



MACQUARIE

Refresh Planning: Factors, Issues, Planning

January 2012

SAMPLE





Agenda

- General strategy principles: architecture, finance, ITAM process/policy
- Overview of major tech advances/changes in 2012-2015
- Classes of equipment: trends, economics, and refresh process issues
 - x86 servers
 - Full-function End-User devices
 - Network gear
 - Storage
- Process and Policy considerations
- Supplier/Vendor management issues
- Architectural temptations and trade-offs...
- Possible interest areas for XYZ inc.
- Strategy Revisited



General Strategy Principles

■ Architectural:

- De-couple elements (subject to performance and reliability constraints)
- Isolate easier-to-move apps/systems from others (virtualize/port where feasible)
- Built auto-provisioning and load-balancing software capabilities toward plug-find-and-play
- Create risk-probability scenarios for capacity forecasts (high, low, EV) and migration costs

■ Financial:

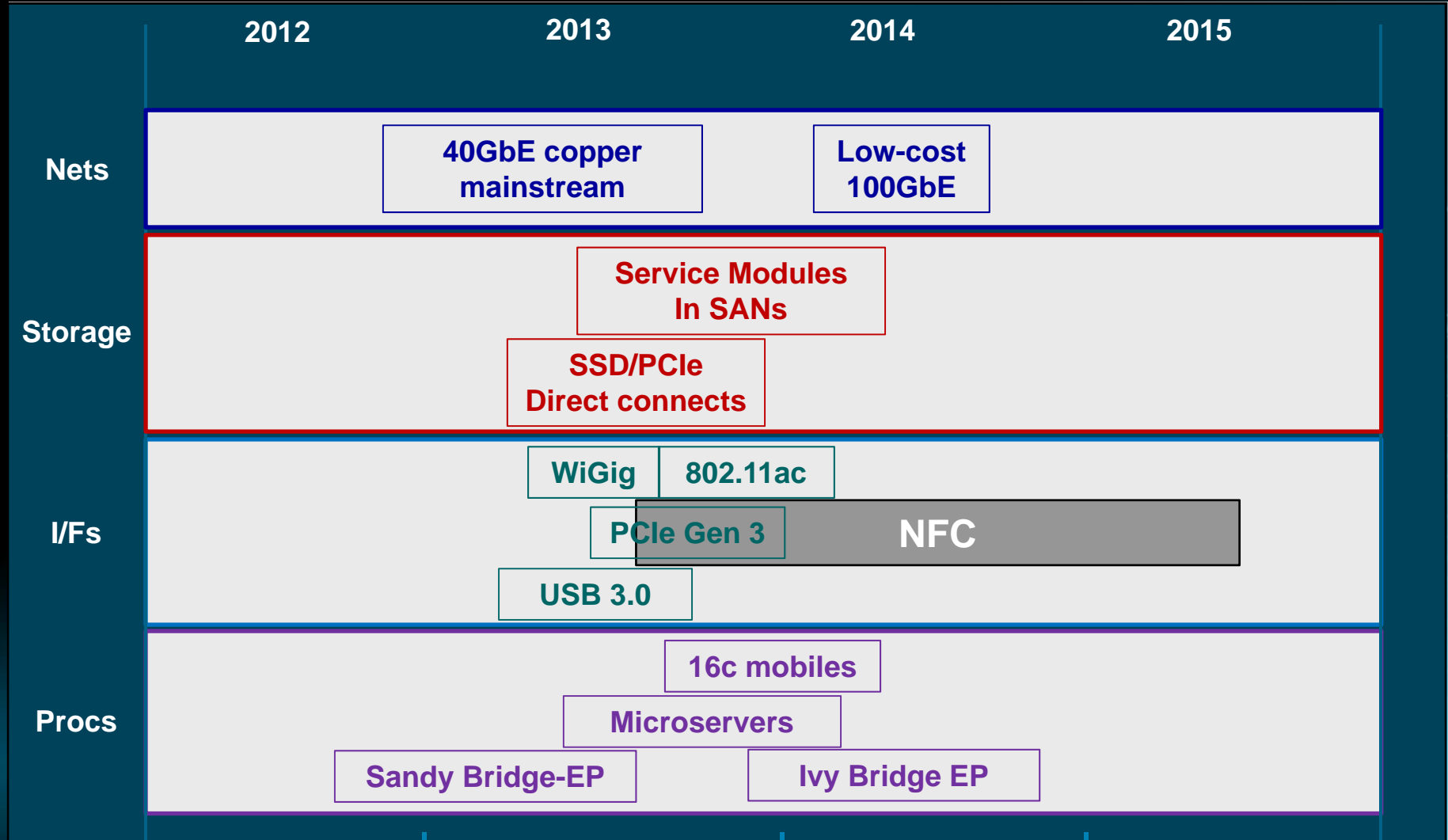
- Move rapidly changing IT capex to quarterly opex (bunched around decision points)
- Create budget trend expectations by volatility-class

■ ITAM process and policy

- De-couple as much as possible in the sourcing process (e.g., hardware, software, financing, labor)
- Centralize and pre-empt major tech choices (stay ahead of the curve)
- Negotiate vendor commitments to specific improvements in capacity, manageability, migration assistance



Major Tech Changes 2012-2015





Refresh Issues by Class of Equipment

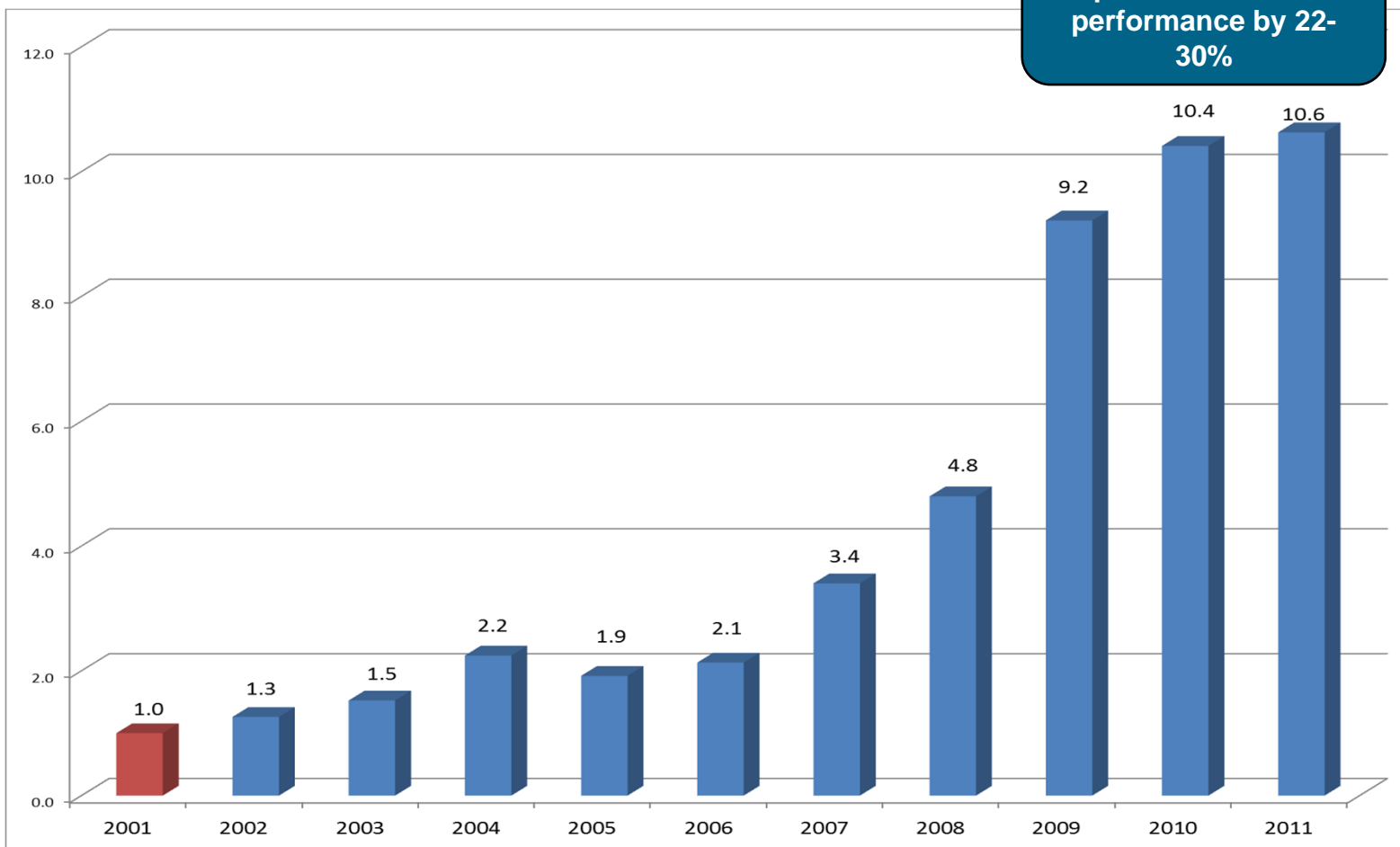
- x86 Servers
- Full-function End-User devices (desktops, laptops, workstations)
- Network gear
- Storage



