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**ARIZONA DEPARTMENT OF ADMINISTRATION**

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August 11, 2014

Mr. John Halikowski, Director  
Arizona Department of Transportation  
206 South 17th Avenue  
Phoenix, AZ 85007

Dear John:

In response to the **Amended** Project Investment Justification (PIJ) for the “**Server Based Computing Phase 3 (SBC3)**” project, my staff has reviewed your updated proposal to re-purpose SBC3 components that were acquired to convert remaining eligible legacy desktop computers to a thin client model.

The original PIJ implied funding was available from the State Highway Fund in the amount of \$7,083.0 thousand for the total five-year life cycle cost of the project. The amended PIJ implies the same funding is available in the amount of \$6,053.1 thousand for the total reduced five-year life cycle cost of the project.

The original PIJ was **Approved** by the Information Technology Authorization Committee (ITAC) on April 24, 2013. This is notification of Arizona Strategic Enterprise Technology Office's recommendation to the Information Technology Authorization Committee (ITAC) for **Approval with Conditions** of the **Amended** technology project as follows:

1. Should there be significant differences in the scope of work, costs, schedule or technology needed to implement the revised approach, ADOT must amend the PIJ to reflect the changes and submit it to ADOA-ASET, and to the Information Technology Authorization Committee (ITAC) if required, for review and approval prior to further expenditure of funds.
2. ADOT should work with ADOA-ASET to determine whether the excess software licenses that were acquired can be re-purposed elsewhere within the State.

The ITAC is scheduled to meet on August 27, 2014 to review this project.

Should the ITAC approve the project, you may then proceed to secure additional approvals as required from the Joint Legislative Budget Committee, the Office of Strategic Planning and Budgeting, and the State Procurement Office.

Mr. John Halikowski  
August 11, 2014  
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Best Wishes,



Aaron V. Sandeen  
State CIO and Deputy Director  
Arizona Strategic Enterprise Technology (ASET) Office

jr

cc: Doanh Bui, ADOT  
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Phil Manfredi, ADOA-ASET  
James Dean, ADOA-ASET  
Joyce Raschiatore, ADOA-ASET

ASET# DT13011\_A

Analyst: Joyce Raschiatore

**PIJ Summary - ASET**

Project Number: DT13011\_A

<i>Agency Name &amp; Address</i>	<i>Contact Information</i>
Arizona Department of Transportation 206 S. 17th Avenue Phoenix, Arizona 85007	Rich Nacinovich 602-712-4796 rnacinovich@azdot.gov
<i>Project and Investment Justification Name</i>	<i>Date Submitted</i>
Server Based Computing Phase 3 (SBC3)	March 27, 2013 – Original PIJ <b>August 4, 2014 – Amended PIJ</b>

**Project Overview**

**Problem Description**

The Arizona Department of Transportation (ADOT) Information Technology Group (ITG) currently supports a fleet of over 5,700 desktop and portable client computers. According to industry best practices, client-side computing devices have a useful life expectancy of 3-5 years and should be replaced within that timespan to keep pace with the ever-increasing hardware requirements of current operating systems (OS) and business productivity software. Through the adoption of an “in-service equipment failure replacement strategy” and limited, successful deployments of server-based computing technology, ADOT has been able to defer the wholesale replacement of its client-side computing devices for nearly 8 years.

While this strategy has extended their useful life, approximately 70% of ADOT’s desktop computers are now over 5 years old. As a result, a number of issues need to be addressed, including the use of Windows XP Professional on these computers, since product support for that operating system (OS) will be discontinued by Microsoft in April 2014. After that date, ADOT will no longer have access to updates, security patches, or technical support for any issue occurring on a computer running XP Professional. In addition, thousands of ADOT computers are ineligible for an upgrade to Windows 7 since they do not meet Microsoft’s published minimum system requirements. The inability of this aging equipment to meet the demands of current business software, coupled with average annual desktop computer failure rates which have continued to rise, is hindering the productivity and efficiency of ADOT’s workforce.

While desktop computers that have failed are replaced with new equipment, there are inherent shortcomings to this in-service failure deployment approach, especially given the size of ADOT’s PC fleet. Due to the complexity and administrative privileges needed, technician intervention is required to replace a failed PC with a new unit. With very few technicians covering a broad geographic area, there is often a wait time of hours to several days before a failure incident can be resolved. Technicians must drive to remote locations around the State simply to maintain the OS and software instances on thousands of computers, and ensure the most current security patches are in place. In addition to being inefficient and expensive, this distributed model also places sensitive and/or confidential Agency information at risk of theft or loss, since computer users are able to store data on their PC’s local hard drive and/or in-office file server. Systems used to backup this data at ADOT’s satellite offices are also aging and many do not have adequate capacity to capture full backups on a single tape, often leaving the burden of daily tape rotations and offsite media storage to onsite business-area designees.

