System Z Looking Back, Looking Forward

What Matters In the Heavy-Lifting

Mission Critical Enterprise

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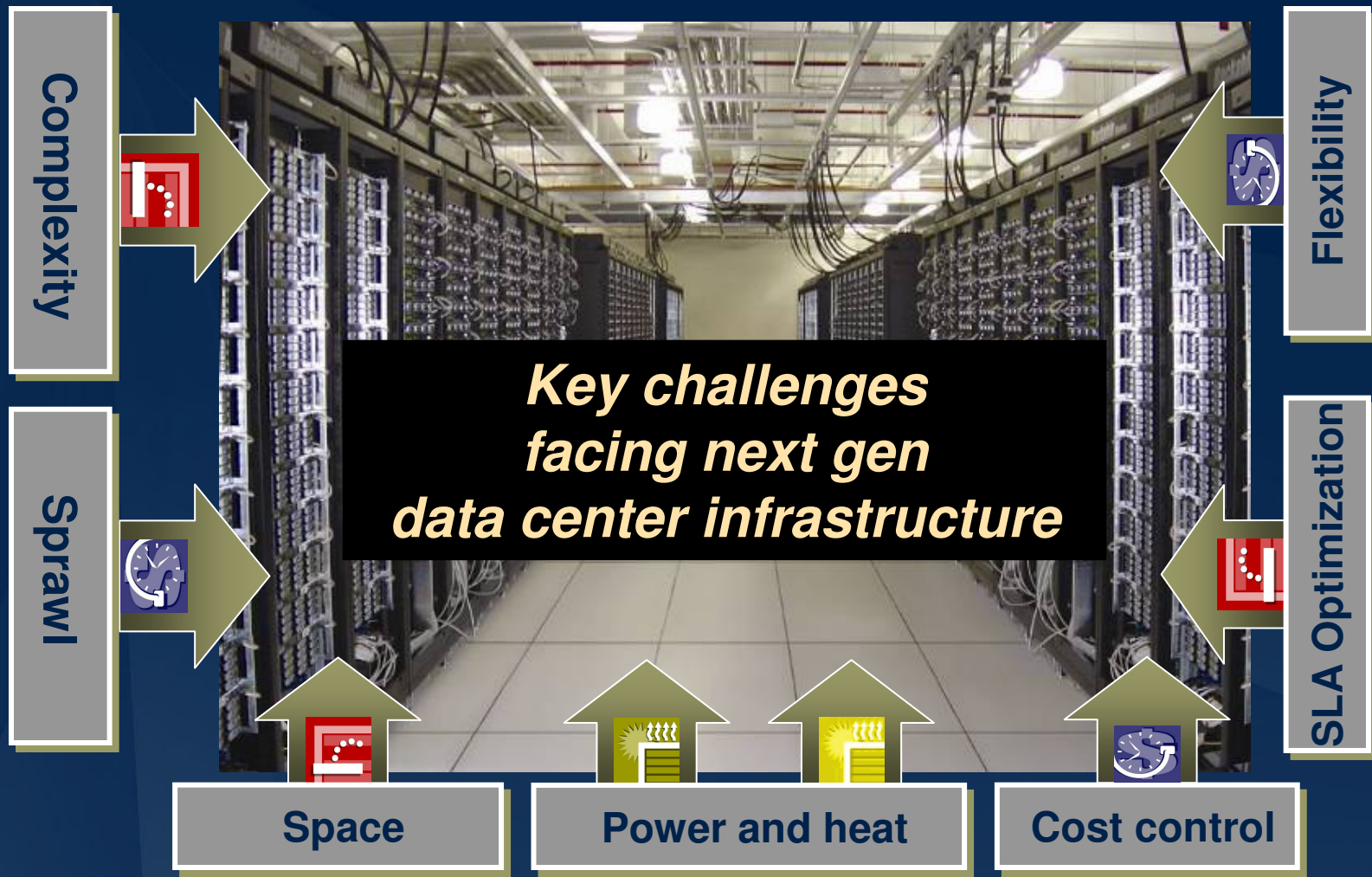Forrester Research

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What keeps IT Executives Awake at night…
…*their visceral issues & concerns*