Servers: Trends

■ Servers (TPC-C benchmarks)

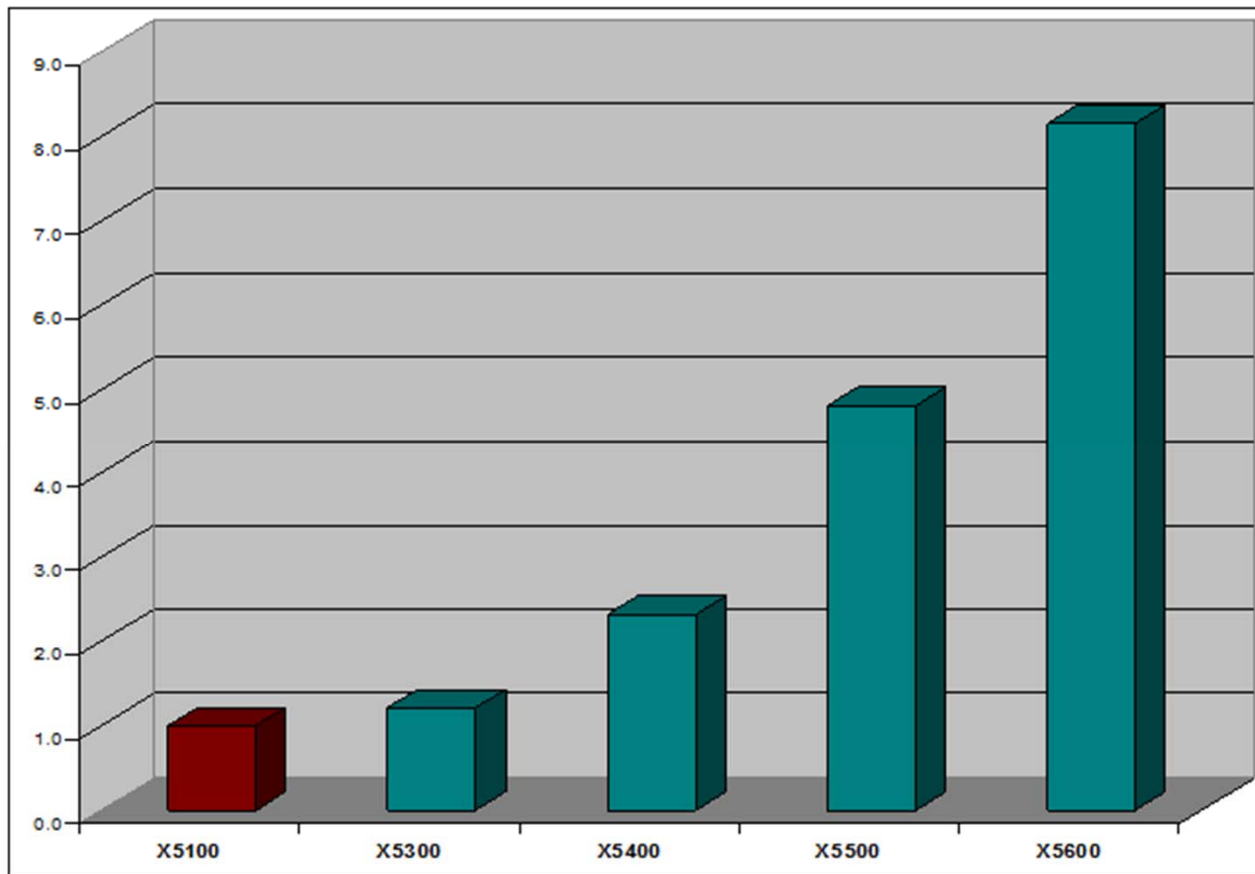
Sandy Bridge EP is expected to increase performance by 22-30%





Servers: Trends

■ Performance per Watt (relative to 5100, *SPECpower*)