**Solution**

To address these issues, ADOT considered several alternatives to its current in-service equipment failure replacement strategy. Working with Citrix Consultants and storage vendors using a best-practices approach, ADOT ITG resources identified and quantified the technologies

required to support a modern, right-sized, highly-available, and efficiently managed server-based computing (SBC) environment. The proposed virtual desktop infrastructure will provide the foundation to enable the conversion of 2,909 additional users from ADOT's existing legacy distributed computing model to a centralized, server-based computing and thin client model. At the conclusion of this project, ADOT will have fully realized its strategy to modernize its client-side computing platform for the next 5 years.

***The ADOT SBC3 team started the project as planned in late April 2013, with the core Citrix infrastructure installed and configured by January 2014. At that point, the team shifted its focus to the deployment and testing of hundreds of applications and software packages required by ADOT's diverse computer user community. In February 2014, ADOT determined that while the original proposed approach for SBC3 was possible, the labor to perform the complex application and commercial-off-the-shelf (COTS) software testing and packaging required would result in significant cost overruns. Since the departure of ADOT's Citrix Engineer in September 2013, ITG has been continuously challenged with securing and retaining qualified Citrix technical resources. The introduction of nearly 300 additional applications and software titles within ADOT's current, basic SBC infrastructure would not only increase complexity, but also reliance on qualified technical support resources. Given the premium paid for Citrix personnel with the know-how to design, construct and maintain a server-based desktop ecosystem, continuing with the project as originally planned would burden ADOT with a high cost of ongoing technical support. Without the benefit of immediate access to qualified engineers, continuing with the implementation of SBC3 could also expose the Agency to the risk of high-impact, extended service outages.***

***Given these challenges, ADOT is no longer planning to convert the previously identified 2,909 users to the Citrix environment. With a separate work effort to address Windows 7 application testing and remediation for current Windows XP users nearly complete, ADOT is well positioned to move the SBC3 Citrix candidates to the Windows 7 operating system instead. As such, ADOT is proposing to re-purpose the infrastructure and software acquired for this PIJ to achieve alternate deliverables that will address other immediate business issues, which would also have required major IT investments.***

### **Major Deliverables and Outcomes**

ADOT has already made a significant investment in desktop virtualization as part of the DT07023 Server Based Computing (Phase 1) project, which deployed a Citrix published desktop using existing 'thinned-down' PCs to approximately 600 Motor Vehicle Division (MVD) Customer Service Representatives in 2008. In 2011, ADOT conducted an internal proof of concept project to select and establish a thin client standard; ITG demonstrated its ability to deploy and support the new devices by delivering an initial round of 51 HP T5720e Thin Clients to existing and newly converted Citrix users within several, diverse business areas throughout the State.

The proposed project will complete ADOT's server-based computing strategy by converting the remaining 2,909 eligible legacy desktop computers in ADOT's PC fleet to the SBC/thin client model. Utilizing lessons learned, existing hardware and software assets, and additional hardware, software and professional services, ADOT will deploy and manage a Citrix and thin client architecture that is built according to best practices, is well-managed, scalable and secure. While a subset of ADOT's PC fleet is not in scope for this project, i.e. laptops and computer-aided design and drafting (CADD) workstations, remaining legacy desktop computers

will be re-purposed as thinned-down PCs accessing 'gold' desktop images specific to ADOT business areas. The project will also provide infrastructure capacity at the Arizona Department of Administration (ADOA) Tucson Data Center sufficient to restore both existing and new SBC desktops in the event of a disaster associated with ADOT's Phoenix Data Center.

Technology that will be deployed in order to implement the proposed SBC/thin client solution includes:

- An upgraded blade server infrastructure in both the ADOT Phoenix and ADOA Tucson Data Center facilities, including 42 new Blade Servers, 3 Blade Chassis, and ancillary equipment
- An upgraded core data center network in both the Phoenix and Tucson facility, including Layer 3 Ethernet switches along with 20 Wide Area Network (WAN) Optimization Controllers, and 4 Citrix Netscaler Load Balancers
- A high-speed solid-state Storage Array and a standard Hitachi Storage Array in each of the Phoenix and Tucson facilities to meet anticipated I/O demand
- A total of 140 HP Proliant Field Servers to support automated deployments throughout the State
- Additional and upgraded licenses for Citrix XenDesktop Platinum, VMware vSphere 5 Enterprise Plus, Windows Server 2008 Data Center and Enterprise, and SQL Server Standard software, including up-front Software Assurance (SA) costs
- Additional Microsoft Terminal Services Client Access Licenses (CALs) required for all Citrix users accessing a virtual hosted desktop
- Microsoft System Center Configuration Manager (SCCM) Server Suite licenses, including SCCM Device Manager Server CALs
- Hitachi HuS storage replication software and new to ADOT software licenses for AdminStudio, AppDNA and AppSense Management Suite support tools
- Professional & Outside Services costs for AppSense, Microsoft SCCM, and Citrix implementation support services
- ADOA Tucson Data Center setup support, including Facilities costs for Power/Electrician Services

