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June 4, 2013

REF: ICB-141-13

Honorable Members of the City Council
City of Los Angeles
Room 395, City Hall
Los Angeles, CA 90012

Attention: Information Technology and General Services Committee

Subject: **CITY INTERNET OUTAGE (CF NO. 13-0239)**

Dear Councilmembers:

Pursuant to City Council Motion (Perry/Parks), Council File No. 13-0239, the Information Technology Agency (ITA) is submitting the following report back regarding the City's February 12, 2013 internet outage, identifying the problems that contributed to it, and providing recommendations for remediation to prevent or minimize other network incidents in the future.

BACKGROUND

On March 11th, 2013, the Information Technology and General Services Committee (ITGS) heard the findings, action completed to date, and recommendations going forward from the ITA relating to the network outage that occurred on February 12, 2013. The outage resulted when the City's Internet network connection reached capacity due to an excessive number of City staff accessing external streaming audio and video content.

Following the ITA's report the ITGS requested a report back on the three recommendations listed below:

- 1) Utilize the current network vendor to conduct an assessment of the City's Network design to optimize the internet access services to increase performance and stability; this would include recommendations for load balancing and scalability to achieve a 99.999% availability for City departments;**

Action: ITA had Cisco/Nexus (the City's network hardware vendor) conduct a no-fee assessment of the City's network. The findings and recommended



actions were reviewed by the ITA staff and are fully supported. The vendor concluded that the following network components are end of life and require immediate replacement. The vendor noted that ITA does not have the proper staffing levels and will require training to support these new products.:

- i. Network Firewall – Firewall's are the primary hardware appliance implemented to prevent hacking and unauthorized access to City systems and data. The ITA had purchased a new Firewall 2 years ago, however the staff working on that effort was hired by LADWP, and the knowledge transfer, proper implementation and documentation never took place. Therefore the older end of life firewalls remain and are continually problematic due to capacity issues, thus causing instability to the City's network.
- ii. Load Balancers – In order to provide for large amounts of traffic over the network, load balancers leverage all existing network hardware resources to prevent a primary point of failure on City systems and networks. The new term in the industry is Application Control Engines. The City's current load balancing system is at end of life and support, and is unreliable. Both Cisco and IT industry expert Gartner have confirmed that a new device and training are required to replace the failing system and bring stability and reliability back to the City's network.
- iii. Intrusion Detection - To monitor network and system activities for malicious actions or policy violations on the City's network, Intrusion Detection System (IDS) devices are implemented. These devices inform staff that unanticipated activities are occurring on the network. The assessment has determined that the IDS devices used on the City's network are at end of life and are no longer compatible with the current firewall configuration, which has caused instability in the network. Also, due to attrition, staff is not always able to proactively monitor alerts or logs to determine the presence of malicious actions and policy violations, nor are they able to quickly identify the root cause of problems and eradicate these problems that are impacting network performance.
- iv. Network Equipment – The network is comprised of a complex array of various types of communications routers (core, application and edge) and switches. In fiscal year 2008/2009, Council approved funding for the replacement of aging network equipment over a period of five years. ITA staff has continued to upgrade end of life equipment, but due to smaller staffing levels this effort is not yet completed. To complicate the situation further, equipment that was newer generation in 2008, is now soon to be at an end of life stage.

- v. Network Management tools-they ensure that all components utilize proper software versions and that they are configured in a way to provide maximum security and performance. The City has made significant investment in network tools, however due to attrition, staff is not trained to use the tools to make quick diagnosis and repairs and revert to manual processes to trouble shoot and restore networks. Most products are installed, but not populated with required data defining our networks and therefore not yet usable by staff. The City needs to invest in training current staff and begin leveraging the sophisticated tools which are already in place.

Limited staff in ITA have the technical knowledge or capacity to effectively implement and maintain the network components referenced above.

- 2) **Work with the LAFD and LAPD to implement redundant Internet access for the 9-1-1 dispatch centers to avoid impact of future Internet outages;**

Action: Redundant Internet access for LAPD and LAFD dispatch centers was identified as an important issue when network outages occur. ITA staff is working with both agencies and they are able to fund laptops with 4G Internet access that can be used for times when this occurs.

- 3) **Work with LAPD to isolate their network traffic on its own firewall to reduce the impact on non-law enforcement impact.**

Action: The LAPD preferred to isolate their internet traffic on their own firewall, so that required video streaming would not impact non-law enforcement Departments. These changes have been implemented.

RECOMMENDATION

ITA recently hired a new Assistant General Manager to lead the Infrastructure and Communication Bureau (ICB) on April 29, 2013. From his 25 years' of experience in communications, along with ITA's and Cisco's assessment results, the General Manager concurs with the following short and long term strategies to stabilize and fortify the City's network infrastructure within the City's budget constraints. These recommendations would be phased-in in order to stay within the boundaries of the City budget :

- 1) Complete the upgrade or installation of major components to the City's networks (firewalls, IDS, load balance, aging equipment).
- 2) Complete implementation of all City owned network management tools.
- 3) Training – Provide staff with the necessary training on the operation of updated network components and the use of network management tools so ITA may begin proactive monitoring of the City's network. This will help stabilize the network, reduce the number of issues experienced on the

- network and provide proactive reporting and troubleshooting in order for ITA to provide faster restoration of network services.
- 4) Reorganization – The ITA will reorganize the Infrastructure and Communications Bureau and move a manager to head up data networks to provide a dedicated resource to that critical function. The entire ITA will be reorganized by July 1st to provide like core competencies by Bureau and to realign vacancies through managed hiring to create a Chief Information Security Office to head Cyber Security initiatives for the ITA and to reallocate (or through attrition to create) the necessary full time resources for the data network division to provide the level of resources required.
 - 5) Strategic Analysis – The City currently has Avasant engaged to develop a strategic plan for IT services delivery. Avasant has started gathering data and will be recommending strategies for improving data networks across the City. Until those recommendations are completed, independent contracts will be utilized where lack of resource and experience exists until City staff is either up to speed or adequately in place to support the systems in house.
 - 6) Technology Refresh – The City has been funded some level of technology refresh every year which has benefited remediation since just a few systems are at end of life. The amount of equipment requiring technology refresh to provide redundancy and stability is estimated to be \$1.2M. The Telecommunications Development Account in the ITA has the remaining technology refresh funding allocated to support this upgrade.

It is clear that the attrition, retirements, and employee transfers, have dramatically impacted the ability for the ITA to effectively manage the City's data network. The remaining staff were not provided the knowledge transfer needed to keep systems stable and properly maintained, and are very much in need of training on the needed newer technologies. The goal of the ITA is to bring the network back into a high availability status, but this will require some long term network redesign, additional ITA resources, additional hardware and software for network monitoring and redundancy, and funding for future fiscal year considerations. ITA will develop a detailed estimate and plan for addressing the long-term resources needed.

Should you have any questions or require additional information, please contact me or Mr. Greg Stoddard, Assistant General Manager at (213) 978-3311.

Respectfully submitted,



Steve Reneker
General Manager

Honorable Members of the City Council

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cc: Honorable Antonio R. Villaraigosa, Mayor
Eileen Decker, Deputy Mayor
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