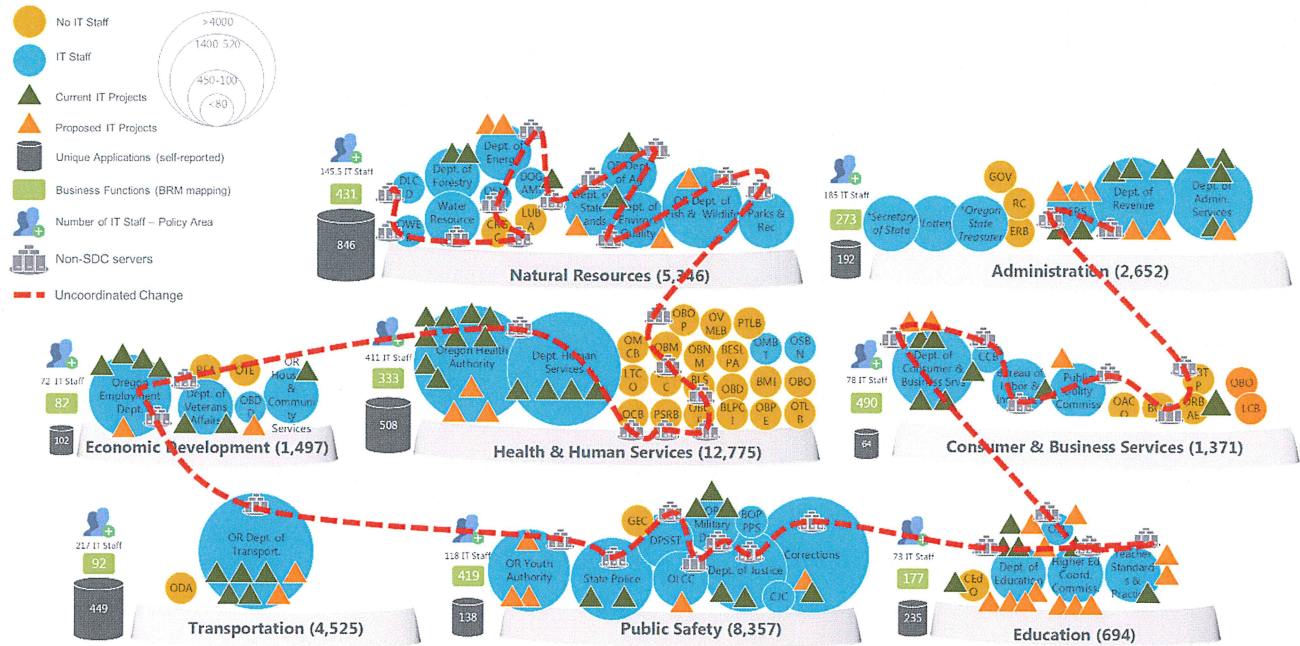
Choppy voice quality is caused by voice packets being either variably delayed or lost in the network. When a voice packet is delayed in reaching its destination, the destination gateway has a loss of real-time information. Consequently, the destination gateway must determine the content of the missed packet. The prediction leads to the received voice not having the same characteristics as the transmitted voice. This leads to a received voice that sounds robotic or choppy in nature. Many of the choppy voice issues are resolved by making sure that the voice packet delay is insignificant. In order to ensure the necessary bandwidth for VoIP packets, a network device must be able to identify the packets in all the IP traffic that flows through it and prioritize certain packets that are vulnerable to significant delays such as voice. This identification and grouping process is called classification and is described as Quality of Service or (QoS). QoS is the fundamental basis for providing voice over IP networks. It prioritizes voice packets as being more critical than standard IP data packets to ensure latency does not become an issue during high traffic volume. It was initially observed by the CenturyLink technical that no QoS had been built onto the circuit. The issue was corrected and voice packets have been monitored since the change was made. Additionally, the network traffic and circuit configuration has been evaluated and analyzed by CenturyLink technicians. The configuration of the network circuits has been adjusted to minimize the risk of voice quality impacts during high congestion periods. CenturyLink Provisioning has reviewed the CTL provisioning process to ensure adherence by all technicians.

Soft Phones and Uncoordinated Change "Control"

In learning about the business needs of Oregon state agencies and the necessary processes and communications required to make each migration successful, the issue of uncoordinated change control has become a recurrent theme. Oregon has a highly decentralized IT operating model, represented by more than a thousand non-OSCIO staff managing more than two thousand unique applications, with at least 40 agencies running their own servers outside of the state data center (SDC)—representing 106 separate data centers, 2,024 servers and consuming 18,008 square feet of floor space. In some cases, these agencies maintain their own non-SDC servers without the benefit of dedicated internal IT staff.