Operational costs in the PIJ include thin client hardware and SCCM Device Manager Client CALs needed to replace re-purposed legacy PCs that are expected to fail at an increasing rate over the five-year lifecycle of the project. Licensing & Maintenance fees for SA, CALs, and other ongoing support for the proposed software and hardware is also included, along with Microsoft Virtual Desktop Access licenses required for thin client access to a Virtual Desktop Infrastructure (VDI) presented desktop operating system. Professional & Outside Services costs include annual Citrix Technical Relationship Management (TRM) services and ADOA Tucson Data Center lease costs.

***ADOT has already purchased and deployed most of the infrastructure components identified above, with the exception of the following:***

- ***20 Wide Area Network (WAN) Optimization Controllers***
- ***Additional and upgraded VMware vSphere 5 Enterprise Plus, Windows Server 2008 Data Center and SQL Server Standard software licenses***
- ***SCCM Device Manager Server CALs***
- ***Hitachi HuS storage replication software***

***Coupled with a reduction in the amount of implementation support services required, and savings realized through pricing negotiations, ADOT has not expended \$1,029.9 thousand of the \$5,162.4 thousand in development costs in the original PIJ. ADOT did acquire 907 Citrix XenDesktop Platinum licenses, most of which will not be utilized. With this Change Request, ADOT is proposing to extend the end date for the project from December 2014 to December 2015 and address the following at no additional cost beyond what has been expended to date:***

- 1. SBC desktops/published applications that were previously delivered currently service over 1,000 ADOT users and external business partners. These services are running on nearly 7 year old infrastructure, utilizing Citrix Presentation Server 4.5, which is unsupported, and the Server 2003 operating system that Microsoft will retire in July 2015. ADOT is proposing to migrate these existing users to the new, fully supported Citrix XenApp 6.5 infrastructure running on new hardware and the Server 2008 R2 OS.***
- 2. While the business processes and supporting application requirements for ADOT's 830 Authorized Third Party (ATP) providers are identical to those of the MVD, ATP processes are entirely paper-based, making them inefficient and costly for both the ATPs and ADOT. In order to provide ATPs with access to ADOT's OnBase document management system for digital scanning/online customer-related documentation, a conversion to the existing MVD Customer Service Representative (CSR) SBC desktop is required. ADOT is proposing to transition 830 ATP users to the new Citrix XenApp 6.5 system and MVD CSR SBC desktop, which will increase the configuration consistency, security, availability and stability of the ATP operation, while reducing technical support overhead for both ATP businesses and ITG staff. While additional time is needed to complete the effort associated with converting ATP locations to a Citrix-based environment, this will enable ATPs to leverage ADOT's OnBase document management system and will provide a single, comprehensive desktop image for all customer-facing MVD operations.***
- 3. ADOT's current 1,000-user Nortel IPSec Virtual Private Network (VPN) system is 14 years old and no longer supported by the manufacturer, with client connection software that is not offered for non-Windows systems and is difficult to obtain when a new version of Windows is released by Microsoft. ADOT is proposing to migrate these 1,000 Nortel VPN customers to the new Citrix access gateways and backend XenApp infrastructure, for secure remote access to the Office 2010 productivity suite, internal web applications, Internet browsing, file shares, mainframe terminal emulator and other commonly used productivity software.***

### **Benefits**

The primary intent of this project is to reduce overhead cost associated with keeping ADOT's desktop computers current and capable of running modern operating systems and software. In addition, a move to server-based computing is expected to increase performance and reliability, afford efficiency gains over the maintenance and management of legacy desktop computers, and enhance data security, while maintaining or exceeding current service levels. The project will provide the 2,909 users converted to the proposed solution with a contemporary, robust, fault tolerant and secure desktop experience without the expense and support overhead associated with refreshing ADOT's PC fleet on a regular, four-year cycle. This approach also positions ADOT to continue to use its old computers to access the SBC environment while

allowing its user base to perform just-in-time, self-service client device replacements for in-service failures, using lower cost thin clients instead of traditional PCs.

ADOT has completed an extensive cost-benefit analysis to determine the cost savings that are expected to be realized with the proposed approach. Over the five-year project lifecycle, ADOT is estimating cumulative hard savings of \$7.3M and efficiency savings of \$2.15M by implementing an SBC/thin client solution for the 2,909 candidates in scope for this project. Development costs of \$5.2M and operational costs of \$1.9M offset these total savings for a net benefit of \$2.35M.