- Technology is a critical part of catalyzing my companies business requirements
  - » Yet I'm at bottom of the investment food-chain, after sales and marketing takes their share
- I need to look at the "good enough technology" for leanest price points
  - » At the same time, I'll still pay higher price for applications differentiators that competitively advantage my core mission critical applications
- Vendor needs to solve problems, not push technology
  - » Vendors focus on feature/function/benefit, instead of benefit/functionality/feature
  - » Forced product road-map choices, when I need longer systems refresh cycles
  - » Bottom line: I need to "solve those problems that are the most profitable to solve first"

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Top Computing Infrastructure Pain Points
...Advance Virtualization Stacks Are Critical Panacea

Complexity

Sprawl

Flexibility

SLA Optimization

Key challenges facing next gen data center infrastructure

Space

Power and heat

Cost control

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CTO/CIO Core Infrastructure Imperatives
What's On The Short-List ?

- Overall data center cost is top of mind

  » Consolidating current data centers typically yields major cost savings

  » Most distributed systems are running at 15-25% capacity utilization -- server (or systems) consolidation may reduce the need for multiple data centers

- Power and cooling is the most wasted computing resource

  » Older data centers have huge cost savings potential in both power and cooling, not just within the rack but also within the data center's four walls

  » Power is the single largest data center operating cost

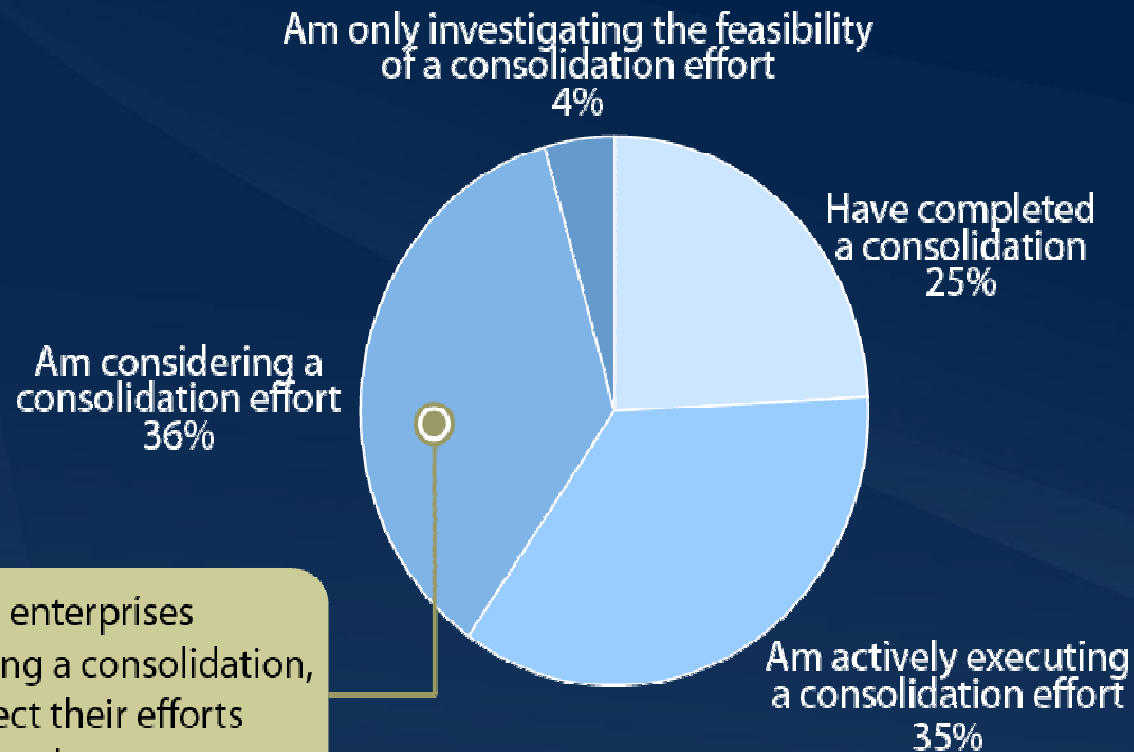 » Blades use 20% to 40% less power than alternative 1U systems

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CTO/CIO Infrastructure Imperatives (cont.)
What's On The Short-List ?

- Business resiliency of data center content still rules

  » Data, applications, and service-level requirements are driving much of the demand for new data centers.

  » In most cases, legacy data centers do not have the proper design, build, infrastructure, or location characteristics.

