# LEVERAGING CLOUD SERVICES:
## PREPARING AGENCIES FOR NEXT GENERATION COMPUTING

## Introduction

This paper provides observations on Cloud Computing as applied in Government Data Centers. Chartis Corporation and Knight Point Systems are not hardware or software vendors tied to any particular product offering. Rather, we provide consulting services for our clients to help them make informed IT decisions. We have been directly involved with successful Cloud implementations, but have also advised our clients toward other solutions when it was in the better interests of their requirements. Our goal is to help our clients establish the best performing IT services for their organization at the highest return on investment (ROI).

## Description of Problem and Goals

Beginning in the mid 2000s, the Chicago Transit Authority (CTA), like most government agencies, began facing extreme budget cuts. With less operating and capital dollars at their discretion, IT organizations are looking to reduce fixed costs in facilities and hardware / software maintenance to ensure they can invest in new mission capabilities while supporting existing systems. New policy directives are driving more in-depth discussion on Agency cross collaboration, data center consolidation, and transparency. IT users are seeking a quicker response to emerging needs and improved system availability and performance.

CIOs are looking to their managers and technical teams for alternatives and solutions that help them provide more with less. Most recently, the concept of Cloud Computing has captured industry's attention. This concept essentially calls for the centralization of IT resources to provide 'shared' infrastructure, platform, and/or application services. In 2009, Knight Point began working with the CTA to develop a new data center strategy to combat 5 challenges that the agency was facing:

The IT organization is unable to scale to accommodate changing requirements:
1. The organization is slow to deploy services;
2. There are limited funds for new systems, the agency must lower the cost of IT, and convert capital costs to operating costs;
3. The lease of primary Data Center space expires in 2012; and
4. CTA maintains many legacy applications.

## Description of Approach, Rationale, Results, and Timeline

Knight Point worked with the CTA to develop a model that provided low cost / high value solutions to the organization including outsourced Data Center operations, Managed Services, Infrastructure-as-a-Service, and the leveraging Cloud infrastructures (Private and Public) and transforming to an IT-as-a-Service provisioning and management model.

These innovative solutions and best-practices offered an immediate cost savings by optimizing IT resources to meet and scale to requirements upon demand while also providing for a predictable monthly spend inclusive of a regular hardware refresh schedule – all without the CTA having to make significant capital investments and re-investments.

By transforming Information Technology's capabilities to dynamically scale operational infrastructure to meet CTA's optimum requirements – whether for Production, Test and Development, or Resiliency and Disaster Recovery – the CTA would have the ability to better control costs and leverage a utility computing / cloud-like model to increase or decrease resource demand when warranted. Specific areas of Cloud Computing / DataCenter Operations outsourcing allow the CTA to lower its costs while providing a higher level of service to its stakeholders. Many of these features include:

Consistent Service Level Driven IT Experience on a Predictable Monthly Spend: Hosted and Managed Data Center and Cloud (public or private) models offer organizations the ability to procure an IT outcome. This outcome is defined and managed to through Service Level Agreements on the IT components contracted-as-a-Service. Typical Service Level Agreements (SLA's) may be on:

Included Hardware Refresh Cycles (e.g., Infrastructure-as-a-Service) eliminating the capital infrastructure spike; Uptime for Infrastructure (Power, Network Connectivity); Uptime when resilient systems are designed and contracted with service provider (e.g.,Replicated, Highly Available, Failover solutions for MS Exchange/eMail); Responsibilities for 24x7x365 Monitoring,

Alerting, Management, Remediation within a response time window; Response times to tickets – whether for infrastructure issues or end user help desk support; Managed Backups and SLA's for the retention and off-site storage of data backups; and more as deemed appropriate per which party is responsible for what tasks between the provider and client. N+1 Infrastructure Redundancy / Resiliency on Single Points of Failure: Most organizations can't justify the capital costs required to harden a data center facility against infrastructure interruptions (Power, Infrastructure) nor can they provide the level of resiliency built into Cloudlike provisioned resources. The CTA can benefit from leveraging all the redundancy and resiliency, which has been put in place and leveraged across hundreds of other clients within a single facility.

Enterprise Resources Leveraged Across Multiple-Tenants, Facility Infrastructure, Technology, People, and Processes to Achieve Economies of Scale: By providing, managing and optimizing Infrastructure-as-a-Service, we can justify the use of Enterprise-Class technologies in operations leveraged across hundreds of clients – all benefitting from technologies each individually would be unlikely to afford. By continually investing in infrastructure upgrades, platform technologies, monitoring, resource allocation, and management tools ensures that we provide the most reliable, secure, and cost effective computing environment is provided to its clients either on a shared, i.e., Cloud Computing and/or dedicated basis or all of the above.