Specific benefits to be realized as a result of the proposed project include:

- Enhanced end user experience using modern, fault tolerant and right-sized server hardware, the latest operating system and software versions, and a robust network with high-speed access to Data Center resources
- Reduced end-point computing costs through the use of lower price-point, longer-life and lower power draw thin client devices
- Simplified, nimble, and scalable approach to provisioning end-user desktop operating systems and software
- Reduced maintenance costs associated with ADOT's end-user computing environment
- Simplified and efficient method of upgrading operating systems
- Rapid desktop and software deployments, upgrades, and rollbacks
- Efficient and rapid troubleshooting, diagnostic, and issue resolution capabilities
- Reduced security attack surface on thin client endpoint devices
- Reduction in the number of devices that must frequently receive security patches and anti-virus updates
- Centralized data protection and disaster recovery capability for ADOT's intellectual property and other electronic records
- End-user 'self-service' removal and replacement of failed endpoint devices
- Same computing experience from anywhere – a user's customized desktop follows him/her when moving from one computer to another
- Ability to deliver an official ADOT desktop to other endpoint types, whether traditional PC, thin client, tablet, smartphone, personal PC, and/or others.

***All computer hardware, communications equipment, professional services and facilities expenditures for the SBC3 project will be fully utilized by ADOT to accommodate the needs of the 2,830 basic SBC desktop users proposed in the amended business case. While not specifically outlined in the original PIJ, ADOT will still achieve identified efficiency savings through the use of the SCCM 2012 Server Suite, which required only support services to implement, and the AppSense Management Suite that was acquired. While SCCM automates operating system and software deployments, the AppSense software streamlines user profile management. These benefits apply to all computer users, whether their desktop is virtualized or resident on the local hardware.***

***ADOT also expects to achieve an annual hard dollar savings of \$170.6 thousand from reduced document shredding, filming and transport costs, as well as an annual efficiency savings of \$85.6 thousand in resource hours, as a result of migrating the ATPs to the SBC desktop and OnBase document management system. Moving the ATPs to a standard MVD/SBC desktop and locked down computer, with no ability to store files on***

*the local desktop, will eliminate the risk of data loss and improve ADOT's security posture as well.*

*ADOT will not utilize 650 of the 907 Citrix XenDesktop Platinum licenses that were acquired, since previously purchased Citrix licenses from Phase 1 are transferable to the new platform. Of the \$4,132.5 thousand spent to date, the financial impact of that excess acquisition is \$134.5 thousand. Given the projected annual savings of \$256.3 thousand to be achieved by moving MVD ATPs to an SBC desktop with OnBase scanning, the proposed approach will result in an immediate positive financial offset of \$121.8 thousand.*

**Project Management**

ADOT will acquire equipment, software and implementation services from selected vendors, along with project management and technical consulting support. ITG staff will work with ADOA and AZNet to acquire facilities and telecommunications services needed to implement the proposed solution.

*ITG staff will complete the proposed deliverables for the amended project.*

**Enterprise Architecture**

Compliant.

**Original Summary of Proposed Costs**

<i>All Figures in Thousands (\$000)</i>						
<i>Cost Description</i>	<i>2013</i>	<i>2014</i>	<i>2015</i>	<i>2016</i>	<i>2017</i>	<i>Total</i>
Development Costs	2,367.3	2,795.1	0.0	0.0	0.0	5,162.4
Operational Costs	102.3	417.4	450.2	466.9	483.7	1,920.5
Total Project Costs	2,469.6	3,212.6	450.2	466.9	483.7	7,083.0

**Amended Summary of Proposed Costs**

<i>All Figures in Thousands (\$000)</i>						
<i>Cost Description</i>	<i>2013</i>	<i>2014</i>	<i>2015</i>	<i>2016</i>	<i>2017</i>	<i>Total</i>
Development Costs	2,367.3	1,765.3	0.0	0.0	0.0	4,132.5
Operational Costs	102.3	417.4	450.2	466.9	483.7	1,920.5
Total Project Costs	2,469.6	2,182.7	450.2	466.9	483.7	6,053.1

**Recommendation: Approval with Conditions**

1. Should there be significant differences in the scope of work, costs, schedule or technology needed to implement the revised approach, ADOT must amend the PIJ to reflect the changes and submit it to ADOA-ASET, and to the Information Technology Authorization Committee (ITAC) if required, for review and approval prior to further expenditure of funds.
2. ADOT should work with ADOA-ASET to determine whether the excess software licenses that were acquired can be re-purposed elsewhere within the State