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Office of the City Manager

To: Honorable Mayor and Members of the City Council

From: Dee Williams-Ridley, City Manager

Submitted by: Savita Chaudhary, Director, Department of Information Technology

Subject: Purchase Order with Carahsoft Technology Corporation: Using General Services Administration (GSA) Schedule for hardware, software, and services related to the Data Center Infrastructure Upgrade and Disaster Recovery Implementation

RECOMMENDATION
Adopt a Resolution authorizing the City Manager to increase spending authority with Carahsoft Technology Corporation for the purchase of server hardware, software, and related services for a data center upgrade and disaster recovery implementation, utilizing pricing established by the General Services Administration (GSA), for a total amount not to exceed $1,678,953 for the period May 15, 2019 to June 1, 2024.

POLICY COMMITTEE RECOMMENDATION:
On April 25, 2019, the Budget and Finance Committee adopted the following action:
M/S/C (Droste/Davila) to send the item to the full Council with a Positive Recommendation. Vote: Ayes – Davila, Droste; Noes – None; Abstain – None; Absent – Kesarwani.

FISCAL IMPACTS OF RECOMMENDATION
Funding for this project in the amount of $1,678,953 is available in the Department of Information Technology's Fiscal Year (FY) 2019 FUND$ Replacement, Computer Replacement, Capital Improvement, General Fund, Employee Training Fund, and IT Cost Allocation. Spending for software maintenance in future years is subject to Council approval of the proposed citywide budget and annual appropriations ordinances.

FY 2019: Summary

Amount	Description
$1,638,503	Total FY 2019 Hardware
$40,450	Total FY 2019 Professional Services
$1,678,953	**Total FY 2019 Hardware and Services**

FY 2019: Hardware and Software

$400,000	FUND$ Replacement: 503-35-362-376-0000-000-412-664140-	
$571,000	Computer Replacement: 675-35-362-376-0000-000-473-664140-	
$365,860	Capital Improvement Fund: 501-35-362-376-0000-000-412-664140-	
$301,483	IT Cost Allocation Fund: 680-35-361-000-0000-000-473-664140-	
$1,638,503	Total FY19: Hardware and Software	

FY 2019: Professional Services

$30,650	IT Cost Allocation Fund: 680-35-361-000-0000-000-472-612990-	
$9,800	Employee Training Fund: 146-35-361-000-0000-000-412-612990-	
$40,450	Total FY19: Implementation Services	

CURRENT SITUATION AND ITS EFFECTS

The City's current server and storage environment has very limited redundancy and disaster recovery (DR) in place, leaving daily operations and services vulnerable to a total outage or a significant interruption after a local disaster, such as an earthquake. Though the City can handle a single server failure, we cannot currently stay up and running when multiple locations are impacted (e.g., when 2180 Milvia and Public Safety are experiencing issues). There is also minimal physical redundancy, with the exception of some of our Public Safety systems. And, the existing platform: (i) lacks scalability, (ii) requires multiple levels of support to manage and (iii) has no onsite or offsite disaster recovery capability.

In addition to lacking DR, the current solution is setup in a 3-tier model (virtual environment, servers, and backend storage) – an outdated technology that requires high overhead and costly to maintain. It is time consuming to deploy new applications and it lacks the stability needed for our mission critical applications. Department of Information Technology (DoIT) staff estimates that standard maintenance and support of these environments takes up an average of 8 staff hours a week or 400 hours a year during working hours and approximately 40-50 hours of additional overtime per year. Vendor support for the 3-tier model is also a concern since each tier in the model has a different support supplier, contact mechanism, and fulfillment approach. This regularly results in delays as well as frequent escalations. Depending on the situation, multiple vendors may be involved to support issue resolution which results in support delays.

In contrast, Nutanix Hyper Converged Infrastructure, storage and disaster recovery solution will provide a simple and easy infrastructure that significantly reduces the DoIT staff overhead. A Hyper-Converged Infrastructure (HCI) combines the 3-tiers from the other infrastructure model into a single one. That, in turn, gives us a single, "one-stop-shop" view, freeing us from procedural complexity for support and maintenance, and resulting in fewer and a lower likelihood of errors. The simplified infrastructure is also more efficient in its vendor support, as one support team supports the entire environment.