- Globalization of IT delivery is the business best practice, but the human resources must follow the sun

  » Clients are building the data center IT skill deployment closer to their operating geographies, realizing significant cost savings in global delivery of all IT assets.

  » In some cases, data center redeployment is often driven by M&A activity.

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In 2007, we took their pulse on IT infrastructure consolidation priorities…

"Are you engaged in or considering an IT consolidation effort today (whether server, storage, or data center consolidation)?"

Am only investigating the feasibility of a consolidation effort
4%

Have completed a consolidation
25%

Am considering a consolidation effort
36%

Am actively executing a consolidation effort
35%

(!) Of the 88 enterprises considering a consolidation, 18% expect their efforts to take less than a year.

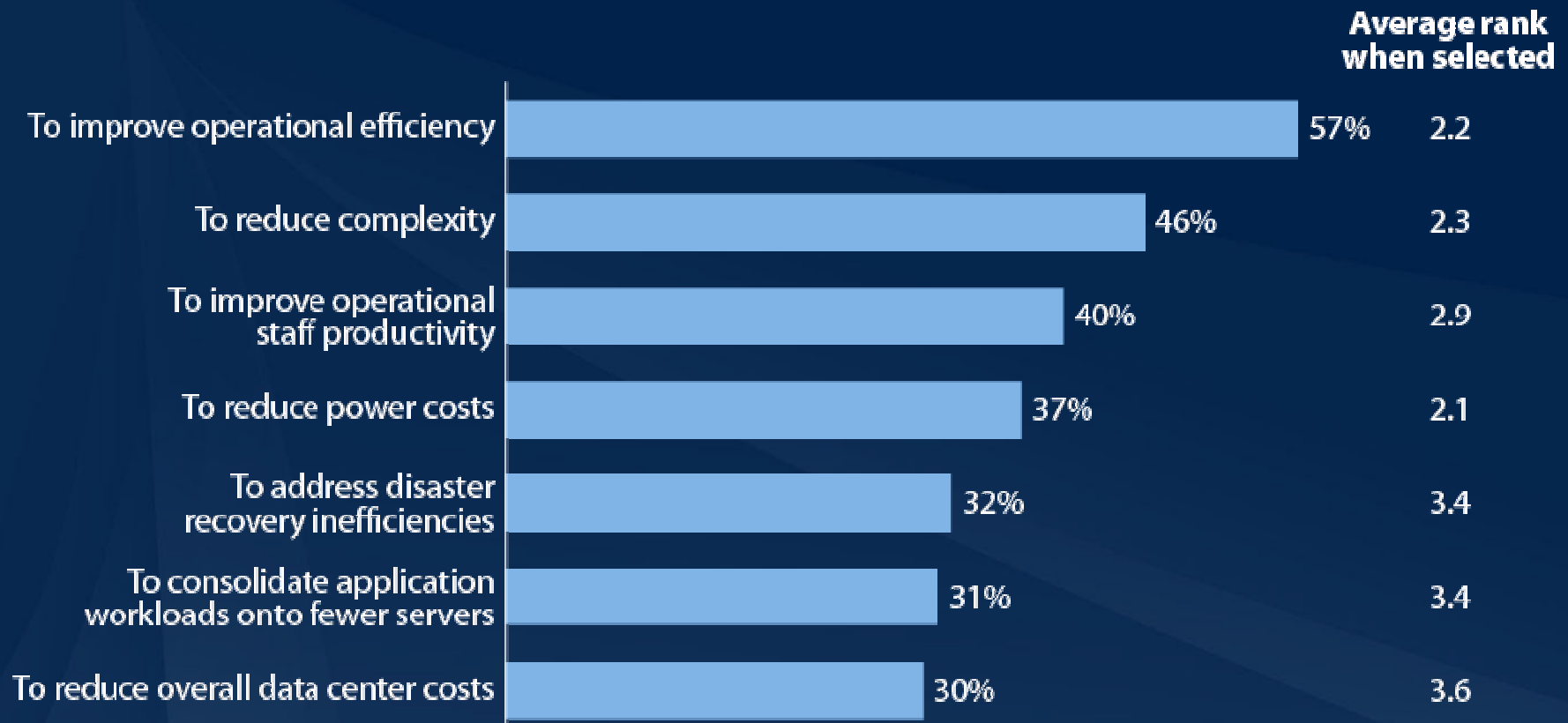Base: 246 Executive IT decision-makers and managers at North American enterprises

