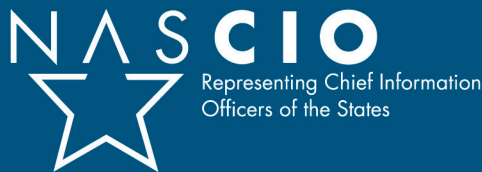


# CAPITALS IN THE CLOUDS PART VII

A CASE STUDY OF CLOUD PROCUREMENT:  
CALIFORNIA'S CLOUD INFRASTRUCTURE



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NASCIO  
Cloud  
Computing  
Series



As needs and requirements in state government technology have changed, the state information technology (IT) sector likewise has evolved to seek new service delivery models for the end users they serve. One such delivery model that most states are adopting is a shift to cloud-based services.

In the 2014 State CIO Survey—a product of the National Association of State Chief Information Officers (NASCIO), TechAmerica, and Grant Thornton—*Charting the Course: Leading Collaboration in Uncertain Times*, 73 percent of states have some applications in the cloud and are considering others. Additionally, 20 percent of responding states are “highly invested” in cloud services, compared to just 6 percent in 2013. (Figure 1)

To be clear, the majority of cloud services adoption by the states is comprised of private clouds—owned and operated by state government. However, the use of public cloud services (or commercial service providers) is certainly taking hold in government and is projected to grow.

NASCIO and NASPO have several resources available to you on cloud technology and procurement.

In 2011, NASCIO launched its *Capitals in the Clouds* series. This paper is one in a multi-part series. Please visit [nascio.org/publications](http://nascio.org/publications) for more information.

NASPO recently updated its flagship publication, *State and Local Government Procurement: A Practical Guide* to include a new chapter on IT procurement. Please visit [naspo.org](http://naspo.org) to order this publication.

**Figure 1**

NASCIO 2014 State CIO Survey		
What is your state's status regarding cloud services?	2014	2013
The state already highly invested in cloud services	20%	6%
The state has some applications in the cloud and is considering others	73%	68%
The state is still investigating cloud services	6%	22%
The state has already considered cloud services and rejected it	0%	2%
Don't know/does not apply	0%	2%
Other	2%	0%

Cloud architecture often provides great benefit by replacing commodity IT services (such as infrastructure needs and software expenses) with a subscription-based product. However, traditional procurement vehicles are not always suited for such purchases and cloud computing brings in additional challenges when it comes to crafting terms and conditions and comparing pricing models.

Partnering with the National Association of State Procurement Officials (NASPO), NASCIO is continuing the Capitals in the Cloud Series by examining how states are procuring and adopting cloud services. The 2014 State CIO Survey reported categories of services that states have migrated to the cloud. (Figure 2)

The survey showed 47 percent of states are storing information and data in the cloud. One such state project that has received widespread attention in the state community because of its scope, stature, potential value and procurement approach is California's Cloud Infrastructure, launched in July,

2014. This case study includes information and advice from the trenches from **Neeraj Chauhan, California's Cloud Infrastructure Project Director, OTech, California Department of Technology; Carlos Ramos, Chief Information Officer, State of California; and Jim Butler, Chief Procurement Officer, State of California.** This will be the first in a series of case studies on cloud projects to be produced by this NASCIO/NASPO joint effort. Let's jump in.

**Figure 2**

NASCIO 2014 State CIO Survey	
What categories of services have you migrated or do you plan to migrate to the cloud?	2014
E-mail and collaboration	63%
Storage	47%
Geographic Information Systems	37%
Disaster recovery	37%
Program/business applications (e.g., licensing, unemployment, insurance, workers' compensation, etc.)	29%
Office productivity software (e.g., word processing)	47%
Digital Archives/electronic records	31%
Citizen relationship management	33%
Open data	28%
Enterprise Resource planning	28%
Imaging	18%
Other	22%

# Who, What, Why, Where and When

## What was the purpose of the cloud project?

**Neeraj Chauhan:** California's cloud infrastructure initiative is an on-premise, private cloud service that is hosted at OTech's [California Department of Technology] data centers located in Rancho Cordova and Vacaville. Each data center ensures security and tier-3 data center power and cooling. This service sits behind the OTech managed network and firewall infrastructure. The infrastructure is vendor-managed up to the hardware and racks, and down to the operating system level. With OTech and the vendor managing and supporting the underlying cloud infrastructure, this allows the customer to focus on their business needs and the application deployment.