Given this decentralized IT operating model, it comes as little surprise that change control has become an issue over the course of the telephony migration. A single uncoordinated firewall change or application upgrade can cascade throughout the entire system, potentially impacting voice quality or making IBM/Unify applications unavailable. As described during testimony, a routine Java update pushed by the Department of Revenue (DOR) rendered their "soft-phones" unavailable until they were able to roll-back the update and reconfigure the Java-based soft-phone application. A soft phone is a software application that enables the user to make telephone calls using VoIP via their computer; *e.g.*, Skype. When DOR headquarters migrated to the new phone system in November 2016, the original scope included 60 PE soft phone. The soft-phone application had been deployed by DOR for the first time in order to enable DOR staff to work from home during tax season. While the issue was quickly identified and resolved, the example underscores the difficulties of deploying enterprise or cloud-based IT solutions within a decentralized IT operating environment.

Change "Control" within a Decentralized IT Operational Model



Analysis of Tickets

Based on an analysis of both open and closed tickets and to the best of the project team’s knowledge, there are currently no users who have been migrated to the IBM/Unify system without dial tone or phone service. As of today, there are a total of 56 incident tickets and 127 total tickets. The other tickets include move, add, connect and disconnect (MADC) tickets and project tickets that require an onsite technician to resolve. The following sections will provide a summary analysis of the more than 2,500 incident tickets that have been closed to date. Additionally, the project metrics have been appended to this letter for additional context.

Closed Tickets

The following provides an analysis of the completed tickets for the complete project as of late April, covering over 2,500 tickets. The overall time to resolve these issues from the beginning of the project has averaged 8.52 days. With a historic average 13.69 days to close the tickets—the system keeps resolved tickets open for a minimum of 7 days to ensure that intermittent issues are completely resolved prior to closing out the ticket.

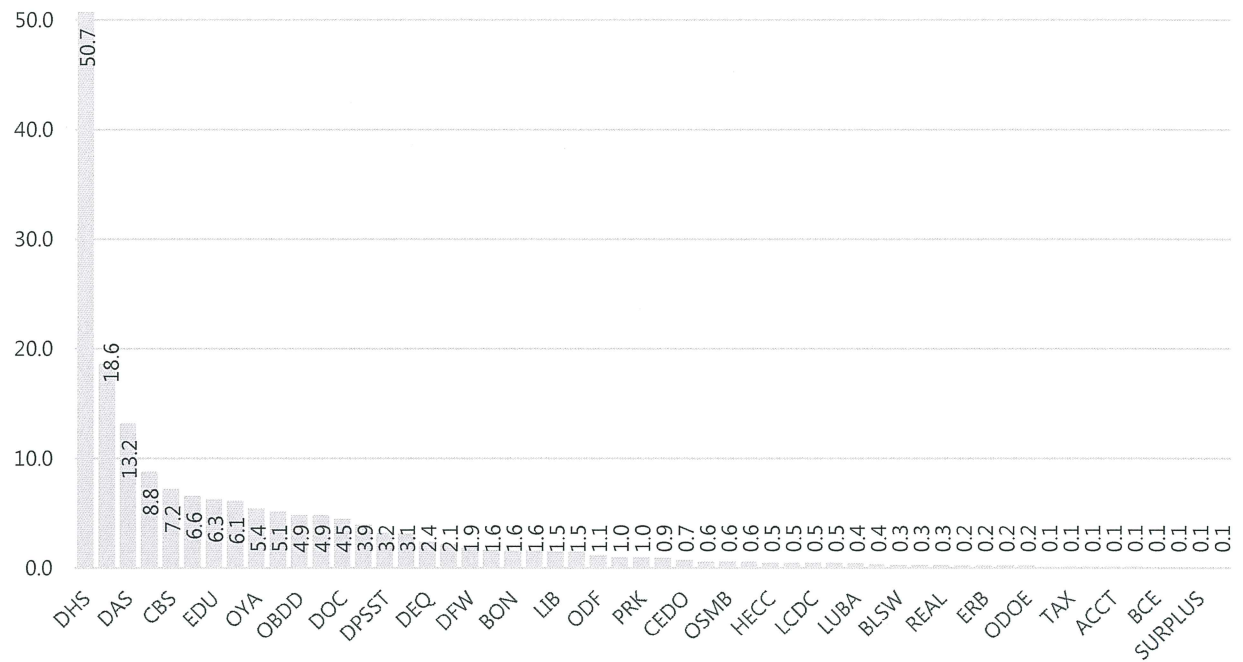
Currently, the time to resolve a ticket has gone down to 3.1 days on average, with 7.85 days to close the ticket on average. Typically, most tickets are resolved within 1 business day, however, issues relating to the technical architecture have taken longer to resolve and have increased the overall average. Of the closed tickets, the project team observed the following:

- 7 incident tickets were due to statewide issues with an application like voicemail;
- 12 incident tickets were related to issues that affected an entire agency site; and
- 2,375 incident tickets were related to smaller issues, typically a single line.