In terms of disaster recovery (DR), the new HCI solution (called "Xi Leap") will provide full redundancy between the data centers at City Hall and the Public Safety Building. It will also provide a secure offsite DR location so that, in the event of a major local disaster (e.g., an earthquake or mass fire), the City will be able to maintain daily operations uninterrupted. The contract further aids the City in being prepared, allowing us to test the HCI's DR capabilities every quarter. It is built secure, it provides data encryption and other cyber security controls by default, and its security is incident-tested. This is one of the core goals of the Cyber Resilience Plan.

In summary, some of the expected benefits of the solution are:

1. Reduces our datacenter footprint, avoiding costs tied to provisioning storage while dynamically expanding resources when and as needed
2. Incorporates a scalable infrastructure that simultaneously reduces deployment time from days to hours, improving resource allocation of DoIT staff
3. Reduces our server rack space, power and cooling requirements, producing power savings and reducing our carbon footprint
4. Achieves DoIT operational and cost efficiencies along with improved application performance by leveraging software-defined technology – the latest technology
5. Provides a single management console with high availability and improved failover while also creating disaster recovery (DR) capabilities
6. Allows both data centers to replicate between themselves with an increased capacity that is large enough to host both of them in the event one fails
7. Provides DR offsite in case both datacenters were to go down and we need to activate the EOC and the DR offsite
8. Increases datacenter, server and data security
9. Ensures and enhances the delivery of services to the community
10. Decreases standard maintenance and support delays and overall time to complete

Datacenter Infrastructure Upgrade, Disaster Recovery installation and Implementation is a Strategic Plan Priority Project, advancing our City's strategic goal to provide state-of-the-art, well-maintained infrastructure, amenities, and facilities.

BACKGROUND
The Department of Information Technology (DoIT) supports the City's core technology 3-tier server and storage infrastructure and staff spends a great deal of time in supporting and maintaining our infrastructure – keeping it configured correctly, optimized and available 24X7. Historically we have purchased various best of the breed solutions to meet our individual project needs which lacks the flexibility and scalability needs for the future projects. The staff uses multiple consoles and interfaces to keep the systems operational and for ongoing monitoring.

The DoIT staff researched various 3-tier and hyper-converged storage technologies, with a priority towards finding a solution that would provide both local and off-site disaster recovery, and ideally with the same vendor to reduce the complexity of the solution, simplify datacenter operations while improving service delivery and to ensure seamless support in the event of a disaster, without increasing the cost of operations.

Nutanix has a single management dashboard for its hypervisor, server hardware, storage, and DR management. The current 3-tier systems have separate applications to manage the hypervisor, storage, server hardware and DR tools.

Staff Time - Currently it takes three separate maintenance windows to upgrade current 3-tier systems compared to one maintenance windows for Nutanix. Nutanix has the ability to do one button upgrades for all software and components. The staff time savings are estimated at 1/3 staff member (FTE) time which can be reallocated to the other infrastructure projects as identified in the City's Digital Strategic Plan (DSP) and Cyber Resilience efforts.

Server Room Space - The current 3-tier systems at the Civic Center Data Center (CCDC) uses 24U of rack space compared to 16U needed for the Nutanix servers or 33% less rack space thus resulting in power savings.

Power and Cooling - There are 20 existing systems at the CCDC compared to 8 needed for Nutanix. Each system uses 2 power cables. For instance, average usage of one server is 850 watts per hour with an average of 7446kWh (kilowatt hour) per year. The existing power consumption comes to 148,920 kWh/year compared to 59,568 kWh/year needed for the Nutanix systems or 60% less power requirement thus resulting in power savings and reducing carbon footprint. According to the U.S. Energy Information Administration (https://www.eia.gov/electricity/monthly/epm_table_grapher.php?t=epmt_5_6_a), as of December 2018 the average rate for electricity is 19.44 cents per kWh thus bringing the operational power costs down from $28,950.05 to $11,580.02 annually

Adding new hosts and clusters takes many hours and is very complex to integrate into existing environment. Issues with current controllers turning off and long support times cost the city staff hundreds of hours making sure the systems stayed redundant and online. We documented 6 incidents with high impact since 2015. We began to log these in 2015 after having multiple issues.

Current solution did not give a seamless way to failover during a data center outage and had no way to send our data to a remote provider without having the same infrastructure and storage systems which is not feasible financially to maintain twice the infrastructure.

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Within the Nutanix solution we will have full encryption, local DR (DR between both CCDC and Public Safety Building (PSB) data centers), remote DR (to Nutanix East Coast Site), data compression and data deduplication all from the same provider.