## Where to Start

You have completed the bulk of the hard work once your organization has a common understanding of Cloud Computing and is unified around a framework that guides how the organization will invest in IT. Now the conversation shifts more to the tactical considerations of where and how to start. It is important to analyze your organization and understand where you "low hanging fruit" exists with respect to a move to a cloud model.
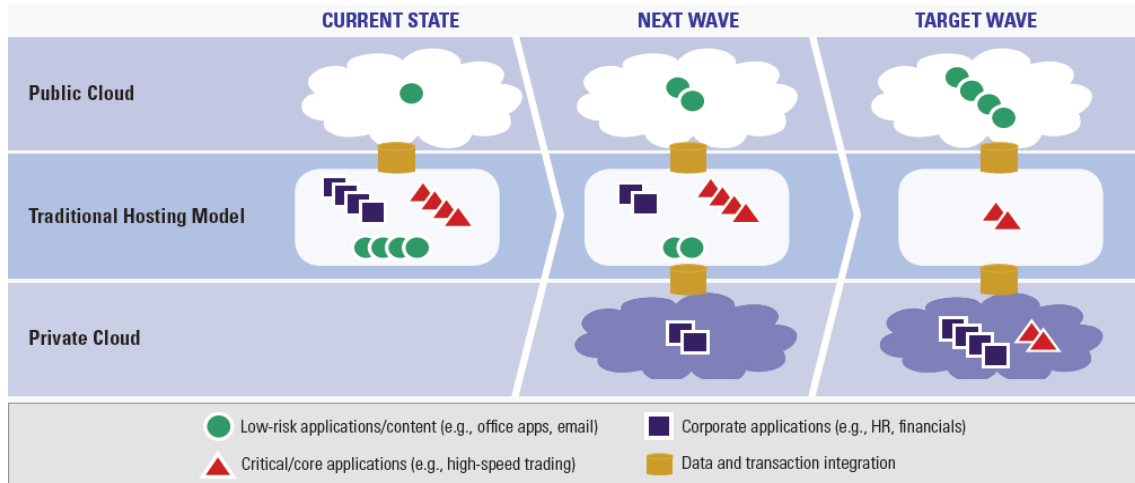
Collaboration and Information Sharing ("Utility" Services);
Development, QA, and Test;
Hosting of non-critical applications & non-sensitive data; and
Projects with large-scale compute and storage demands.

If your organization's Strategic Right-Souring framework calls for SaaS, the process is relatively clear. You will identify a provider; establish service level agreements (SLAs) based on requirements; negotiate financing; transition services to the provider; and follow-up to ensure your organization is achieving business and technical objectives.

Despite the general appeal of SaaS, it seems that most Federal IT organizations are looking to maintain some IT capabilities in house. There is no definitive explanation for this. In some cases there are security concerns; in others it seems to be control-based; and in others there is not enough funding to move completely to SaaS. However, one Federal CIO seemed to summarize it well by articulating that SaaS is appealing, but will realistically require a gradual shift away from the historical way of providing IT capabilities over time.

It is expected that enterprises will eventually migrate or replace most applications to a cloud model, but core applications will remain in the traditional hosting model, at least for the next few years. The graphic below, from Diamond Management and Technology Consulting, depicts the manner in which applications will migrate to the cloud relative to the traditional hosting model. It is expected that CTA will closely follow this model by leveraging a public could for utility services and beginning to build an outsourced private cloud for critical applications.

| | CURRENT STATE | NEXT WAVE | TARGET WAVE |
| --- | --- | --- | --- |
| Public Cloud | | | |
| Traditional Hosting Model | | | |
| Private Cloud | | | |

● Low-risk applications/content (e.g., office apps, email)   ■ Corporate applications (e.g., HR, financials)
▲ Critical/core applications (e.g., high-speed trading)   ▮ Data and transaction integration

## Results

The data in the graphic to the right comes from a recent PaaS Cloud Implementation for a Federal IT organization completed in 2010, which will help the organization avoid $60M+ over five years and deliver a $1: $1.95 ROI. Chartis Corp served a key role managing this implementation, but acknowledges the accomplishments were the result of a true team effort. This implementation had strong Federal leadership who engaged in strategy, day-to-day decision-making, work prioritization, and technical discussions. We involved key subject matter experts in computing, network, storage, and facilities who brought new virtualization techniques and approaches to the initiative. Our operating systems (OS), middleware, and COTS teams helped guide implementation and the transition of physically separated systems to the Cloud's logical environments. Most of all, we had the full support of the organization's CIO and IT executives who helped resolve escalating issues. We believe the overall success on this particular initiative was rooted in picking the right place to start and focusing on requirements.

In addition to the technology and service delivery implications of Cloud Computing, organizations should prepare to manage

**Contractual Landscape:** As the Cloud implementation matures, it is important to synchronize the maintenance contracts for supporting hardware and software. We recommend making these **Service Management:** Finally, organizations should mature their approach for service management. We recommend augmenting traditional governance models

resulting change. The following are some considerations that we have found directly impact the success a Cloud implementation.

**Cost Allocation:** Organizations should have a clear plan for allocating and / or recovering IT infrastructure costs prior to Cloud implementation. We have seen some organizations treat IT as a working capital fund whereby budget is set aside to deliver and maintain IT services for the entire organization. In these cases, cost allocation is not a significant concern. On the other hand, we have also seen IT organizations act more like true service providers and establish cost allocatio models in an attempt to recover service delivery costs from customers. Unfortunately, shared infrastructures are more complex to allocate than dedicated ones. Further, the nature of the Federal budget process makes it more appealing to know exactly how much IT funding an organization needs since budgets can be appropriated early in the year. The graphic above provides some considerations for organizations developing cost allocation models for Cloud Computing.

contracts coterminous, so that an organization has the ability to comprehensively review maintenance policies and ensure the right products are being maintained at the right levels.
with Information Technology Information Library Version 3 (ITIL v3) practices. ITIL will not only help operate the Cloud, but also strategically evaluate how to improve the services that it delivers.