Public Sector Implications and Opportunities from Cloud Computing

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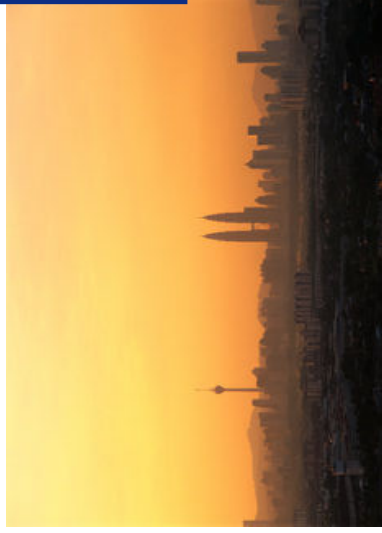# Dynamic Forces of Change are Creating Disruptions for Government

As a result of physical and virtual global connectivity, the impact of events thousands of miles away are felt swiftly and strongly.
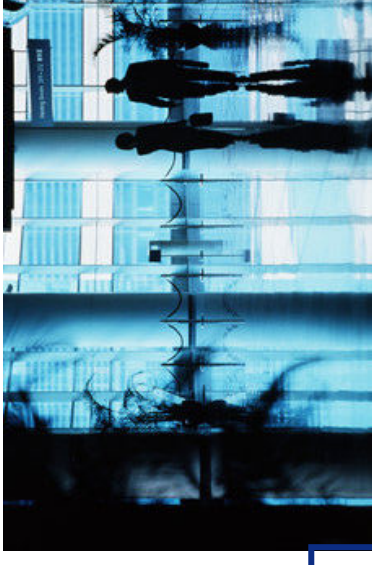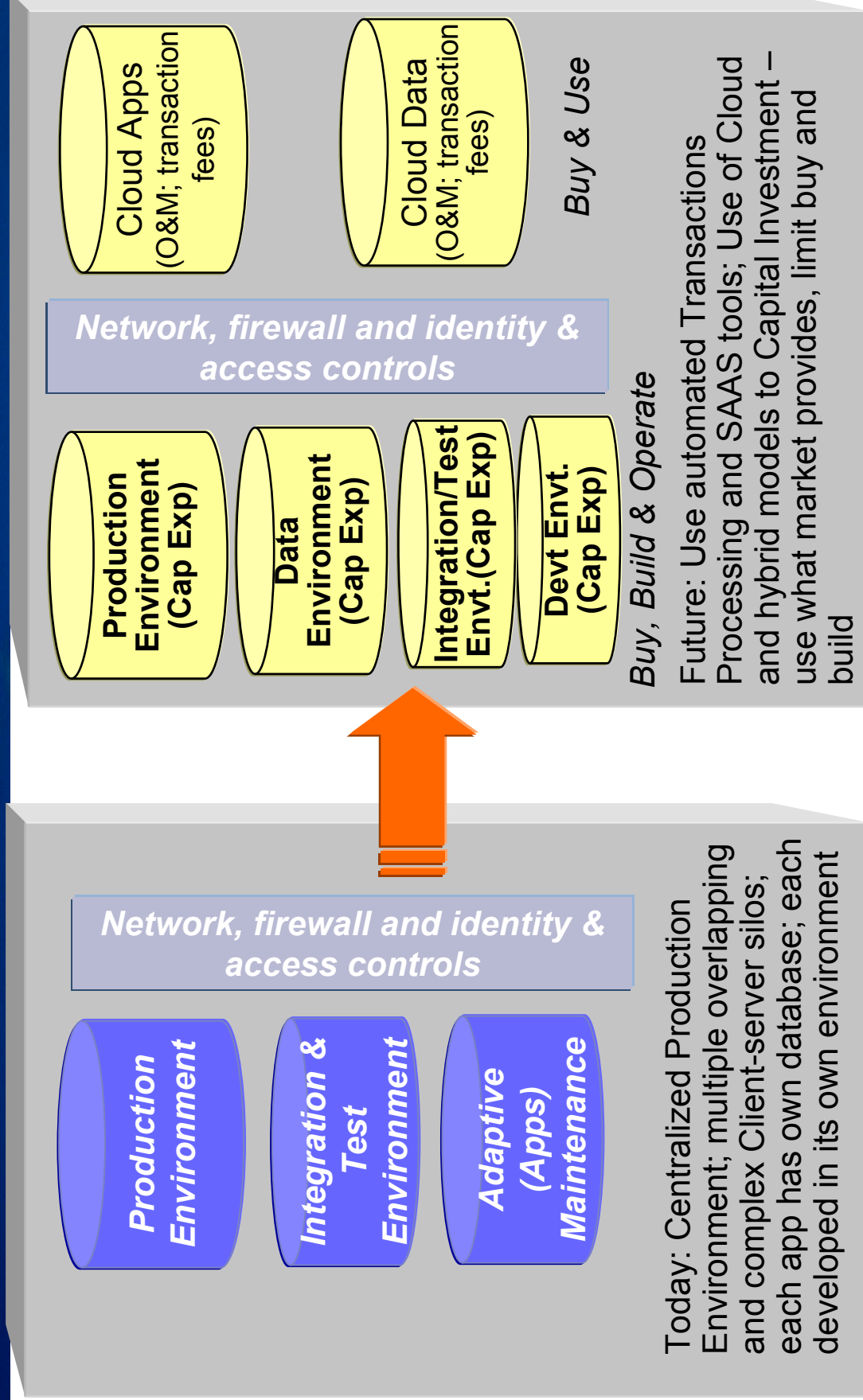
These developments are causing transformational changes in government and include:

- **The global economy**
- **Push for transparency**
- **Citizen-centric government**
- **Demographics**
- **Commoditization**
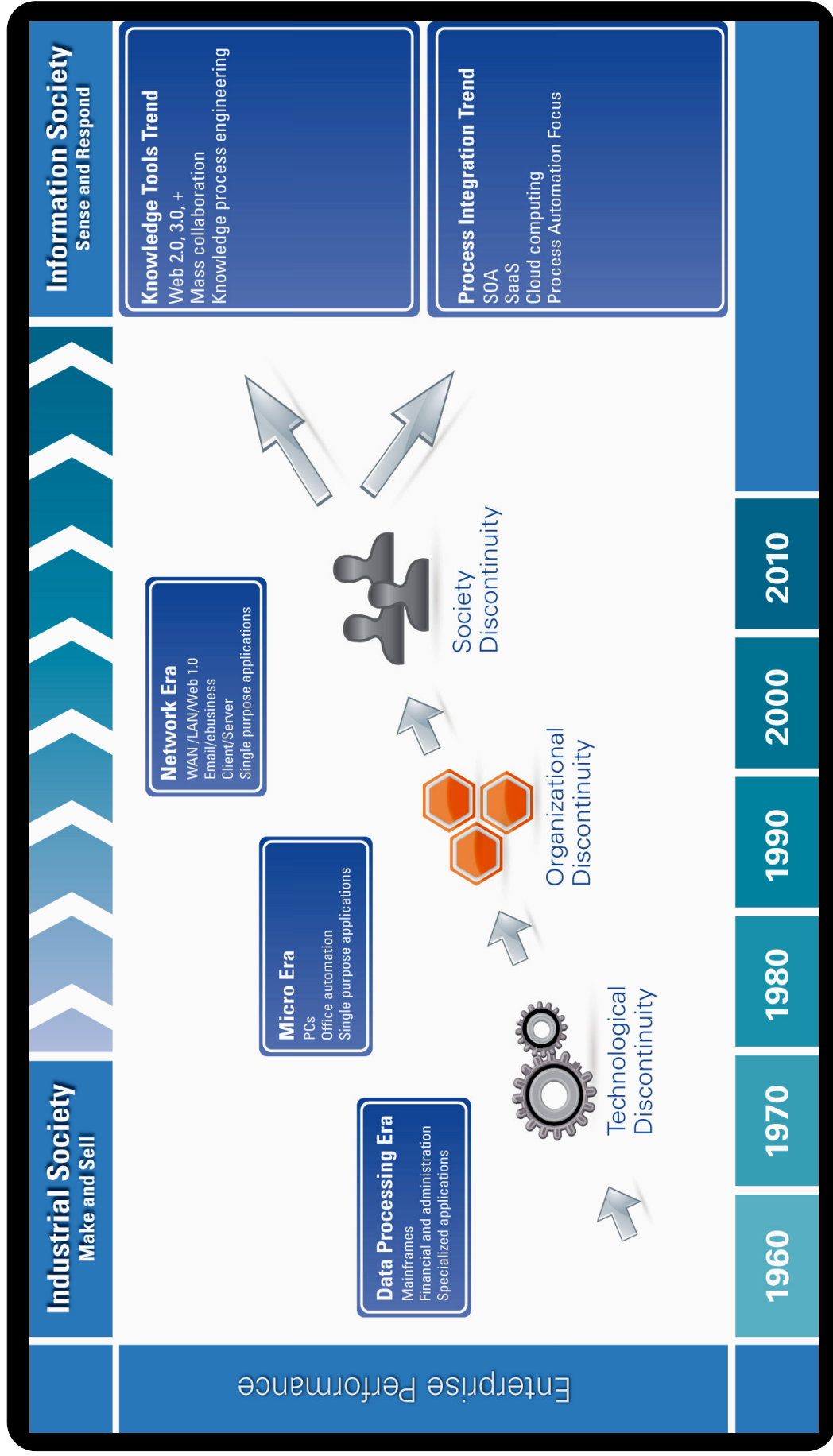
CIO Governance Issues Becoming More Complex