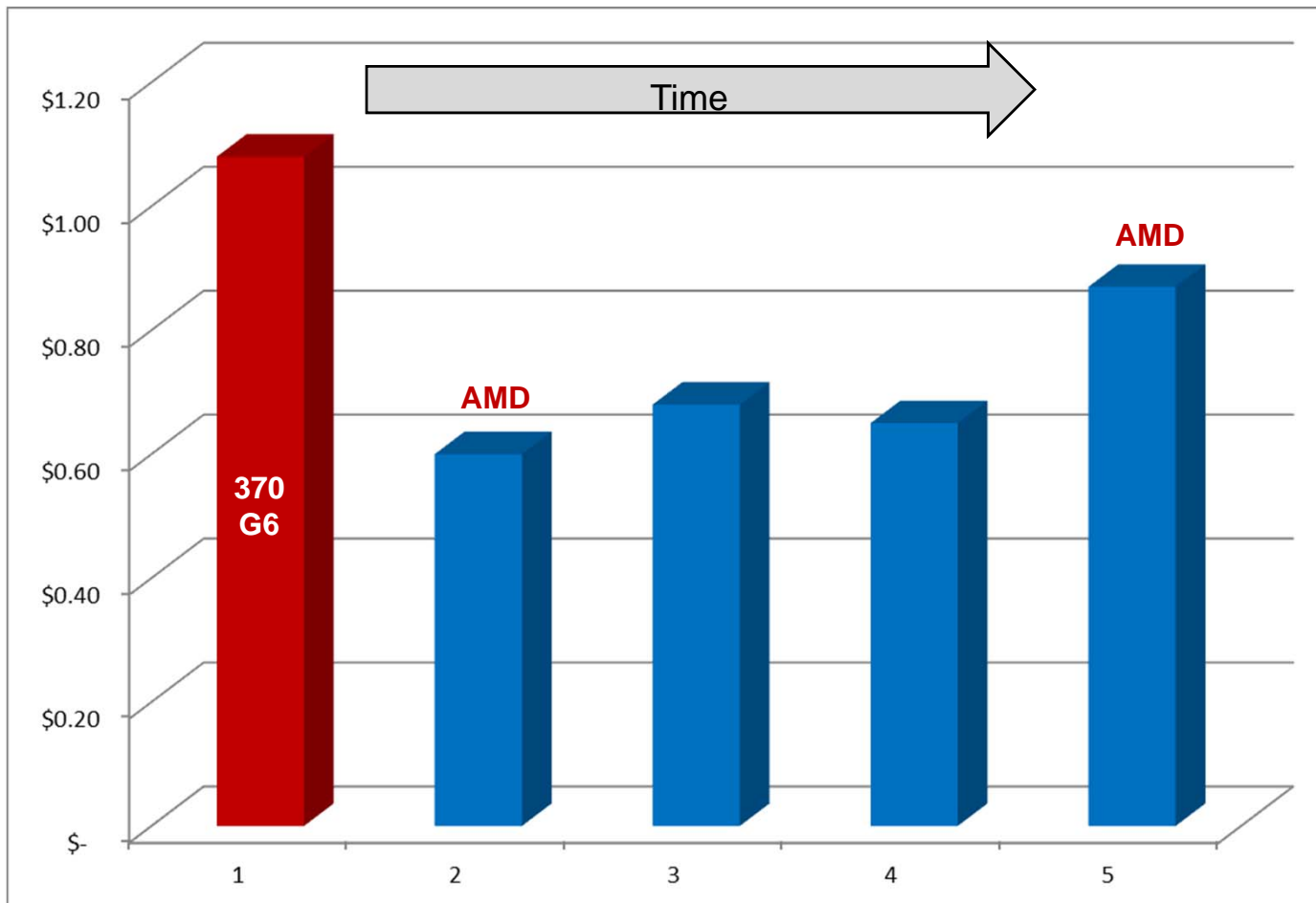




Servers: Trends

■ Sample: 1way (HP 38X Proliant; TPC-C, Price-Perf)

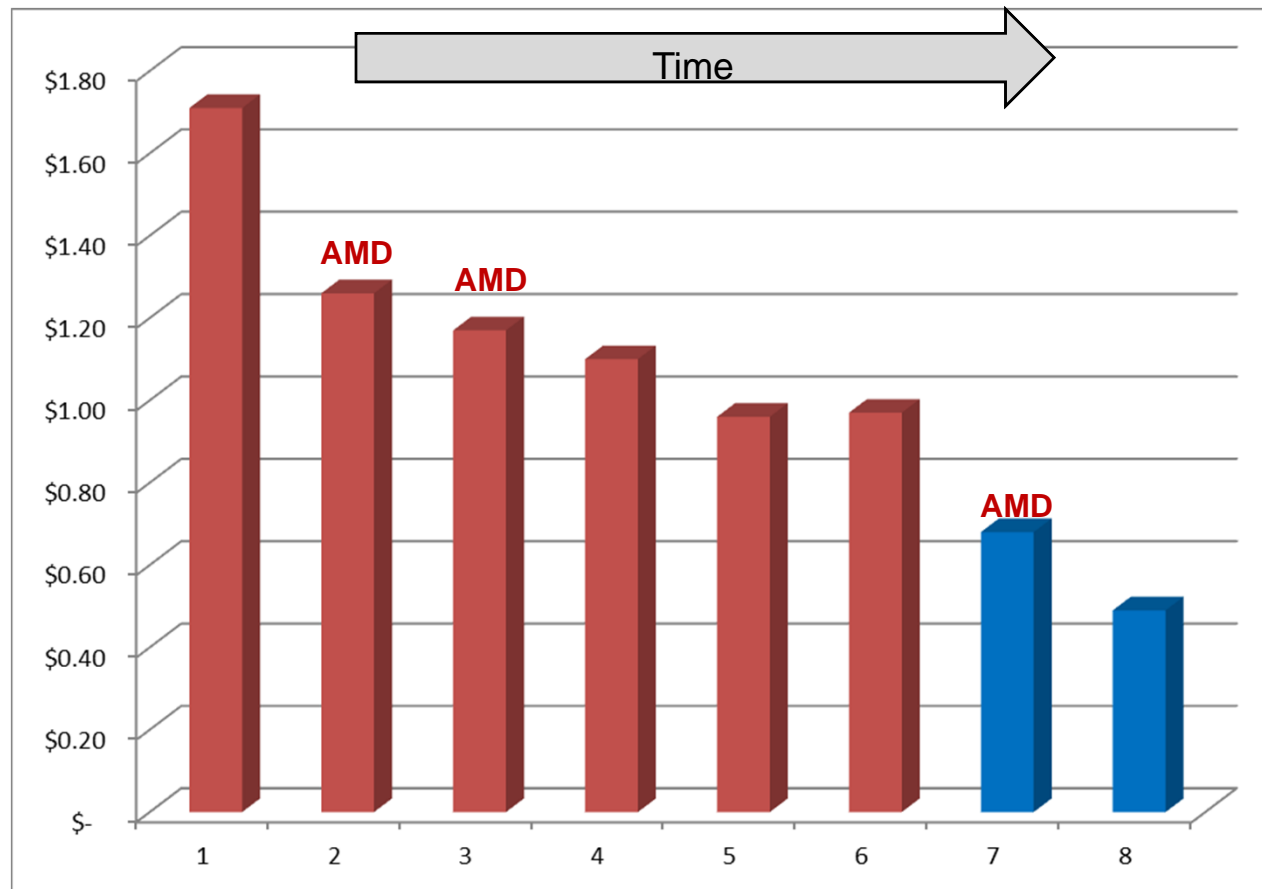
Red is G6
Blue is G7





Servers: Trends

- Sample: 2-4way (HP 58X Proliant ; TPC-C, Price-Perf)



Red is G5
Blue is G7



Servers: Economics of Replacement

■ Generation-to-Generation Server Replacement (Steady Capacity Model)

	Units	Watts	Ext-KWs	5600 Equivalent	#5600s Needed	5600 KWatts	Freed-Up Watts	KW costs	Saved ExtKW\$
X5100	1,000	258	258	0.12	123	29	229	\$0.08	\$ 160,169
X5300	1,000	334	334	0.16	158	38	296	\$0.08	\$ 207,445
X5400	1,000	276	276	0.30	301	72	204	\$0.08	\$ 142,860
X5500	1,000	237	237	0.59	590	142	95	\$0.08	\$ 66,825

■ Footprint reduction (in units) frees up capacity for cost harvest or reinvestment

- Software licenses (but watch contract structures here!)
- Energy costs, insurance, any displaceable location costs
- Other overhead costs (e.g., cabling, management, monitoring, SAN ports, etc)
- DR/redundancy units