Our cloud infrastructure environment provides a highly available, 100 percent virtual environment to customers through agile, cost-effective, innovative, reliable, and secure technology. In accordance with the National Institute of Standards and Technology (NIST), California's Cloud Infrastructure is defined by the five essential characteristics of cloud computing:

### 1. On-demand Self-Service

California's Cloud Infrastructure will enable OTech's customers the ability to provision processing, storage, network, and other fundamental computing resources; and deploy and run arbitrary software and applications through a self-service web portal.

### 2. Broad Network Access

California's Cloud Infrastructure is a pathway to providing a more responsive, accessible, and mobile government IT solution through utilization of a web-based self-service portal. The portal will be available from any remote location, thus enabling government to be accessible to citizens and deliver services and information with excellence, creativity, and efficiency.

### 3. Resource Pooling

California's Cloud Infrastructure is a multi-tenant service offering, allowing customers to access a shared pooling of configurable resources.

#### 4. Rapid Elasticity

With California's Cloud Infrastructure, provisioning can be completed rapidly. Customers are provided control of their server environment, with the ability to provision or de-provision computing resources as fitting for their business needs. Once customers have subscribed to California's Cloud Infrastructure new virtual servers can be set-up and resources can be scaled, sometimes in little as a couple of hours. This flexibility allows the consumer to keep their virtual environments in line with their ever-changing business needs.

#### 5. Measured Service

California's Cloud Infrastructure environment is a subscription-based service. The environment is measured, controlled, and reported ensuring customers pay only for computing resources they provision each month.

**What was the timeframe of the procurement process - including sourcing, solicitation, evaluation, award, and contract management?**

**Chauhan:** Six Months.

**What was the overall timeline of the project - from market research to contract management?**

**Chauhan:** Nine months.

**What were the high-level deliverables of the project?**

**Chauhan:**

- California State Private Cloud (IaaS) infrastructure deployment
- Self Service Portal
- Integration with existing OTech process and functions like billing, network, security infrastructure
- Security Compliance to HIPAA, IRS PUB 1075, PCI and FedRamp
- Project Collateral like project plan, architecture documents and test plans

**Who were the key players? What agencies were involved in the planning? Who will be the key players after implementation (i.e., will this be a statewide contract, agency specific, etc.)?**

**Chauhan:** This service offering is available to federal, state, local, and county government entities. California's Cloud Infrastructure is based upon a self-service business model. Once customers subscribe to California's Cloud Infrastructure, they manage their environment(s) via a self-service portal. The singular, self-service web portal will allow customers to provision servers, add/remove resources to/from the servers, manage capacity, monitor servers, add backups, and subscribe to IDR for their servers.

### Key players include:

- Over 20 large, medium and small California State departments (data center customers)
- California Department of General Services
- California Department of Finance
- California State Legislator
- California State Information Security Office
- California Department Of Technology

### How was the decision made to purchase a cloud solution?

**Chauhan:** The Office of Technology Services delivers comprehensive, cost-effective computing, networking, electronic messaging, and training solutions to benefit the people of California.

A challenge for OTech is to maintain not only their business strategy, but also to balance opportunities for economies of scale with customers' needs for management or control over their computing environments. The advent of virtualization technologies, which allow more server instances to reside on fewer pieces of hardware and occupy less raised floor space, have provided opportunities to support more customers within their existing data center footprint. The current legacy service offerings did not allow for traditional customer management and control of their environment.