Cloud Apps
(O&M; transaction fees)

Cloud Data
(O&M; transaction fees)

Buy & Use

Network, firewall and identity & access controls

Production Environment (Cap Exp)

Data Environment (Cap Exp)

Integration/Test Envt.(Cap Exp)

Devt Envt. (Cap Exp)

Buy, Build & Operate

Future: Use automated Transactions Processing and SAAS tools; Use of Cloud and hybrid models to Capital Investment – use what market provides, limit buy and build

Network, firewall and identity & access controls

Production Environment

Integration & Test Environment

Adaptive (Apps) Maintenance

Today: Centralized Production Environment; multiple overlapping and complex Client-server silos; each app has own database; each developed in its own environment

Can Governments Respond To Today's Dynamic Environment With Yesterday's Management Approach?

- 20th century management structures are constrained by information and organization silos locked-in by client-server software

- Process improvement initiatives that were so prevalent in the 1990s are too segmented to address today's needs

- Reorganizing or creating new boxes on an organization chart does not create performance breakthroughs

- Data is everywhere, yet there is so much conflicting or inconsistent information that multi-week data calls have become the norm for responding to leaders' questions

WHAT'S NEEDED: Less focus on government unique processes and more focus on solving problems

Dynamic technologies: A driving force of change for government

Information Society
Sense and Respond

Knowledge Tools Trend
Web 2.0, 3.0, +
Mass collaboration
Knowledge process engineering

Process Integration Trend
SOA
SaaS
Cloud computing
Process Automation Focus

Industrial Society
Make and Sell

Network Era
WAN /LAN/Web 1.0
Email/ebusiness
Client/Server
Single purpose applications

Micro Era
PCs
Office automation
Single purpose applications

Data Processing Era
Mainframes
Financial and administration
Specialized applications

Society Discontinuity

Organizational Discontinuity

Technological Discontinuity

Enterprise Performance

1960 | 1970 | 1980 | 1990 | 2000 | 2010

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Value From The Knowledge Trend

- **Power Diffused:** Power is continuing to shift from the organization to the individual; from hierarchy-based decisions to expertise-based problem solving.

- **Productivity Models Fundamentally Changed:** Traditional productivity models were based on information being proprietary and scarce, requiring hierarchical and dedicated organizations. The new economic productivity model of the knowledge era recognizes that Information is abundant, open and largely non-proprietary, and that productivity is driven by insights from group synthesis, problem-solving, and diverse perspectives.

- **Information is not scarce:** What is scarce is the ability to make sense out of the information, the ability to turn information into insight. The rapid pace of consolidation and improvement in tools as well as agile development methods have made traditional periods (2 years from requirements definition to build and implement) of waiting for implementation obsolete or at least unacceptable.

Value From The Knowledge Trend (Continued)

Transparency and Accountability:

Organizations have traditionally managed risk by controlling the content and the distribution of information. Today's environment has displaced that control, and extended it outward, beyond institutional walls. At the same time, the results are being made transparent for public scrutiny, creating accountability and incentives for good performance.