Nutanix provides one call support for all components purchased. This includes the hardware, hypervisor, and software (Encryption, compression, DR (LEAP and Xi LEAP) and deduplication). During our research San Mateo County said "The support is excellent and Nutanix called them when a drive was failing and sent it out automatically". Our current vendor on the other hand waits for us to call to get support and fix, this has taken over 16 hours in few cases.

After comparing different options, including looking at the ease of support and maintenance, the continuity of support in the event of a disaster, and speaking with other local jurisdictions about their storage and disaster recovery solutions (BART, City of San Mateo, California Public Utilities Commission), the City intends to move forward with a Nutanix solution. Nutanix provides both local and offsite disaster recovery from a single vendor, and with a hyper-converged solution that simplifies support and maintenance.

ENVIRONMENTAL SUSTAINABILITY
The Nutanix hyper-converged solution is a simplified and streamlined design compared to a typical 3-tier solution, reducing the 60% power consumption reduction for equipment and 50% reduction in hardware space required for both data centers, which has a direct reduction in power consumption and server room cooling requirements. This supports the reduction of carbon footprint and the goals of the City's Climate Action Plan.

RATIONALE FOR RECOMMENDATION
Nutanix is an industry leader in the hyper-converged market, and have received high marks for customer service and support when compared with other hyper-converged and 3-tier vendors in the marketplace. Department of Information Technology (DoIT) staff consulted with BART, San Mateo County, and the California Public Utilities Commission, all of whom use the Nutanix solution. San Mateo County reported overall system stability and a reduction in support costs. BART reported a 50% reduction in support time for IT staff. Staff recommends the Nutanix hyper-converged solution as the solution best met the City's operational, technological, and fiscal requirements

ALTERNATIVE ACTIONS CONSIDERED
DoIT staff researched multiple 3-tier and hyper-converged solutions. 3-tier solutions proved to have higher administrative and support costs, and require more staff time to support and maintain when compared with hyper-converged solutions. In the hyper-converged space, the Nutanix solution provided both local and offsite disaster recovery with a single vendor, which satisfies the two main requirements of providing both local and offsite disaster recovery, as well as reduced support and maintenance costs, and continuity of support in the event of a disaster. In addition the City would not yield better

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pricing compared to what is achieved through Carahsoft Technology Corporation within the structure of the GSA agreement.

CONTACT PERSON
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Attachments:
1: Resolution

RESOLUTION NO. ##,###-N.S.

PURCHASE ORDER: CARAHSOFT TECHNOLOGY CORPORATION USING STATE COOPERATIVE GENERAL SERVICES AGREEMENT FOR DATA CENTER INFRASTRUCTURE UPGRADED, DISASTER RECOVERY INSTALLATION AND IMPLEMENTATION

WHEREAS, the City of Berkeley's core infrastructure is 3-tier based and multiple vendor technologies are implemented. Nutanix Hyper Converged Infrastructure, storage and disaster recovery solution, will provide a hyper-converged, or "1-tier" infrastructure that will significantly reduce administration and support time for Department of Information Technology staff; and

WHEREAS, after comparing different options, including looking at the ease of support and maintenance, the continuity of support in the event of a disaster, and speaking with other local jurisdictions about their storage and disaster recovery solutions, the City intends to move forward with a Nutanix solution. Nutanix provides both local and offsite disaster recovery from a single vendor, and with a hyper-converged solution that simplifies support and maintenance; and

WHEREAS, by utilizing existing GSA pricing schedules, the City of Berkeley is able to take advantage of pre-negotiated prices, economies of scale, and increased efficiencies; and

WHEREAS, funding for this project in the amount of $1,678,953 is available in the Department of Information Technology's Fiscal Year (FY) 2019 FUND$ Replacement, Computer Replacement, Capital Improvement, General Fund, Employee Training Fund, and IT Cost Allocation, spending for software maintenance in future years is subject to Council approval of the proposed citywide budget and annual appropriations ordinances.

NOW THEREFORE, BE IT RESOLVED by the Council of the City of Berkeley that the City Manager is authorized to approve purchase orders with Carahsoft Technology Corporation for the purchase of server hardware, software, and related services for a data center upgrade and disaster recovery implementation, utilizing pricing established by the General Services Administration (GSA), for a total amount not to exceed $1,678,953 for the period May 15, 2019 to June 1, 2024.