In 2010 the Infrastructure Consolidation Program as a part of Executive Order S-03-10, was established to improve the State's information technology (IT) efficiency, effectiveness, agility, security, and reliability while reducing costs and energy usage.

The current process of requesting servers involves long lead times to procure hardware. However, installation activities add to the already extensive lead times experienced by OTech's customers. In light of this, there was an opportunity for OTech to improve flexibility to customers and provide a path to reduce project lifecycle time through on-demand cloud service infrastructure.

The State Chief Information Officer (CIO) and Deputy CIO made the decisions to procure a California private cloud to satisfy the customer demands.

# How We Got There

**What benefits did you seek over traditional IT services?**

**Chauhan:**

- Zero State Capital expenditure
- “Pay as you go” financial model
- Scalable and elastic service model to adapt to unknown future customer demands and services

**Was it replacing existing technology or beginning a new service?**

**Chauhan:** California’s Cloud Infrastructure is a new service offering.

**Does your state have a procurement and contract template for common cloud services?  
How did you develop the terms and conditions for the cloud project?**

**Chauhan:** Our State recently developed terms and conditions (Ts&Cs) for SaaS, or Software as a Service. The Ts&Cs were developed by the California Department of General Services (DGS) in coordination with Department of Technology services.

**Are there any other details, background information or resources you could provide to help other states understand the scope of this cloud procurement project? Is there anyone else you recommend that we interview?**

**Chauhan:** See the below documents:

- Technical Plan
- Business Plan
- Invitation to bid (IFB)

These documents can be found on [www.nascio.org/procurement](http://www.nascio.org/procurement)

# The Solicitation Phase

**How does your state procure third-party cloud services? Is this different than typical IT services or other IT purchases? How?**

**Chauhan:** The existing State Of California 6611 procurement process was used to procure California's Cloud Infrastructure.

**By what process was it procured? (i.e., Request for Proposal, Request for Negotiation, Request for Qualifications, Direct Purchase, Private Public Partnership, etc.)**

**Chauhan:** Invitation for Bid

**Walk readers through this project:**

**Chauhan:**

- a. **Market research:** [We] spent a third of the project time researching the large cloud service provider's services catalog. [Then, we] invited several of the vendors to come demo their service offerings. We wanted to make sure we put together a realistic set of requirements to match the maturity of the market. We also surveyed the customers to gauge interest and create capacity projections.
- b. **Solicitation Phase:** [We] used IFB and allowed six weeks of questions and answers. There were no technical requirements protested. There were a few business requirements protested, like vendor qualification and server guarantee. We reduced the numbers of experience years on a few modified qualifications also added a 500 server guarantee after system acceptance. We held a vendor conference to explain the goals of the procurement and explained technical and business requirements.
- c. **Evaluation of bids**
  - i. **Did you negotiate?** Yes
  - ii. **Did you receive Best and Final Offers?** Yes
- d. **Execution/Purchase**
- e. **Approvals (both internal and external)**  
[We] had to get approval from internal stakeholders, but having the State Deputy CIO as a sponsor helped.

f. **Implementation/Roll out (Different in a cloud hosted environment versus agency/ state hosted)** California’s Cloud Infrastructure is a state vendor partnership as explained in the illustration below.

Customer Application Environment	Customer Provided & Managed
Disaster Recovery	OTech and Vendor Provided & Managed
Backup/Recovery	
Storage	
CalCloud Firewall	
CalCloud SAN/LAN/Switches	
Virtual Operating Systems	
Servers	
Load Balancing	
Firewall/IPS	
Network Management	
LAN/Switches/Routers	
Internet Connection	
Racks/Cabling	
Conditioned Air	
Redundant Power	
Raised Floor Space	

CalCloud (OTech Virtual Private Cloud)

g. **Contract Management:** [We] had dedicated program staff for contract management. [The dedicated program] staff was involved throughout the procurement phase.