Source: August 2007 US Enterprise IT Consolidation Online Survey

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System Z's consolidation of new workloads is strong
Why Big Iron Systems For Infrastructure Consolidation

"Rank the top five motivations for your data center consolidation effort"*

Motivation	Percentage	Average rank when selected
To improve operational efficiency	57%	2.2
To reduce complexity	46%	2.3
To improve operational staff productivity	40%	2.9
To reduce power costs	37%	2.1
To address disaster recovery inefficiencies	32%	3.4
To consolidate application workloads onto fewer servers	31%	3.4
To reduce overall data center costs	30%	3.6

Base: 147 IT executives and managers at US enterprises that have completed or are actively executing a consolidation

Source: August 2008 US Enterprise IT Consolidation Online Survey
*Percentages are based on the number of respondents who ranked the motivation in the top five.

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Overall Factors That Drive System Consolidation
The Big Iron Opportunity – Re-facing The Legacy, Adding New Workloads

- Under-utilized server capacities

- Improved application performance scalability (higher range of performance & lower price for that range)

- Technology refresh (to a new platform, new server design)

- Hardware/software end of life

- Legacy operating system environment (requiring upgrades to optimal feature/functionality)

- Legacy applications (requiring re-writes and/or upgrades)

- Organizational politics

Server Virtualization
Project Catalysts & Expected Benefits

Project Catalyst

- Consolidations

- Dynamic provisioning/hosting

- Workload management

- Workload isolation

- Software release migration

- Mixed production and test

- Mixed OS types/releases

- Reconfigurable clusters

- Low-cost back-up servers

Benefits

- Higher resource utilization

- Greater usage flexibility

- Improved workload QoS

- Higher availability/security

- Lower cost of availability

- Lower management costs

- Improved interoperability

- Legacy compatibility

- Investment protection

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The "Dynamic Infrastructure" Dance Card
Synergy Between Virtualization, Consolidation, Optimized Math

- Advanced virtualization is a core underpinning of server consolidation

- Systems and applications stacking, coupled with advanced virtualized environments creates new pricing models (capacity on demand & utility pricing)

- Server consolidation often stimulates investigation of systems transitions (upgrade, re-write, re-host)

- Yet, justifying the math for the business cases and projects still needs to offer an improved cost-of-life-cycle ownership outcome – Forrester's "3C's" Model
  - » Cost Of Acquisition
    - – Important, But Lowest Cost Category
  - » Cost Of On-Going Operation
    - – Critical, Substantial Cost Category, And Biggest Battleground
  - » Cost Of Incremental Change
    - – Most Critical, Highest Cost Category, Always Overlooked, and Z's Biggest Strength

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Critical Selection Criteria
Servers and capacity utilization

- Capacity utilization audit critical first step before server refresh
  - » Mainframes have highest capacity utilization
    - Typically 80%-95% due to legacy of virtual machines and workload management technology
  - » Unix environments weigh in a 28%-40%
    - In entry workgroup and midrange
  - » Windows weigh in at 8-15% capacity utilization
    - With lowest possible capacity utilization
    - Due still to single-app-per-server mentality

Critical Selection Criteria

Virtualization continues the most transformative technology

- Virtualization is a critical option for collapsing multiple O/S images — and multiple mixed application types — onto fewer number of physical servers

- Consider virtualizing server resources to offer a variety of higher utilization against several scenarios:

  » Consolidation to lower overall cost of systems administration and operations management

  » Application and new release test environments

  » Customized partitioned performance flexibility

  » Reduction of distributed server foot-prints, thus eliminating power & cooling of under-utilized servers

Z A Strong Contender With New Pricing Models, New Workloads, And Optimized Math

Pay Per Use Pricing Options -
…increasingly popular in delivering the dynamic infrastructure

- Continuous thirst for creative financing options (e.g., capacity on demand, pay-per-use, and other creative on/off price metering approaches).

  - » To enable more versatile chargeback options

- Pay-on-demand or "per use" offers greater competitive differentiation in the virtualized systems resources environments

  - » Key is comprehensiveness of feature/functions and full inclusion of the entire computing stack (system, software, and services)

- Automated and granular chargeback through minimal clickstreams as base offering

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Critical selection criteria
Systems architecture overall

- Virtualization as a systems technology is becoming a critical selection criteria in the minds of both enterprise architects and systems administrators.