Servers: Economics of Replacement

- Economics best around 36-38 months
- Plan for 2-3 month overlap (for staging/test/QA)
- We get 20-30% performance increases for the same monthly payment every 24 months, within the same product class families
- If our refresh window OVERLAPS two Intel generations, we can choose between price and performance for some replacements



Servers: Refresh Considerations





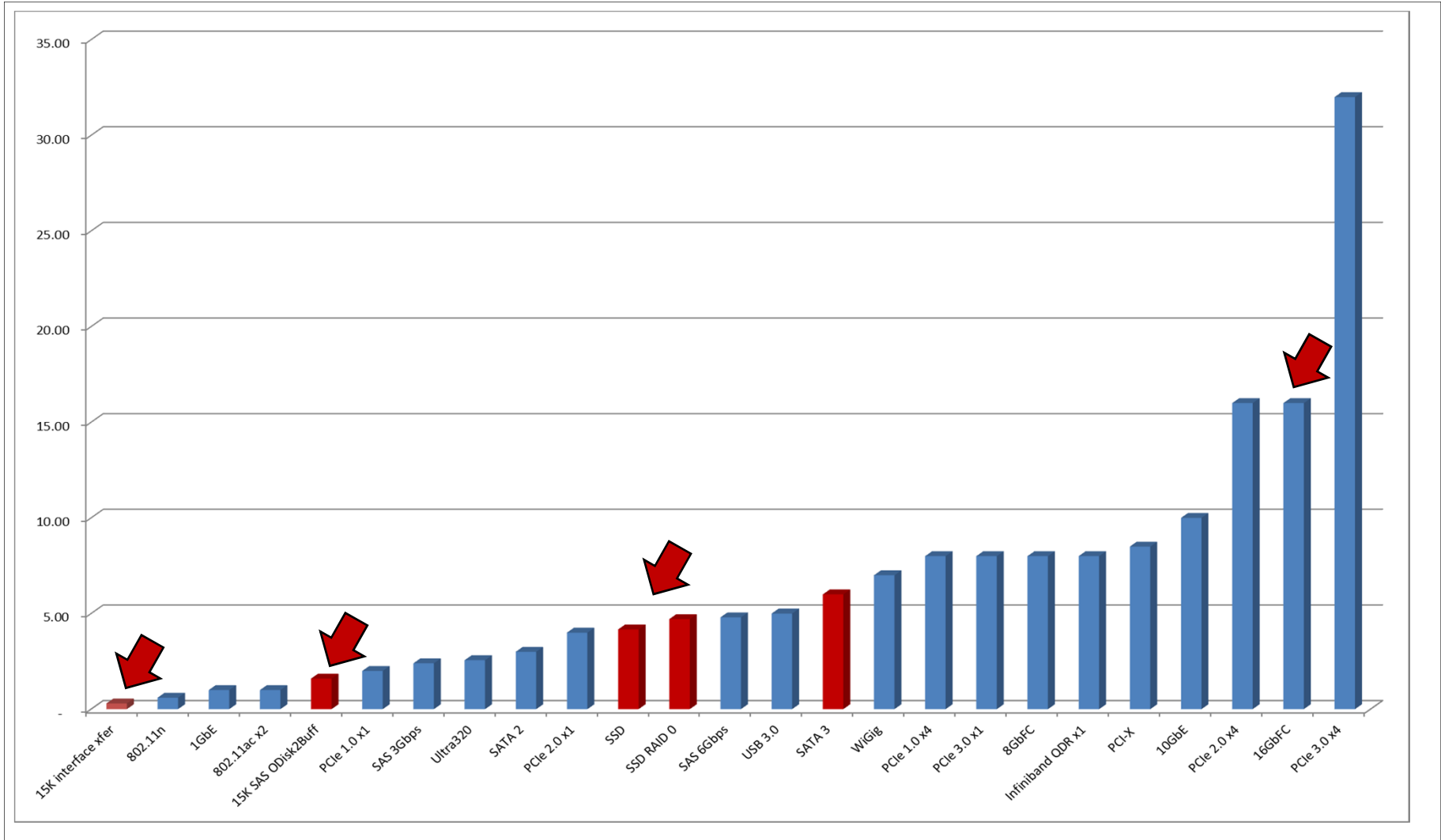
Servers: Refresh Process Issues

- Auto-provisioning and load-balancing architecture improvements
- Factor in growth in High Availability requirements
- Headroom versus scale-steps [wasted money for unused headroom]
- Power and density limitations
- Consolidation ripple-out effects: NIC bottlenecks, SAN ports

- License costs?
- The desperate need for PCI 3.0 when it comes out!
- Security (e.g., Intel's *trusted computing pools*)



Transfer Speeds





End-User Computing Refresh Trends

Date	Source	Core/Focus	Cost-of-Money Considerations?	EUC Costs	Recommended Refresh
Sept 2003	Giga	Standardization; Costs & Risks	No	No	3 years
Jan 2004	Intel	Very 'Hard' Cost	Some	No	3 years
Nov 2004	Forrester	Survey data	No	No	3 years
Late 2004	Wipro	Standardization	No	No	2-3 years
Dec 2005	Robert Francis Group	Very 'Hard' Cost; NPV	Yes	No	3 years
Dec 2007	Gartner	Technology substrate	No	Yes	2-5 years (varies)
Mar 2009	Gartner	Better Management	No	Yes	4-5 years (via exception)
Mar 2009	Gartner	Repair costs in laptops	No	No	3 years (laptops)
May 2009	Intel	Support costs for notebooks	Yes	No	3-3.5 years (notebooks)
May 2009	Wipro	Age of units in installed base	No	No	3 years
Nov 2009	SquareTrade	Laptop repair incident rates	No	No	(3 years; not stated)
March 2010	Experture	Hard costs only; includes leasing	Yes	No	36-38 months



EUC: Refresh Trends

- Mostly driven by TCO, software requirements, or process advantages
- Headroom for compliance changes
- More mobo advances (pre-boot security, I/O virtualization, graphics)
- Product families for SIPP
- Not about performance as much anymore--features and RAS
- VDI is still very limited

Top Five Reasons for Leasing PCs*

Discipline imposed on maintenance and replacement	cited by 65%
Protection against obsolescence	cited by 54%
Off-balance-sheet accounting	cited by 53%
Convenience	cited by 51%
Efficient use of tax incentives	cited by 36%

*Based on Global Insight survey findings reported in "(Don't) Look Deep into My Lease," [CFO Magazine](#), 07/01/2006).