End-User Gains:

Greater Access – information when you need it and how you need it, on demand;

Greater Empowerment – the user can get IT as a service, using what they need when it's needed;

Lower Costs – With crowd sourcing, open source, and virtualized technology, individuals and groups can experiment more quickly and efficiently and obtain real-time feedback

Value From the Process Integration Trend

- **Continuing Automation:** Business processes that were automated in pieces using client server technology are being re-architected to integrate all transactions related to an end-to-end function (e.g. the acquire-to-retire activities for capital assets).

- **Data Integration and Authoritative Source:** No longer can each subset of a business process maintain its own terminology and data structure to be manually reconciled at a later date. Data integration activities will help improve transparency, quality, and timeliness of data on operations, resources, and performance.

- **Consistency and Repeatability:** Recurring government business processes and activities can achieve standards for performance, efficiency, and risk management across agencies.

- **Economies of Scale:** One to two orders of magnitude can lower costs of operations and maintenance through shared solutions and acquisitions.

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Cloud Computing Concepts Are Important for Government

Cloud Computing = **Internet-based data access & exchange** + **Internet-based access to low cost computing & applications**

Cloud Computing Characteristics:

- On-Demand Self-Service
- Internet Accessibility
- Pooled Resources
- Elastic Capacity
- Usage-Based Billing

Cloud Service Models

Software as a Service	Platform as a Service	Infrastructure as a Service
Business operations over a network	Deploy customer-created applications to a cloud	Rent processing, storage, network, other computing resources
"SaaS"	*"PaaS"*	*"IaaS"*

Cloud Deployment Models

Private	Community
Operated for a single organization	Shared by several organizations, supporting a specific community
Public	**Hybrid**
Available to the general public or large industry group, owned by an organization selling cloud services	Two or more clouds that remain unique but are bound by technology that enables data and application portability

Cloud Impact on Business and Government

Cloud Computing = *Internet-based data access & exchange* + *Internet-based access to low cost computing & applications*

Virtualized Technology
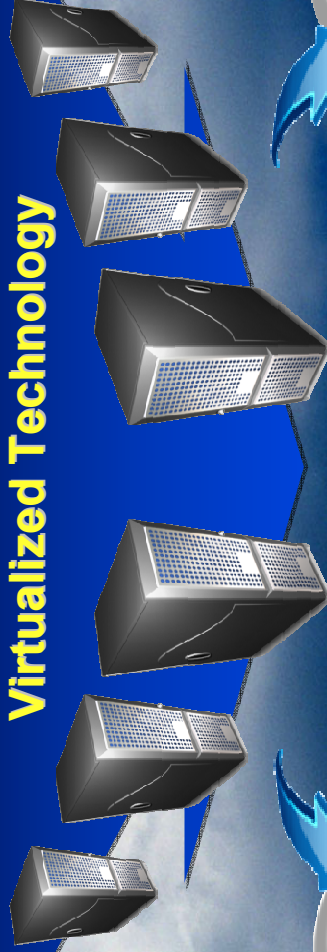
Virtualized Processes

Virtualized Organization

Opportunities to Leverage Commoditized Enterprise Applications and Economies of Scale

Virtualized Business Models

| Speed to Market | Improve Working Capital | Reduce Invested Capital | Reduce Cost of Goods Sold | Reduce SG&A |

Business Operations Are Being Structured to Leverage Commoditization: Improving Efficiency and Performance

Disparate
- Processes performed and managed locally
- Typically geographically disbursed operations

Consolidated
- All functions performed in a central location
- Among the best processing for locations / Business Units

Shared Services
- Separated and distinct cost center / operating unit
- Shared Services governance model employed
- Optimized and standardized processing throughout
- Performance expectations monitored through Service Level Agreements (SLAs) and reverse SLAs

Business Process Outsourcing (BPO)
- Includes Shared Services characteristics
- Processing performed by external party
- Typically bound by multi-year contract