On average agencies have entered 3.3 tickets per month. The agencies that have entered the most tickets can be seen on the next page.

Agency	Tickets	% of Total	Number of tickets per month by agency	# of Subscriber Lines	Number of Tickets Per User
DHS	710	28.33%	50.7	8075	0.09
ODOT	261	10.42%	18.6	2873	0.09
DAS	185	7.38%	13.2	754	0.25
OSP	123	4.91%	8.8	825	0.15
CBS	101	4.03%	7.2	1397	0.07

Number of tickets per month by agency

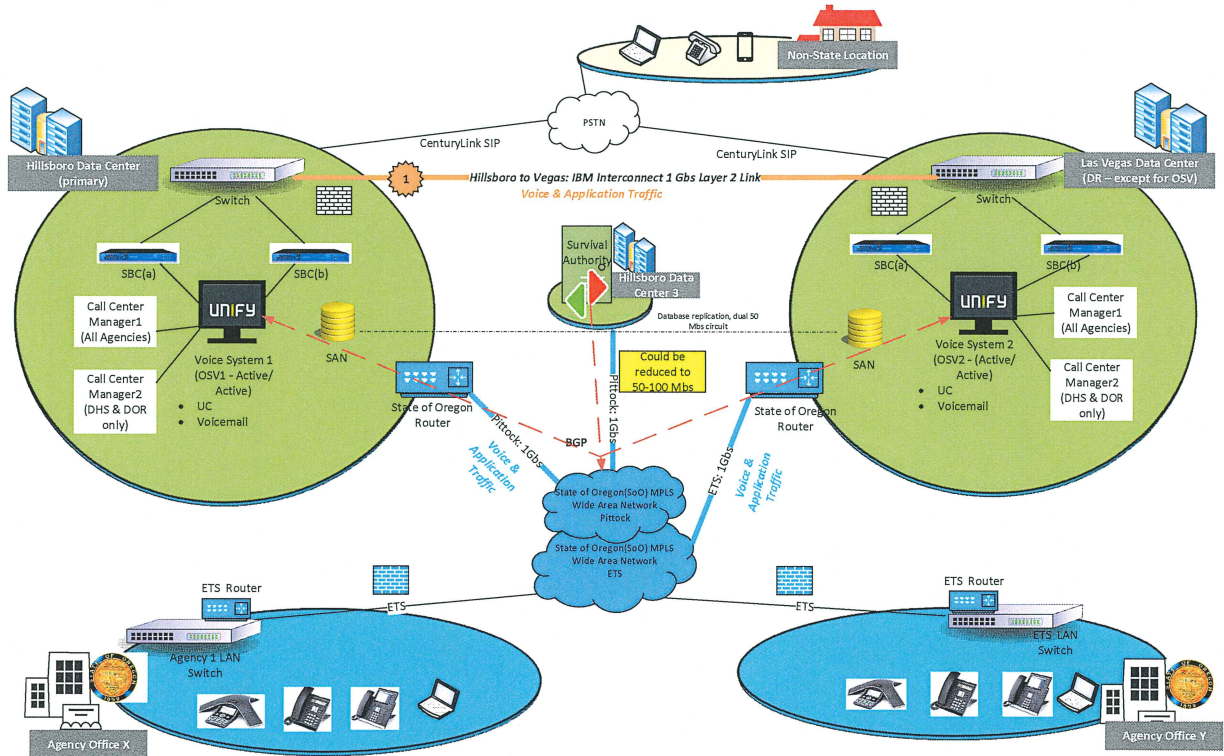


As the project has progress, the peak number of incident tickets generated was 277 tickets within a single month. The average number of incident tickets per month overall is 152. Over the life of the project, substantial efforts have been made to improve end-user training, provide additional documentation and enhance agency engagement—reducing the number of tickets over time. Overall the project has seen significant improvement over time, as demonstrated by the project metrics in Attachment A.

Disaster Recovery and Fail-Over

On April 23rd IBM conducted disaster recovery execution testing to determine the timing of system availability in Las Vegas, identify lessons learned and make recommendations for the future and enable informed decisions about the future of deployment and system stability. The following simplified diagram is a representation of the technical architecture.

Finalized Phone Architecture



Our Office looks forward to working with the Committee to address any outstanding concerns regarding Project MUSIC and are always available to provide individual briefings or status updates. Thank you for your continued interest.

Sincerely,

Alex Z. Pettit, Ph.D.
Chief Information Officer

Cc: Paul Siebert, Legislative Fiscal Office
Ken Rocco, Legislative Fiscal Office
Patrick Heath, Chief Financial Office