**How did you communicate with vendors during the solicitation process so that they understood the process, technical requirements, history and other requirements?**

**Chauhan:** There was extensive outreach done with the vendors even before the solicitation process. The outreach consisted of conferences, forums and one-on-one meetings.

During the solicitation, we conducted vendor conferences and allowed a formal question and answer session regarding the requirements.

**Did you hold a pre-specification or pre-bid meeting?**

**Chauhan:** We used various state forums and conferences to communicate with the vendor community to explain our goals with this procurement.

## Next Step: Evaluation

**What criteria were used to select a vendor? How do you compare cloud offers? How did you address different terminology, standards, technology and vulnerability between vendors?**

**Chauhan:** The selection was made based on technical and business requirements as described in the Invitation for Bid (IFB). Vendors that met these criteria went to a second round of confidential discussions where they were evaluated on:

### A. Evaluation Goals:

#### a. “Production ready” Portal (40 percent of best-value):

A production ready self-service user portal is the most important component of California’s Cloud Infrastructure solution. The portal will be the key to the success or failure of California’s Cloud Infrastructure service offering. It is very important that the portal on day one is highly integrated out of the box and requires minimal configuration. It should also provide the data center users all the functionality in a single portal. California’s Cloud Infrastructure service is intended to be a low-cost IaaS and PaaS service offering based on the business principle of self-service. Data Center customers can provision, maintain and monitor their servers, databases etc., via a single easy to use portal. Further the portal must provide out of the box custom and ad hoc reporting, incident management, monitoring alerts and patching status of their resources. The portal should require minimal care and feeding during the life of the contract.

The adoption rate of this service is directly dependent on the ease of use and flexibility of the portal. This is the most important component of the solution. A solution with a deficient portal will not be accepted. A deficient portal can cause significant delay in the delivery of the service and add a lot of unknowns to the service with significant cost to the state down the road.

- b. Commercially available software and hardware (5 percent of best-value):**  
California's Cloud Infrastructure Solution must use commodity software and hardware which can easily scale up or down based on customer demand. The software and hardware used must support virtualization and multi tenancy.
- c. Mature security design (5 percent of best-value):**  
California's Cloud Infrastructure Solution must adhere to Data Center prescribed security requirements. The design should be the right balance of high security hardening standards and superior system performance.
- d. Cost (30 percent of best-value):**  
California's Cloud Infrastructure vendor will be paid for server, storage, memory, backup, and disaster recovery as they are provisioned. The cost of various components of California's Cloud Infrastructure service needs to be bundled into those rates. Such a rate structure minimizes unknown and hidden cost of the service. A deviation from this structure will not be accepted. The benchmark for cost negotiations will be data centers current rate for managed infrastructure services. The overall goal of negotiations is to achieve savings in the 40-50 percent range. [We will] negotiate aggressive volume discounts.
- e. Early adopter support (5 percent of best-value):**  
The adoption rate of the service will depend on the success with signing on early adopters to create a bandwagon effect. The goal of negotiations is to have the California's Cloud Infrastructure vendor help onboard early adopters at no additional cost to the state.
- f. Maintenance and Operations of California's Cloud Infrastructure solution (5 percent of best-value):**  
California's Cloud Infrastructure service should require minimal overhead from the state data center. The goal of negotiations would be to clearly define roles and responsibilities. Additionally, our goal is to ensure most of the responsibility to maintain and operate the California's Cloud Infrastructure solution lies with the California's Cloud Infrastructure vendor.
- g. Future services (5 percent of best-value):**  
California's Cloud Infrastructure service will grow in the future to provide additional platforms and databases like AIX, Oracle and MS-SQL. The goal of

negotiation will be to reach an agreement with the vendor to be able to add these services at a later date with no hidden or unknown cost.