Process Operating Model

Performance (vertical axis) vs. Efficiency (horizontal axis) curve: Disparate → Consolidated → Shared Services → BPO
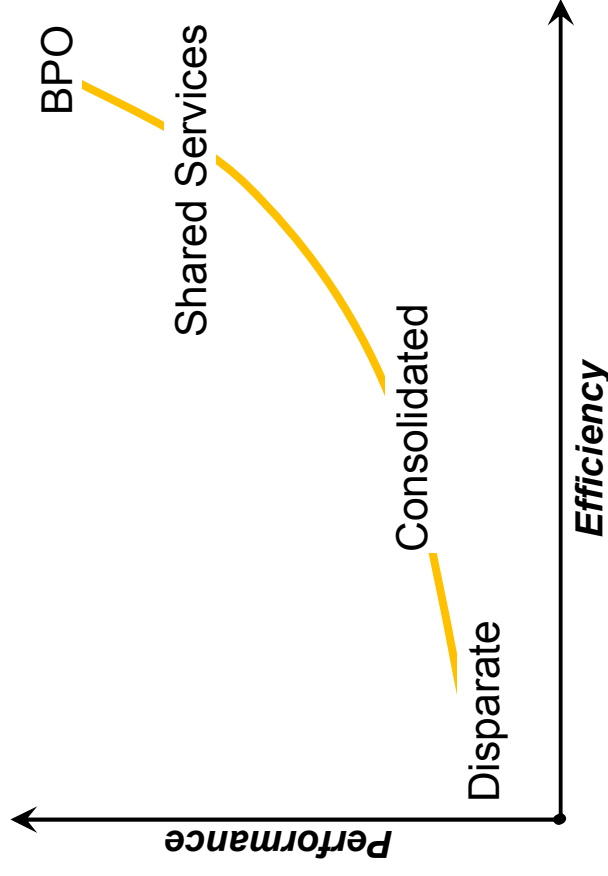
Capturing the Value of these Trends:
Metrics and Risk

Measures of Success
- Transactions costs
- Cycle-time (issue identification, solutioning, analysis)
- Productivity: traditional productivity models were based on information being proprietary and scarce, requiring hierarchical and productivity to be driven by insights from group synthesis, problem-solving, and diverse perspectives.
- Agility and resiliency
- Adoption/endorsement
- Government-wide (e.g. Trust in Government polls, etc.)

Risks Should Be Included in How We Score These Projects

Check Out What's on Twitter

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Cloud and Crowd Sourcing: What you need to know

- Crowd Sourcing: obtaining ideas, insights, analysis, data, or applications from a loosely coupled, self motivated group, e.g. Linux open source software development, apps for democracy, recovery.gov tips

- Key Characteristics of a crowd sourcing initiative:
  - Collaborative, knowledge based in nature; Not a 20th centur supply chain model
  - History of producing knowledge-based products such as mash-up applications, web services, software bug fixes, viruses
  - Forms around communities of interest (e.g. VA-MUMPs)
  - Order of magnitude less cost
  - Focused on problem solving, customer development

- The cloud approach makes sense if government can obtain these capabilities at higher quality, better security and lower cost compared to agency developed applications

- The crowd sourcing approach makes sense if the solution is more important than organization structure considerations

A Potential Framework for Transitioning

Create Collaboration Operating Model
- Identify End-to-end business Processes
- Identify transactional and knowledge-based processes
- Develop new operational and technical support models

Rationalize Applications
- Identify outdated systems
- Automate/integrate transactional processes
- Select knowledge processing tools
- Develop common data model

Information Access and Use

Leverage Culture
- Focus on organizational change management
- Find data sources across organizational boundaries
- Pilot solutions iteratively

Arrange Infrastructure
- Leverage and enhance robust infrastructure
- Develop information governance policy

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Some examples

- Transparency in the cloud – Recovery.gov

- Buying Cloud Services – Apps.gov

- Platform as a Service – Rapid Access Computing Environment

- Data as a Service – Data.gov and Nebula

- Secure cloud services – FedRamp

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Recovery.gov

Apps.gov

Apps.Gov - Microsoft Internet Explorer provided by KPMG

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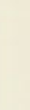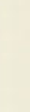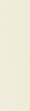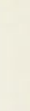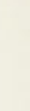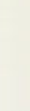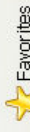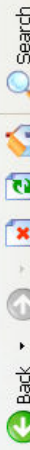
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Federal Cloud Computing Services

Cloud computing is a major feature of the President's initiative to modernize IT and can reduce the cost of IT infrastructure by utilizing commercially available technology. Cloud computing could improve data sharing and promote collaboration among government agencies, according to Federal CIO Vivek Kundra.