- Scale up, scale out, and scale within are still core systems design customer selection criteria – well-balanced architecture to optimize all workload types

- Performance benchmarking per server core or specialty engine (not processor) and $$/against performance range is a new metric as core life cycle cost consideration for select workloads.

- Creative financing alternatives for consuming server resources and system software carry renewed short-listed imperative
  - » Flexibility in Instant capacity on demand and/or pay-per-use models and mechanics
  - » To fit SOA, SaaS, and emerging cloud approaches

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Critical Selection Criteria
Embracing Linux As Mission Critical

- Historically, it's been an x86/blades sweet spot (per volume, reach).

  » With blades, the strongest play remains HPC markets relative to applications affinity, but is posing

- The only OS infrastructure that could be successful on the widest variety of server microprocessors, server design wins, and systems architectures.

- Linux as OS strategic choice has made the shortlist, but in its native form, its value prop is different depending on the server systems architecture, specifically:

  » Applications workload characteristics

  » Overall development and systems administration affinities

  » Virtualization requirements

  » RAS requirements

  » Cost of life-cycle ownership expectations and metrics

  » Maturity perspective of various IT stakeholders

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Critical Selection Criteria
Virtualization stack advantages becomes renewed battleground

- Infrastructure consolidation of servers, storage, and networks will remain highest priority on CIO's most strategic initiatives
  - » Provides highest demonstrable value by reducing infrastructure costs and improving LOB service level responsiveness
  - » Advanced virtualization stacks will continue as the core ingredient as the technology underpinning for successful infrastructure transformation in next gen computing infrastructures
- Advanced hypervisors and comprehensive management consoles will continue as key ingredient creating virtualization stack differentiation.
  - » Needs to provide fine-grained resource sharing across all computing elements, and be easy to apply within both scale-up and scale-out, and hybrid systems architecture computing environment.

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Z Will Continue To Differentiate On Virtualization Supremacy
For Every Initiative, Every Competitive Play

- Ultimate future benefit of virtualization will be more simplified IT management – getting to the single pane of glass.

  » Enterprise computing infrastructure labor costs far exceed server systems costs.

  » Virtualization will reduce management costs by simplifying management tasks.

- IBM System Z's virtualization stack must continue to set the high water mark for the feature/functionality required in most demanding mission critical business computing environments

  » Impact of virtualization on capacity utilization and adoption of new workload

  » Impact of virtualization in mixed, multiple applications workload environments

  » Impact of virtualization in transforming life cycle cost of ownership argument

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Critical Selection Criteria
Life cycle cost metrics will drive applications workload best fit

- CTO/CIO will favor bundles of "good enough" software technology and from systems companies as lead contractors.
  - » Promise of cost efficiency of "good enough" technology over "best-of-breed" technology (requiring premium prices) from third-party software suppliers
- CTO/CIO cost of ownership scrutiny will shift.
  - » From traditional two- to three-year TCO models to three- to five-year cost-of-life-cycle ownership
- Vendors that can make strong proposal/commitments against all stages of a three- to five-year cost-of-life-cycle ownership methodology will be advantaged.
  - » Cost of acquisition (Stage 1)
  - » Cost of ongoing operation (Stage 2)
  - » Cost of incremental change (Stage 3)

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The Trends That Matter…
In The World of High-End, Heavy-Lifting Enterprise

- Consolidating applications of different types and behaviors on fewer number of servers (e.g. server consolidation)

- Huge drivers pushing a 64-bit computing world

- Need for a well-balanced systems architecture – give me scaleable performance, scaleable availability, but all with scaleable economics

- Equal investment in systems architectures that will maintain my ability for multi-OS deployment and support

- Virtualizing to higher capacities and creating new pay-per-use ways of charging your LOBs

- Linux ecosystem infrastructure readiness

  » For choice in commercial applications, and in open source applications alternatives

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Battle For Future Systems Architectures
Old Basics Still Rule The Day

- The real battle for strategic systems architecture will remain:

  » Power & cooling systems efficiency & sustainability

  » RAS extensions

  » HA/clustering

  » Full applications and system virtualization and virtualization management

  » Creative financing options (based on virtualization granularity)

  » Integration with the desktop

  » Lowest life cycle cost of ownership for highest solutions value

- Winners will be vendors with deep management stacks and other IP to bring to bear on Linux and open source alternatives