VDI Status

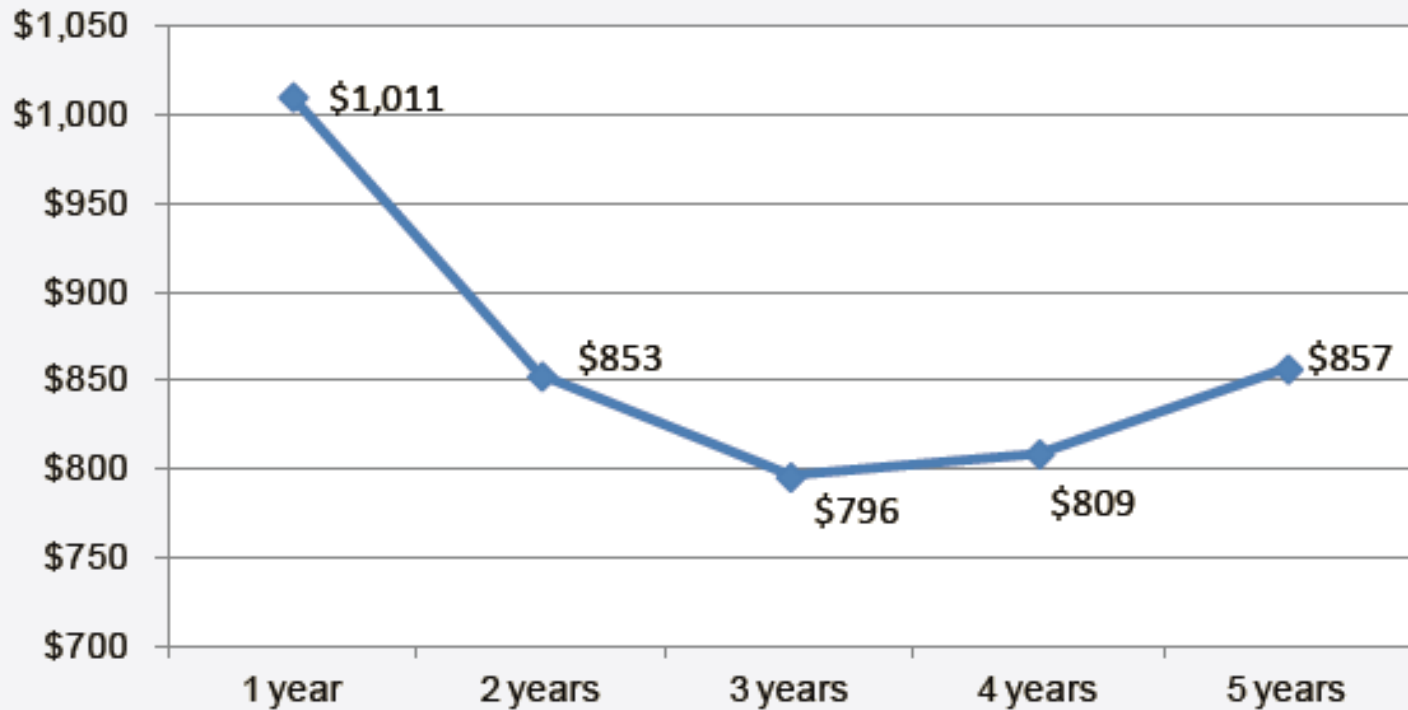


- VDI status update and issues (for scale, not isolated cases):
- Still a small installed base (3% of installed desktops in 2011; Never to be larger than 10-12% or 15-18%--estimates by Gartner and IDC, respectively)
- Main challenges cited:
 - 1. Application incompatibilities
 - 2. End-user experience problems
 - 3. Back-end infrastructure costs (between 1.3x-1.5x the cost of regular PCs)
 - 4. ISV non-support (including specialized/legacy interface HW)
- Additional issues
 - Homogeneity, richer clients needed, mobile devices, 'personal space' (eg, XD5.5 'Personal vDisk')
 - Shared versus individual images: the IOPS issue
 - More interaction with the hardware *again(!)*--graphics acceleration, ports, virtualization
 - Printing over the WAN