**h. Extras (5 percent of best-value):**

The goal of negotiations will be to ask for additional managed services (like offsite active security monitoring, architecture and design of system migration) from the vendor at no additional increase in cost of server, storage, memory, backup, or disaster recovery service menu items.

**B. Pre-Negotiations:**

**a. Architecture discussions:**

Prior to actual negotiations the vendor will be brought in for a detailed system architecture discussion with the data center in the area of security, network, storage, backup and disaster recovery. The reference documents used in the discussion are System Architecture, Bill of Material and the floor plan layout of the hardware components.

**b. Portal demonstration:**

As mentioned before, the portal is the most important component of the solution. The vendor will be brought in to demo the portal. During the demo the vendor must cover the list of portal requirements from the IFB. [The] state team will be assessing if:

- The portal is ready for production out of the box with minimal configurations;
- The portal design integrates various components out of the box (provisioning, monitoring, reporting, alerting, workflow) into a single portal; and
- The portal is easy to use and gives the shopping cart experience.

If the portal is deemed deficient and cannot be modified in time to be ready, the state may decide not to go into further negotiations.

**C. (Broad) Areas of Negotiations:**

- Cost
- Service Level Agreement
- Network
- Hardware and Software

**D. Best and final offer (BAFO):**

The BAFO must contain the following.

- Must meet Terms and Conditions from IFB.
- Meets all administrative and technical requirement as mentioned in IFB (unless otherwise negotiated)

- Meets all Service Level Agreements (unless otherwise negotiated)
- Cost by each menu item with volume discounts submitted via Attachment A.
- Identifies all additional services provided at no additional cost to state, like early adopter support, future service enhancements and marketing.

### How did you evaluate cyber security?

**Chauhan:** Several security requirements like HIPAA, IRS Pub 1075, PCI, Federal Risk and Authorization Management Program (FedRAMP) were built into the IFB. The Vendor had to have those security controls in the solution. We also asked for a FedRAMP certification document. The IFB contains two separate sections to evaluate the company for its ability to adhere to the requirements.

### What steps did you take to keep the project on track?

**Chauhan:**

- Frequent and open communication with all stakeholders like and departments involved.
- Created a customer cloud advisory board
- Strong project management framework
- Unconditional support from state CIO and deputy CIO



In September 2014, the Center for Digital Government released the Best Practices Guide for Cloud and As-A-Service Procurements. This guide, built upon the collaborative work of state and local government and industry executives, outlines and explains the changes needed for more flexible and agile procurement processes.

# Reflection

### How was the project evaluated once completed?

**Chauhan:** The project was evaluated against stated business and technical goals in the business and technical plans.

### Why is it considered a success?

**Chauhan:** It met all of its business and technical goals of

- Low cost
- No upfront cost
- Self service delivery
- Highly virtualized and standardized technical architecture
- Highly scalable and elastic

### What was the most surprising or difficult part of the undertaking?

**Chauhan:** It took a lot of work to get everyone on the same page. Everyone had a different understanding of Cloud. I am glad we spent time educating stakeholders on goals of the procurement. Otherwise it would have elongated the time for requirements gathering, bid evaluations, etc.

### If you had the opportunity to do this project again, how would you change it?

**Chauhan:** I would not change much in the approach we took with the project. I would probably spend more time with internal OTech stakeholders in educating them on the benefits of service and also with the state legislature. Additionally, I would maybe spend more time making the requirement set even more comprehensive.

### What else would you like to add or share about the procurement process that would help other states who are making a similar purchase?

**Chauhan:** Get the high level executive sponsorship early, preferably your state CIO, and key large customers.

## Advice from the Trenches

### What are some best practices/lessons on collaboration between CIOs and CPOs?

**Jim Butler:** Even though the general rule is that procurement officials administer the process and technology officials deliver the solution, collaboration throughout the process is critical because any decision has the potential to affect both the process and the solution. For these reasons, California combined the procurement process for large IT projects with the technical project oversight function to eliminate artificial barriers to the free and open flow of information between these closely connected disciplines.

