State of the Computing as a Service (CaaS) in DoD Ground Systems

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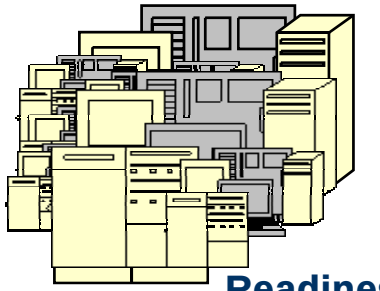
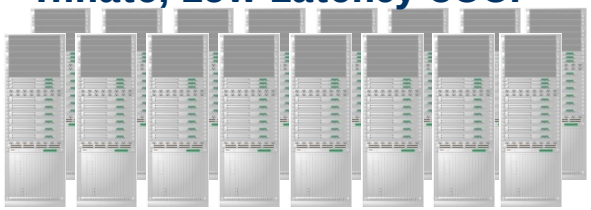
New Approach Needed

Dedicated hardware
Highly tuned SLOC
Manual, High Latency COOP



IT Procurements
Stove Pipes to Shared Resources

Shareable hosting environment with a 2x efficiency increased
Just Enough OS (JOS)
Innate, Low Latency COOP



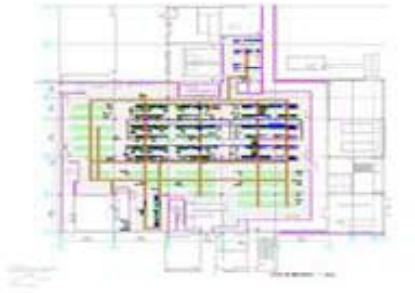
Readiness
Complex
Cumbersome
Fragmented
Rigid

Resource Timelines
Development-Centric to User-Centric

Resources Dynamic - Minutes
Mission Flexibility - Days
New Missions - Months
Facilities - Yrs

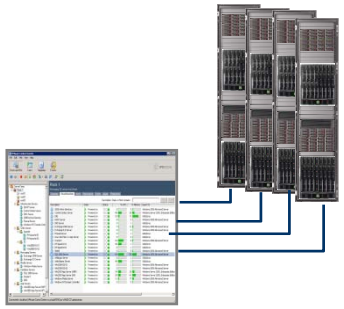
Capability in Years/Months

Capability in Weeks/Days



Power, Space and Cooling
Inefficient to Efficient

Objective: 70%
Economy of Scale



Exceeding Facilities Space, Power and Cooling capabilities

Accommodate yearly growth while decreasing existing systems P/S/C demand by 70%

Problem Set Demanding Commercial Twist: Unique Government Problem Set

- Systems designed for a limited life span still operating today (80's technology)
- Commercial interest in addressing / solving government specific legacy coding and services seen as marginal ROI: Not able to repackage for resale to commercial market space
- OS are coded to exploit hardware specification in order to increase efficiency
- Geographically dispersed nature of equipment lent to "islands of excellence" with no desire for an enterprise IT approach
- Blurring of Echelon one (LRU) and Echelon two (Baseline Changes & Discrepancy Resolutions) roles and responsibilities resulting in constant baseline changes
- Facilities upkeep outstripped by need for computation capabilities: "Moore's law" timeline continues to contract with increased density issues

Problem Set Demanding Commercial Twist: Unique Government Problem Set

- Virtualization “Manager of Manager” standard is needed to alleviate vender lock-in
- Accommodate “local” desire for immediate changes and ownership while keeping “enterprise” architecture focus
- High Capacity Processing platforms bring unique facilities issues
- Most Commercial approaches are “Green Field” where as the need is to “build in place”
- Government practices do not lend themselves to established commercial process
- Data ingest rates and system responsiveness under strict constraints
- Intermingling of IT ownership by different government agencies

Single DOD Estimated Problem Set:

- Business and Mission Support (~10% of architecture). These servers have no specialty hardware and do not support intensive computational cycles. Virtualization and Consolidation (VAC) migration could be a solution. Primary VAC occurs early in the transformation strategy to help educate and build confidence in the newer technology.