TCO Sample (1): Intel Desktops

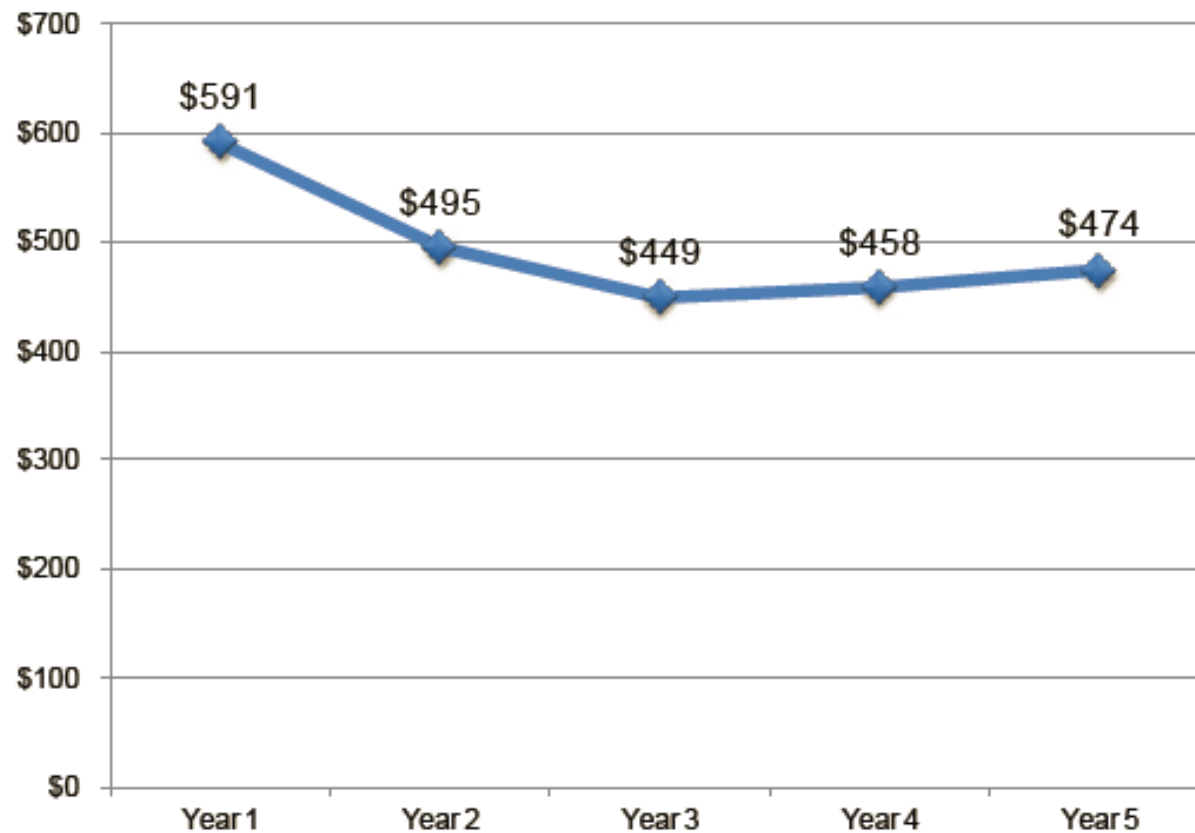
IT desktop annual TCO by refresh rate





TCO Sample (2): Intel Laptops

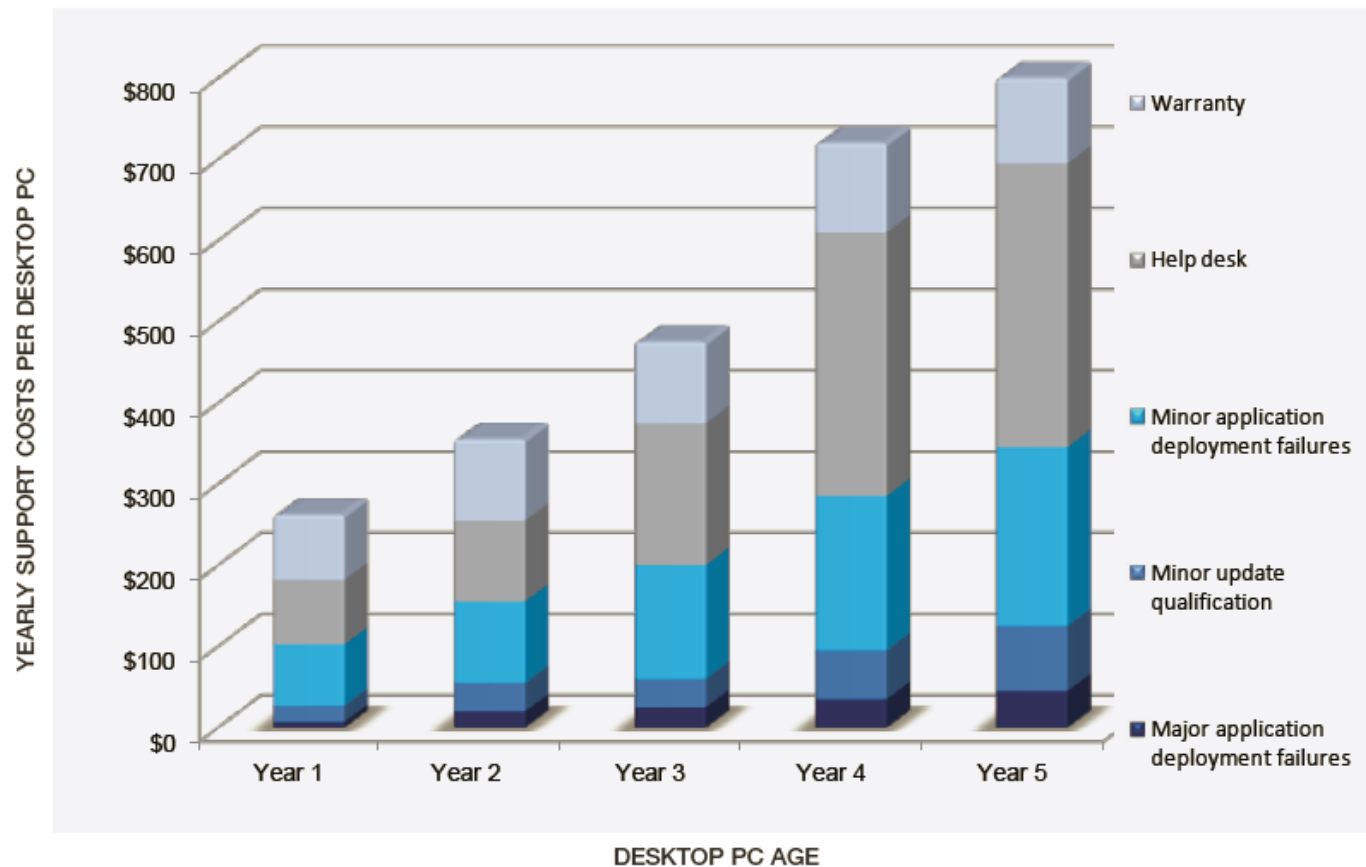
IT PC annual TCO by refresh rate
[Equivalent annual costs in USD]





TCO Sample (3): Management Costs

Yearly support costs for a single configuration





TCO Sample (4): Cash Flow Model (2005)

	Year 1	Year 2	Year 3	Year 4	Year 5
One-time costs					
Hardware	\$600	\$ -	\$ -	\$ -	\$ -
Deployment	\$ 80	\$ -	\$ -	\$ -	\$ -
User training	\$ 50	\$ -	\$ -	\$ -	\$ -
System build	\$ 75	\$ -	\$ -	\$ -	\$ -
Warranty cost	\$130	\$ -	\$ -	\$ -	\$ -
Ongoing costs					
Help desk support	\$101	\$127	\$165	\$204	\$247
On-site support	\$ 75	\$114	\$152	\$210	\$272
Software upgrades	\$ 50	\$ 86	\$120	\$140	\$116
Patch deployment	\$114	\$131	\$153	\$191	\$228
Ongoing warranty costs	\$ -	\$ -	\$ -	\$160	\$304
Yearly costs	\$1,275	\$458	\$590	\$905	\$1,167
Total costs	\$1,275	\$867	\$774	\$807	\$879
Cost of capital	6%				
NPV calculation					
Outflows	-\$1,275	-\$478	-\$590	-\$905	-\$1,247
	-\$1,275	-\$478	-\$588		
NPV 5 year own	-\$3,755	[Residual value = \$0, disposal/disk wipe = \$80]			
NPV 3 year own	-\$2,104	[Residual value = \$42, disposal/disk wipe = \$40]			



EUC Refresh Process Issues

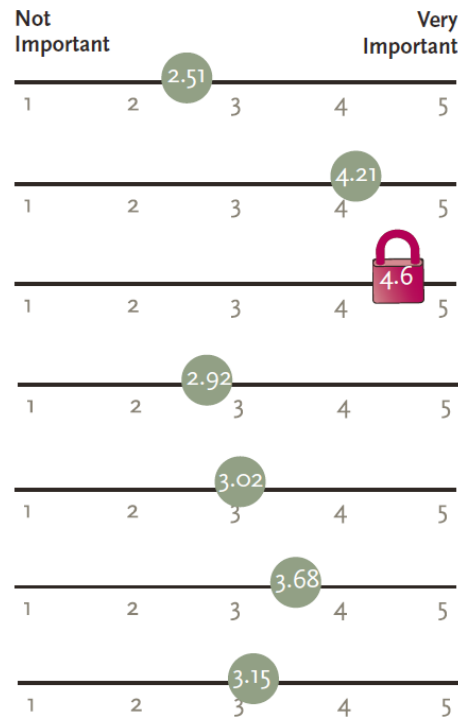


- Current wisdom: do in waves or blocks, not monthly
- Most of the up-front planning has to deal with setting up the back-end processes (i.e., user work-space movement, equipment disposition, compliance reporting)
- Publish standards, but offer a simple choice if possible
- Try to exploit Stable Image Platform SIPP tech where possible
- Do 'publicity pilots' with key opinion influencers (where possible/needed)
- Watch out for graphics processing power issues (in dense-media situations)
- Compliance headroom (reserve a core or two for this)



EUC Refresh Process Issues

- ITAM/ITAD top goals now
- Software recovery
- Management discipline
- Audit and compliance
- Data security at EOL
- Get lifecycle partners into the process
- (Someday get to SvcMgt...)



