



Cloud Computing

Overview and Lessons Learned

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Cloud Service Models



Utility Billing



Scalable



Real-time Elasticity



Self-management



Security Services

Infrastructure-as-a-Service

*Hardware
Storage
Servers
Traditional compute
Customizable*

Platform-as-a-Service

*Develop
Deploy
Manage
Limited Customization*

Software-as-a-Service

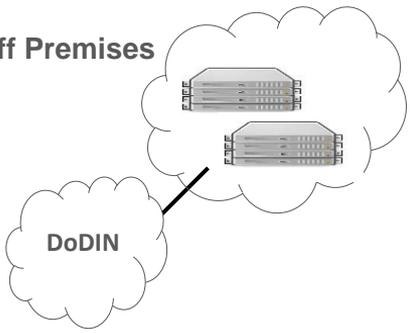
*Enterprise services
Internet-based
Application hosting
No customization*

Cloud computing enables the DoD to tailor IT resources based on real-world events and evolving mission requirements. It is the foundation to build and scale more effective cybersecurity, advanced analytical capabilities, improved command and control, and future enabling technologies.



Evolution of the Cloud

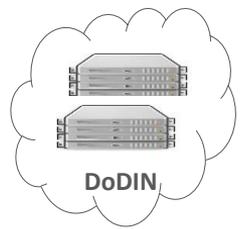
Off Premises



Off-Premises Commercial Cloud (General Purpose Cloud)

- Standard hosting across all consumers
- Broad scalability to support requirements for compute / storage
- Utility pricing model “pay for usage”
- Lowest Total Cost of Ownership (all cloud consumers share cost of infrastructure)

On Premises
milCloud_{2.0}



On-Premises Commercial Cloud (Fit for Purpose Cloud)

- Commercially provided cloud service hosted in DoD facilities
- DoD security posture ensured by on premise execution
- Moderate customization to tailor the service for mission needs
- Utility pricing model “pay for usage”
- Low Total Cost of Ownership (DoD consumers share cloud cost)

Traditional Hosting

DISA



- Highly customizable commercial computing services
- Tailored for unique DoD operational and security requirements
- Full command and control in DoD facilities
- Highest Total Cost



Cloud Readiness Assessment

Financial

- ✓ Architecture does not require costly upgrades
- ✓ Mission area breaks-even in operational costs
- ✓ Commercial pricing models fit requirements

Operations

- ✓ Modern backup and recovery standards and processes
- ✓ Includes a software-based resiliency model
- ✓ Does not rely on host-based management
- ✓ Command and control policy and procedures

Sustainment

Security

- ✓ Impact level aligns to required data-sets
- ✓ Application leverages baked in security features or acquires required services

Contracting

- ✓ Commercial providers meet application requirements
- ✓ Contract vehicles available and capable of acquisition





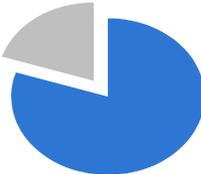
Lessons Learned and Best Practices

Establish dedicated migration teams: assess, select, configure, migrate, and sustain

Resource Scaling:
Elastically Manage Applications



start small... **win early**
Manage realistic migration plans to validated processes and procedures

Invest 
Dedicated cloud resource allocations and training

Performance versus Projections



Compare legacy systems and hosting to cloud-based environments. Adjust future sustainment and migration projects.

License Management



Carefully review existing licensing agreements and transfer requirements



Cloud budget planning

Define your vision and intended outcomes; measure the impact and adjust migrations and sustainment

Assess and Refine

Business processes should evolve to support the flexibility and real-time nature of cloud computing

3Q FY 2018

INITIAL
OPERATING
CAPABILITY



Environment Services

PHASE 1

SIPR &
ENHANCED
SERVICES



3Q FY2019

Application Programming Interface
Object Storage
Engineering + Support Services
Backup-as-a-Service
SIPR IaaS Build Delivery

Virtual Private Cloud Peering
Application Backup & Restore Services
Network Appliance Templates
Automated Application Migration Tools