What is Cloud Computing?

Want to learn more?

Watch this brief video for an overview of Cloud Computing to gain a better understanding of what it is and its benefits.

Watch the video now »

Video transcript »

What type of solution do you need?

Business Apps
Your agency or service is complex and requires state-of-the-art software to get business done.

GSA Cloud Business Apps has a solution!

Productivity Apps
You need to get things done and GSA is there to help you do just that.

GSA Cloud Productivity Apps has the tools!

Cloud IT Services
Need a better solution to reduce cost and implement projects faster?

GSA Cloud IT Services has the answer!

Social Media Apps
Social media tools make it easier to discuss the things we care about and help us get the job done.

GSA Social Media Apps can help you get the word out!

Before using/purchasing the products and services on apps.gov, please do so in accordance with your agency's policies and procedures pertaining to Procurement,

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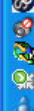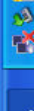
Rapid Access Computing Environment

RAPID ACCESS COMPUTING ENVIRONMENT (RACE) - Microsoft Internet Explorer provided by KPMG

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Data.gov - Apps Showcase - Microsoft Internet Explorer provided by KPMG

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APPS SHOWCASE

With so much government data to work with, developers are creating a wide variety of applications, mashups, and visualizations. From crime statistics by neighborhood to the best towns to find a job to seeing the environmental health of your community — these applications arm citizens with the information they need to make decisions every day. Enjoy these highlights of the hundreds of applications available.

FlyOnTime

Washington, DC: Ronald Reagan Washington National (DCA) to New York, NY: Kennedy International (JFK)

Flight Delay Summary

National obesity comparison tool
Select your state on the right to see how your county compares
Obesity by county

Select a state
New Hampshire
Obesity (% of pop)
3%
10%
20%
30%
40%

VERMONT   NEW HAMPSHIRE

*Alaska and DC have no values for obesity and are thus excluded. Certain counties are also excluded for the same reason.

National Obesity Comparison Tool

VERMONT
Montpelier

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Securing Cloud Serviced for Government: The Federal Risk and Authorization Management Program (FedRAMP)

FedRAMP Government Wide Security Authorization Process

Government Wide Collaboration
(Security Requirement Authorities)

- Identify FIPS 199 Level (using NIST SP 800-60)
- Derive the initial baseline NIST SP 800-53 controls
- Tailor controls for domain and document additional security requirements
- Create system security and privacy specification and vet within government
- Publish approved consensus cloud security specification

Executed once for each technology domain

Information System Owners
(both government and commercial)

- Cloud provider produces authorization package
- Independent 3rd party performs assessment
- Implement and document relevant security controls
- Develops security plan and possibly negotiates modifications to the specification

Executed once for each system

Government Wide Authorization
(FedRAMP Office and Joint Authorization Board)

- Reviews authorization package and identifies remaining risks, security gaps, and privacy issues
- Potentially require additional risk mitigations (compensating controls, documentation, or testing)
- Authorizing Official(s) sign the authorization and accept the residual risk

Executed once for each system

19

Five Principles to Guide Your Initiative

Show the benefits – measures of success should be clearly spelled out: dollar savings, security, reliability, and other improvements agencies can expect. Actual benefits and costs should be tracked in a transparent manner.

Simplify – too often complexity reflected in data slows problem solving; why are there so many disparate data bases—because each one was created for a unique application or purpose. Now, emphasis on collaboration and integration is highly dependent on simplification,

Enterprise services should be identified and characterized – identify enterprise-wide common approaches and set standards for security, identity management, access controls, data architecture, and other foundational elements needed to use web services in a secure, scalable manner.

Create a governance structure that facilitates achievement of benefit – government leaders should facilitate approaches that fulfill agency and enterprise needs.

Let the market decide – agencies that insist on sticking with the old model should be given a chance to make their case – in the marketplace. If they want to keep a customized application or their version of data, they should be able to sell it to other agencies; let the market decide whether it's better and costs less than a similar available application or data.

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