Remarketing the disposed assets

Compliance with external environmental laws and best practices

Protecting data security

Redeploying these assets

Donating phased-out IT equipment

Compliance with our company's own (internal) green IT strategy

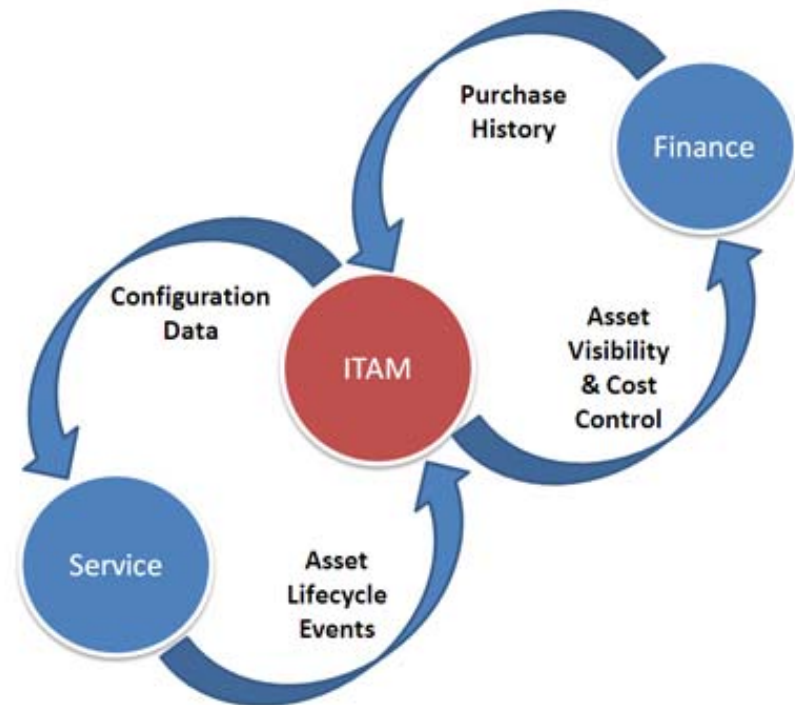
One single disposal process company-wide/internationally

(Source: Converge 2010 Survey)



ITAM/SM

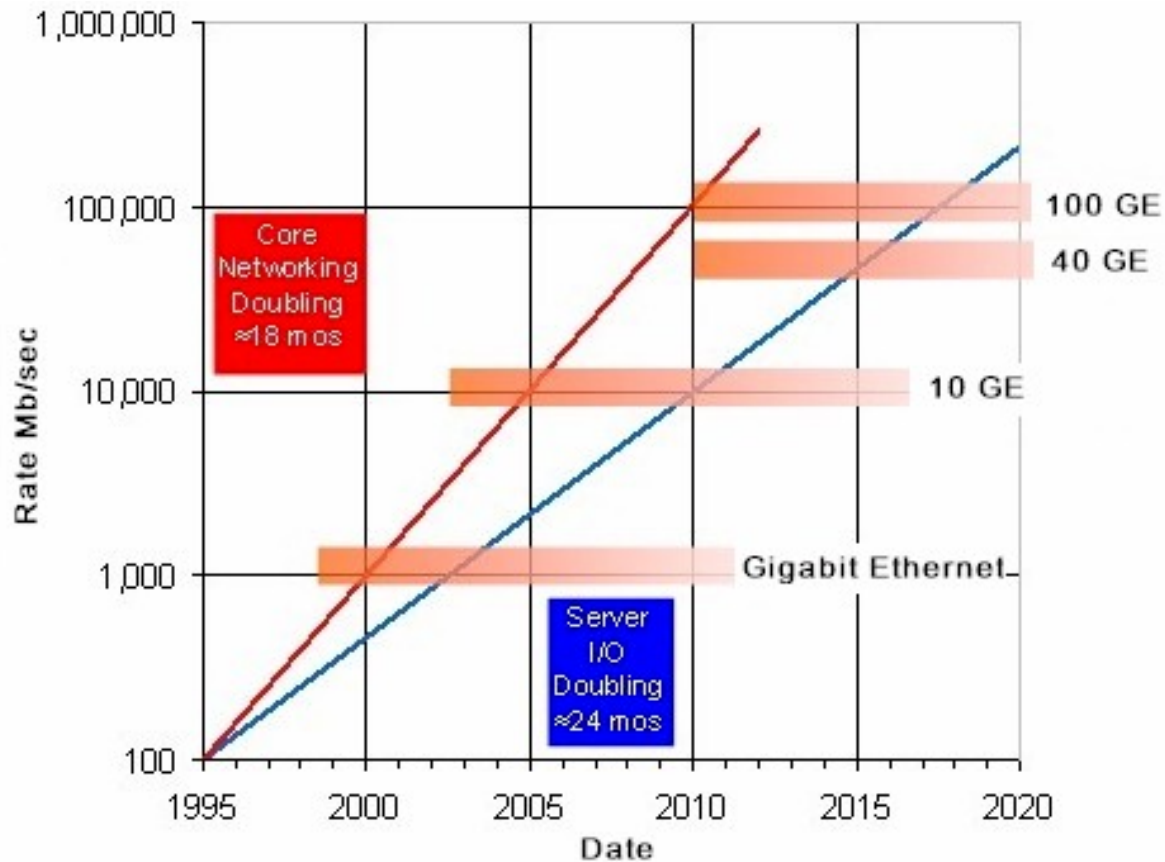
- ITAM/ITAD directions
- Trying to get all the assets into the process...
- Trying to tie Service Management and Asset Management together





Networks: Trends

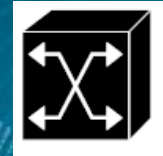
■ Network gear - wired



(Source: The Register, Oct 10th 2011)



Networks: Trends



- Low adoption: FCoE, network flattening, VEPA (Virtual Ethernet Port Aggregator)

- Fast adoption: 10/40 TOR/EOR, faster switching, 11n

- New WLAN options -both in 2012
 - IEEE 802.11ac (5GHz range; single link at 500Mbps--up to x8), extensions to 11n
 - WiGig (7Gbps, room-range)

- Long-reach acceleration technologies (e.g., Netscaler, Riverbed)