**Carlos Ramos:** I think we learned that collaboration between CIOs and CPOs is key to a good outcome. Further, in that collaboration, communication is king. Early and ongoing communication helps keep everyone on track and brings in two different and very valuable perspectives. This ensures that there is consistency in messaging to state agencies and bidders and results in a better procurement process and better results.

## What makes a cloud procurement project successful in your opinion?

**Butler:** It was the ability to work in collaboration and have an open line of communications with the technical team for the project.

**Ramos:** In my opinion, what makes for a successful cloud procurement is recognizing that there are some important differences between a cloud technology model and our more traditional models for leveraging and deploying technology. This calls for a different approach to everything from the licensing of software, the acquisition of hardware, the allocation of costs and our approach to information security. It is critical that the approach to cloud procurement address such differences.

## How does this process compare with the traditional procurement process in California?

**Butler:** The California's Cloud Infrastructure procurement was the first procurement conducted by the Department of Technology, Statewide Technology Procurement Division to successfully utilize the Public Contract Code 6611(a) process to award a contract. This was an eight-month procurement process that allowed the State to negotiate a strong technical solution, while getting very attractive rates for the California's Cloud Infrastructure service offering.

In January 2015, WSCA-NASPO began undertaking an IT Solutions Market Place Portfolio of public cloud based applications and services with multiple awards in each category based on the Ts&Cs in the Center for Digital Government Best Practice Guide. At print time, WSCA-NASPO was reviewing and collecting feedback on Potential Services from industry experts and State CIO/CPOs.

For more information, please contact Paul Stembler, WSCA-NASPO, [pstembler@wsca-naspo.org](mailto:pstembler@wsca-naspo.org).

## What advice would you give to other CIOs and CPOs who are undertaking Cloud Procurement projects?

**Butler:** The success depends on the open line of communications and being flexible with one another in order to make adjustments to the procurement scope and schedule.

**Ramos:** Be deliberate and thoughtful in your approach to a cloud procurement. However, at the same time be bold and innovative. Recognize that your old procurement models may have to be re-thought in a cloud world. Don't be afraid of that. Recognize that it is an opportunity for improvement and modernization.



**Neeraj Chauhan, California's Cloud Infrastructure Project Director, OTech, California Department of Technology**

Neeraj Chauhan, Cloud Services Project Director, for the State of California Private cloud, CalCloud and has worked in IT for over 18 years. He has a degree in Electronics and Communications Engineering. Neeraj has implemented and facilitated many major technology changes and improvements. He has worked for the State Of California since 2005 and has managed several missions-critical services. In the private sector, Neeraj implemented large system integration projects.



**Jim Butler**  
**Chief Procurement Officer, State of California**

Jim Butler has been the chief procurement officer for the State of California since May 2008. He is responsible for managing and leading the Department of General Services, Procurement Division, California's central acquisition business agent, serving an integral role in enabling state departments to carry out their missions. Jim has 20 years of experience leading procurement, systems, and business development teams through the process of growth and change.



**Carlos Ramos, Director**  
**California Department of Technology**

Carlos Ramos has been a leader on many of California's key technology initiatives. He has served as Director of the Office of Systems Integration - with a multi-billion dollar portfolio of California's largest technology projects. He concurrently held the position of Assistant Secretary for Health and Human Services and was the Agency's senior technology executive. He was the principal technology advisor to the Secretary of HHS and was responsible for the entire HHS IT portfolio.

Previously, he served as Director of the State's Data Center - one of the largest public-sector data centers in the world with an annual budget of \$200 million and over 200 government agency customers. Before that, he was CIO for California's Department of Social Services managing a large computing infrastructure and a statewide data communications network.

The California technical plan, business plan and information for bid (IFB) referenced in this document can be found at [www.nascio.org/procurement](http://www.nascio.org/procurement)