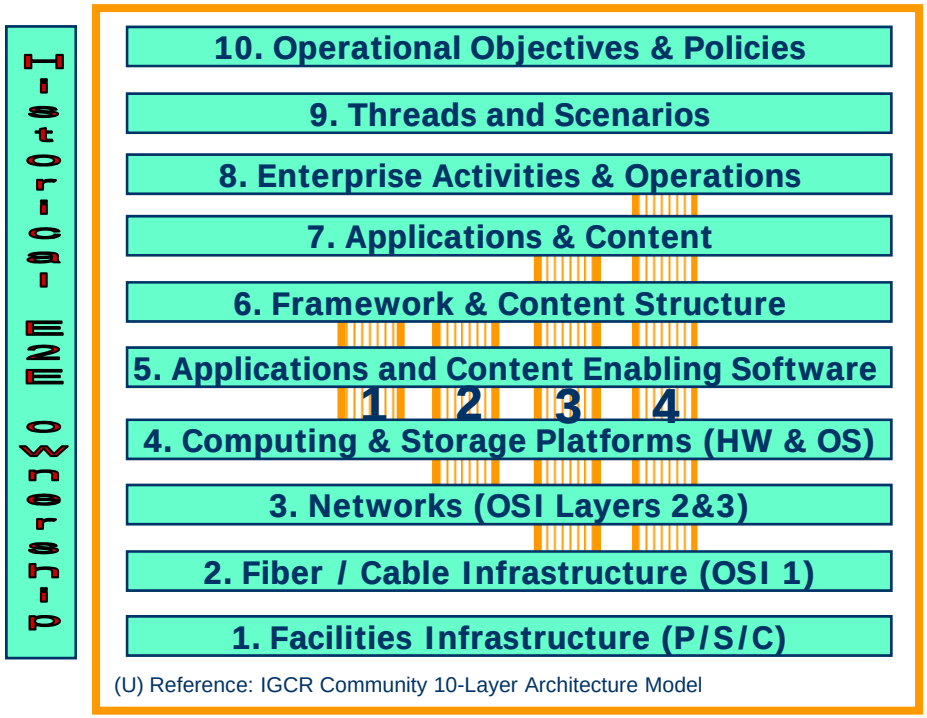
- Modern Operating System (OS) (~35% of architecture). These servers are coded based upon x86 standards no specialty hardware and marginal intensive computational algorithms. VAC migration could require 6-8 months of labor hours based upon lower implementation complexity. Primary VAC occurs early to continue building confidence and expanding into development concepts.

- Legacy OS (~30% of architecture). These servers are coded based upon unsupported VAC standards and will require extensive development, intensive testing and code modifications (12 – 18 months (min)). VAC could be applied during a scheduled system recapitalization or new acquisition activity. VAC is applied mid to late in the transition once development has accepted these concepts.

- End of Life (EOL) (~25% of architecture). These server suites are comprised of specialty hardware that current technology can not virtualize (80's or older). These suites could require a total system replacement. Technology advancements will define migration in later years.

IT stack and Program Ownership

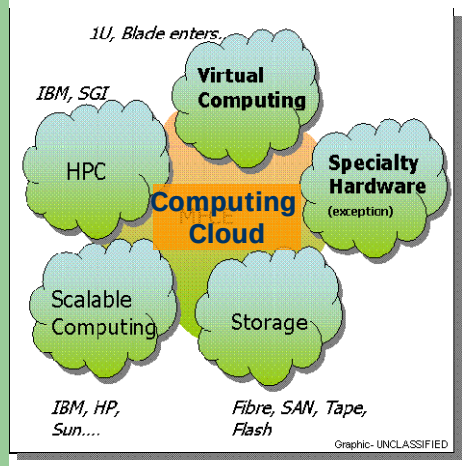
- **Where are the insertion points for a CaaS**
- **What make sense based upon best commercial practices**
- **How much of stack should be considered when creating an enterprise approach for program manager ownership**



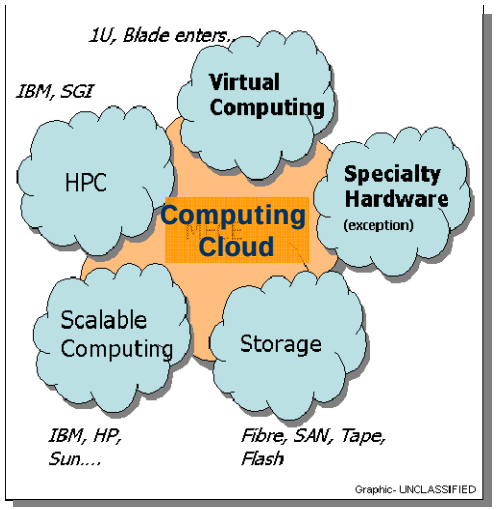
Defined & Shared Resources:

- **Programmatics**
- **Experience Levels**
- **Costing**
- **Risks**

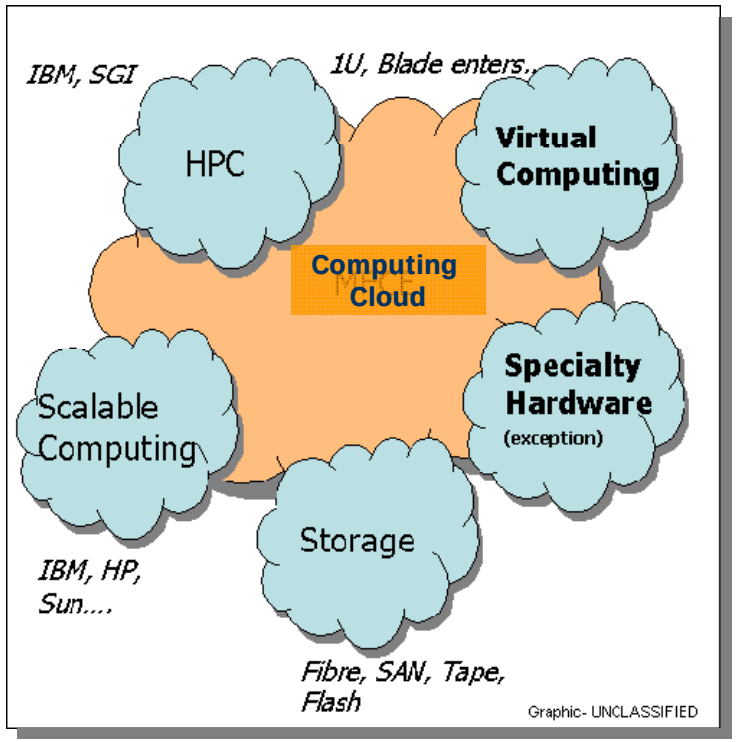
Potential CaaS Environments Approaches



(U) Prototype Environment



(U) Development/Test Environment



(U) Operational/Operational Demo Environment

- Envisioned three environments to foster concept:
  - Prototype (Flexible with some bounds)
  - Development/Test Environment (Closer to Ops environment)
  - Operations (Fixed with strict configuration)
- Prototype and D/T are geographically dispersed with “long line” access

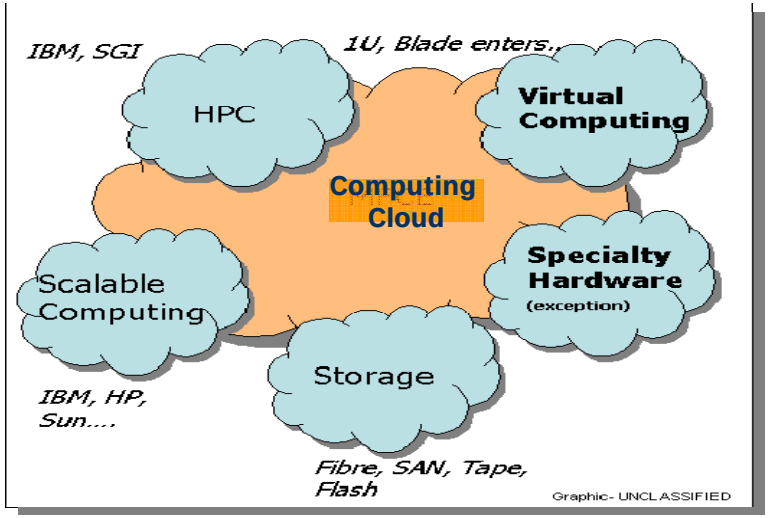
CAAS Consideration

What is the best approach for build out of the computing cloud?

- Government owned with Government build out
- Government Specified with commercial build out
- Commercial Owned with Government Leased

Technology Transition

- Evolution / Revolution
- Decision Points
- Trades
- Life Cycle
- Recapitalization



(U) Operational/Operational Demo Environment

Identifying Risk

- Migration approaches
- No impacts to Operations
- Regression Testing
- Document Processes
- Education
- Culture modification
- Study "Open Looped"

Issues

- Short suspense for transition
- Multiple network
- Multi-Level Security Restriction
- Budget Ownership Demarcation
- Managing hosting services (what is this)

Distributed Computational Capability with Centralized Management (DCM) Visibility