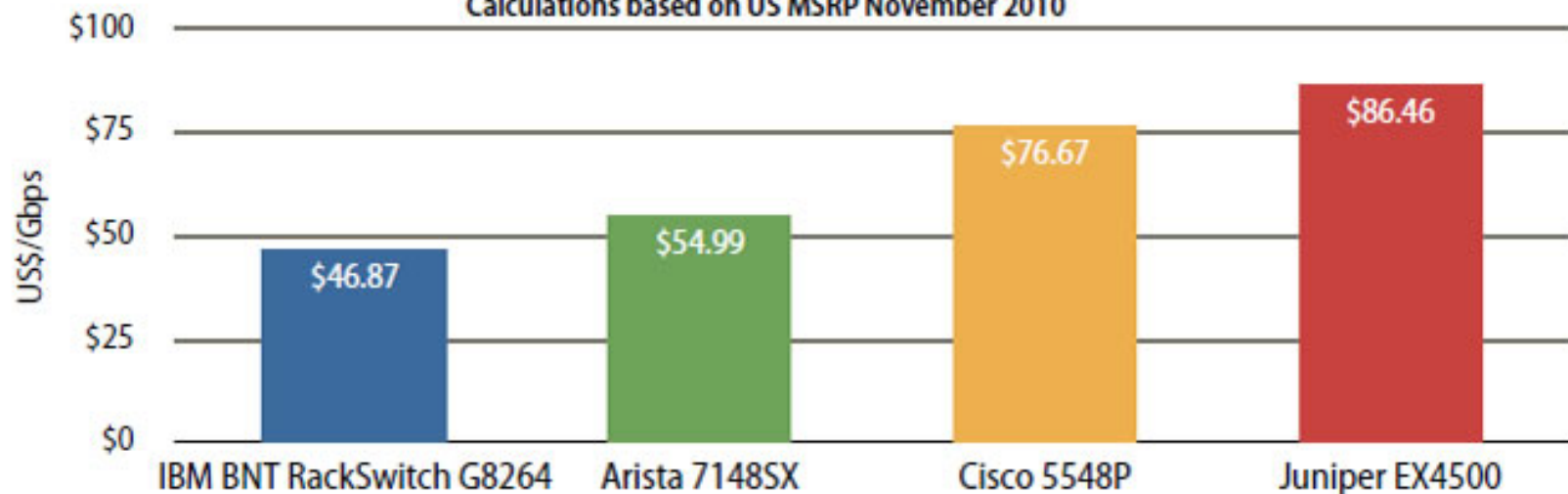


Networks: Economics

Top-of-Rack 10GbE Switch Price/Performance Comparison

Lower numbers are better

Calculations based on US MSRP November 2010



Note: Switch pricing obtained from public sources in November, 2010. Price calculated based on IBM BNT G8264 48x10GbE and 4x40GbE Switch, Arista 48Port 7148SX 10GbE Switch, Cisco Nexus 5548P 1RU Chassis 2 PS 2 Fan 32 Fxd 10GE with Nexus 5500 Module 16P 10GE, and Juniper EX4500 40-Port 10G SFP+ Switch with two 4-Port 10G SFP+ Uplinks and one 1200W AC power supply. Performance based on theoretical max throughput for all switches evaluated.

Source: Tolly, February 2011

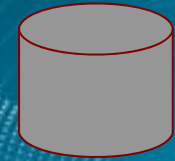


Networks: Refresh Process Issues

- The move to 10GbE and 40GbE -- the overlap in the closets and port mix
- PoE devices, PoEP(30w) and UPoE(60w)
- Re-tiering
- In-store dense-media wireless:
 - IEEE 802.11ac (5GHz range; single link at 500Mbps--up to x8), extensions to 11n
 - WiGig (7Gbps, room-range)
- Vendor 'excitement' windows... End of Marketing versus End of Support
- Support for NFC devices
- Social media input feeds (if not kept in the respective clouds)?
- Overall capacity planning



Storage: Trends



- 16GFC - 19% of Brocade's switch revenues last quarter
- Tuning for application performance
- Limited use of Virtualization of other vendors' equipment
- Limited use of VMware API's (by internal coders)
- Vendor moves to modular design and commodity components
- Need for unified storage? (Enterprises still at 70/30% SAN/NAS)



Storage: Economics

- HDD/SDD prices (generally!) decline, but SAN composite costs do not
- Tiering precludes \$/GB metrics now
- Software is everything--hardware moving toward commodity components (e.g. EMC Vmax, IBM XIV)



Storage: Refresh Considerations

- Maintenance contracts, extension costs, virtualization of older gear
- SSD drives versus 'distributed cache' models
- Social media data feeds (volume, access, cloud)?



Process & Policy Considerations (1)

- Requires centralized processes, designed around two focal points:
 - Population/Usage subsets (e.g., by geography, LOB, worker role, business priority)
 - Ease-of-deployment (e.g., plug-and-play, find-and-replace, automation, disruption, location delivery costs)
- Make it easy to refresh to the standards, more justification-intensive to do otherwise
- Use standard R&R tactics to make heroes: awards, budget perks, express line service, etc.
- You must create some version of 'profit sharing' for those who help hit budget and savings targets



Process & Policy Considerations (2)

- Politically, you may need to implement 'franchises' in some LOB's at first.
- Sell, sell, sell... budget for this very real marketing cost...
- If you are moving to, or expanding an eProcurement system (e.g. Ariba, Basware), work the vendor to 'pilot' on your actual data...
- Make sure you can extract the data for 'competitive vendor uses', when needed
- Audit controls for external feeds must be strong, but interface technologies should be simple (do not try to 'boil the ocean' on this--the I/F will change almost as fast as technology does now).
- IT and Finance: There needs to be a clear 'account review' periodically for this, to document how the savings were re-invested (if harvested) and/or how the capacity was leveraged for business results (to the extent it can be estimated)



Process & Policy Considerations (3)

- **Lease-versus-Buy Pre-Analysis Overrides:**
- Are there debt covenants which restrict us from borrowing to buy these assets?
- How would ownership of these assets affect our critical financial ratios?
- Do I need to transform this asset buy from a CAPEX spike to an OPEX line?
- Are there other investments for this amount of money which would generate ROE-level results?
- Do I need to use this IT refresh to implement large scale process improvements or standardization?
- Do I need the flexibility to vary how long I keep an IT asset (and thereby vary how much I pay for it)?
- Do I need to decrease my risk of data leakage problems for end-of-life assets?
- Do I need to decrease my risk of book-loss due to early obsolescence?
- Do I need to decrease my risk of unforeseen 'forced' equipment replacements?
- Do I need to decrease my risk of downtime for some group of systems?



Supplier/Vendor management issues (1)

- **Push our vendors to:**
- Move their technology base to x86, ARM, industry standard components
- Indemnify us of Intellectual Property violations (no 'pass through')
- Support our virtualization platforms (especially our internal apps!)
- Produce a support roadmap for 4-5 years (e.g., platforms, OS, substrate firmware)
- Contractual commitments to measurable improvements in priceperf, energy, migration, manageability, and reliability
- Footprint 'families' (e.g. Stable Image Platform Program, SIPP)
- Put a full IPv6 stack in every device (IT or not)
- Provide clear documentation of data privacy for OUR data on THEIR remote management and/or SCM software servers!



Supplier/Vendor management issues (2)

- Require documentation of DR for Supply Chain for components (disk, mem)
- Any Capacity-upgrade-on-demand must be priced at pre-negotiated price decay or market-indexed at point of usage (not earlier!)
- Keep pushing for un-bundling of pricing, even in integrated stacks



Architectural Temptations & Trade-offs

- **Advantages:** performance, simplification, longevity, goodness-of-fit
- **Disadvantages:** fault isolation, skill sets, vendor lock-in, localization, cost
- Various "Convergence" plays (FCoE, integrated stacks/appliances)
- Network fabrics and VEPA-type offloading
- Compression technologies, and backup/recovery planning
- Tightly-coupled disk and compute resources (e.g., PCIe-SSD, "Service Modules")
- Wide-scale Desktop virtualization (versus legacy support)



Possible Areas of Impact to XYZ inc

- Social media data BI clouds: Costs, data location, legal futures
- Media centers in retail locations
- Augmented reality usage (e.g., "digital fitting rooms")
- Cloud usage in Asia - interconnect options with supply chain and/or outlets?



General Strategy Principles: Revisited

■ Architectural:

- De-couple elements (subject to performance and reliability constraints)
- Isolate easier-to-move apps/systems from others (virtualize/port where feasible)
- Built auto-provisioning and load-balancing software capabilities toward plug-find-and-play
- Create risk-probability scenarios for capacity forecasts (high, low, EV) and migration costs

■ Financial:

- Move rapidly changing IT capex to quarterly opex (bunched around decision points)
- Create budget trend expectations by volatility-class

■ ITAM process and policy

- De-couple as much as possible in the sourcing process (e.g., hardware, software, financing, labor)
- Centralize and pre-empt major tech choices (stay ahead of the curve)
- Negotiate vendor commitments to specific improvements in capacity, manageability, migration assistance



MACQUARIE

Thank You