PHASE 2

AI/ML, PaaS, SaaS,
and
ACCELERATORS



4Q FY2019

Key Management Service
Graphics Processing Unit-as-a-Service
High Performance Object Store (AI/ML)
VMWare Hypervisor
Database-as-a-Service
Virtual Private Network-as-a-Service
Platform as a Service
Virtual data center security stack

Enhanced Migration and Management Services

1Q FY2020

VCloud Director
SIPR Infrastructure
Cross Domain Solution
Virtual data center managed services
Test/Dev-as-a-Service
Tactical solutions

2Q FY2019

NIPR Infrastructure as a Service
Ordering Portal
Provisioning Portal
Infrastructure Backup and Disaster Recovery

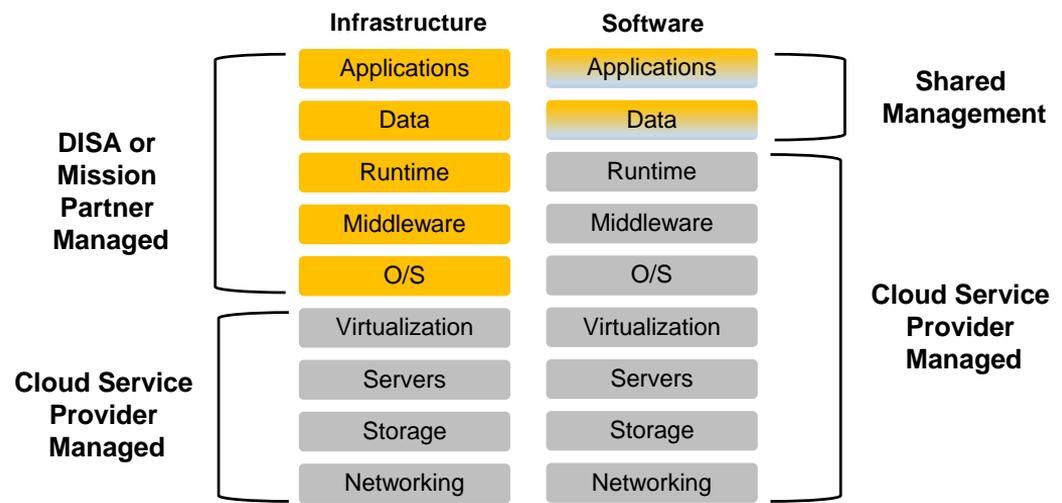
High Performance Storage Options
Manual "Lift and Shift" Migration Services
milCloud + Services (DISA)
Secure Cloud Computing Architecture (DISA)
Cybersecurity Service Provider (DISA)



Cloud Management Roles and Responsibilities

DISA Cloud Connection Approval Onboarding Checklist

- ✓ Approved cloud vendor
- ✓ System Network Approval Process (SNAP) Registration
- ✓ Internet Protocol Registration
- ✓ Cybersecurity Service Provider
- ✓ Authority to Operate





Features and Capabilities



Integrated



Scalable



Real-time

Utility billing: solely pay for actual usage

Workload transition: workloads into and out of commercial IaaS environments

Accreditation: based on Cloud Computing Security Requirement Guide (CC SRG) controls for impact level five

Business management portal: supports service contracting, billing, metering, and automated provisioning

Cost calculator: Estimate and forecast the amount of financial commitments for consumer-defined use cases

Deployment: full replication between two DISA data centers

VPC separation: Segmented compute for core, management, and customer virtual private clouds



Features Overview: Secure Cloud Computing Architecture



Connect: Access DoD approved level 4/5 cloud service providers.

Secure: Extend application and data-level security services to the cloud.

Manage: Obtain custom analytics and intelligence data for host based security and role based access controls.

Boundary Defense: Connect to approved Level 4/5 providers and protect DoD networks

Web Application Firewalls: Prevent targeted attacks; cross-site scripting, forceful browsing, cookie poisoning, and invalid input

Next Generation Firewalls: Virtual appliance architected to identify network traffic and implement policies in a mission-centric fashion

Host Based Security Service: Develop cloud-based orchestration for security policies, upgrades, and reporting

Assured Compliance Assessment Solution: Manage roles, scan zones, and policies

System Patching: Cloud-based DoD patch repositories

Recursive DNS Caching: Forward and cache external DNS queries

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