IBM Software Group

Balanced Total Cost of Ownership With an Effective IT Optimization

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Abstract

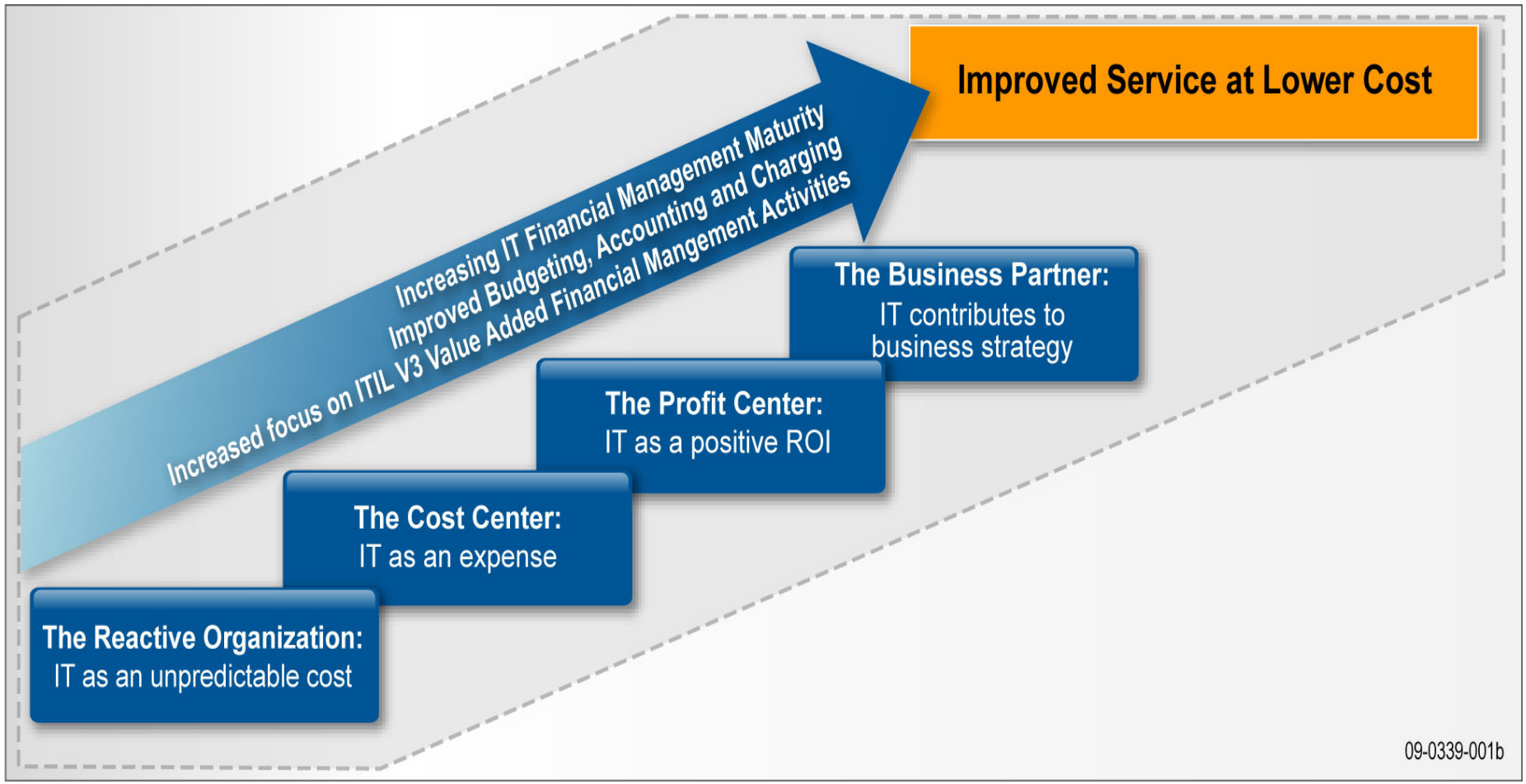
- With the tightening and continued scrutinizing of IT budgets and expenses, the growth of alternative computing models like cloud computing and virtualized infrastructures, and acknowledged business criticalness of IT, making the right decisions about how to communicate, optimize, and invest IT dollars and resources is critical. This session will:
  - **Overview growing complex computing models**
  - **Discuss the elements of IT Total Cost Ownership (TCO)**
  - **Illustrate examples of how improperly considering TCO can lead to some very bad conclusions**
- Discuss techniques and provide approaches for properly collecting and consolidating TCO elements that help lead to a more optimized IT service platform

Agenda

- **Top IT Realizations and Evolving Computing Models**
- **The Elements of and the Growing Importance of Total Cost of Ownership (TCO)**
- **Ignoring TCO Can Lead to Bad Consequences**
- **So What do You Need to do**

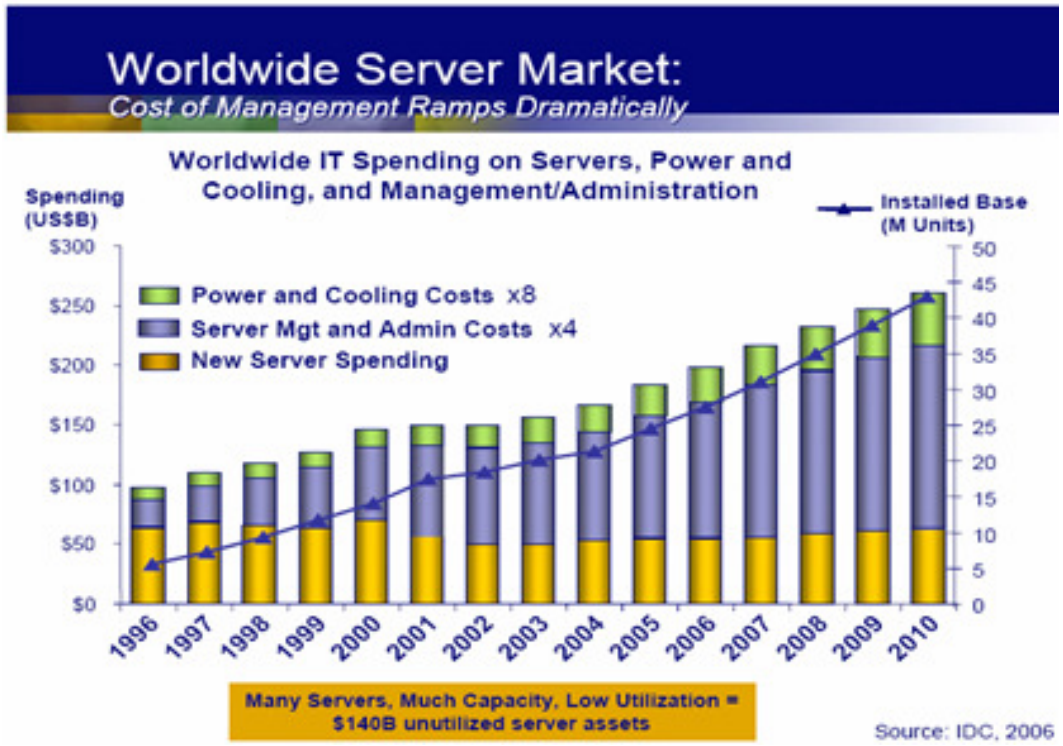
The IT Management Imperatives

Evolving to Business Partner



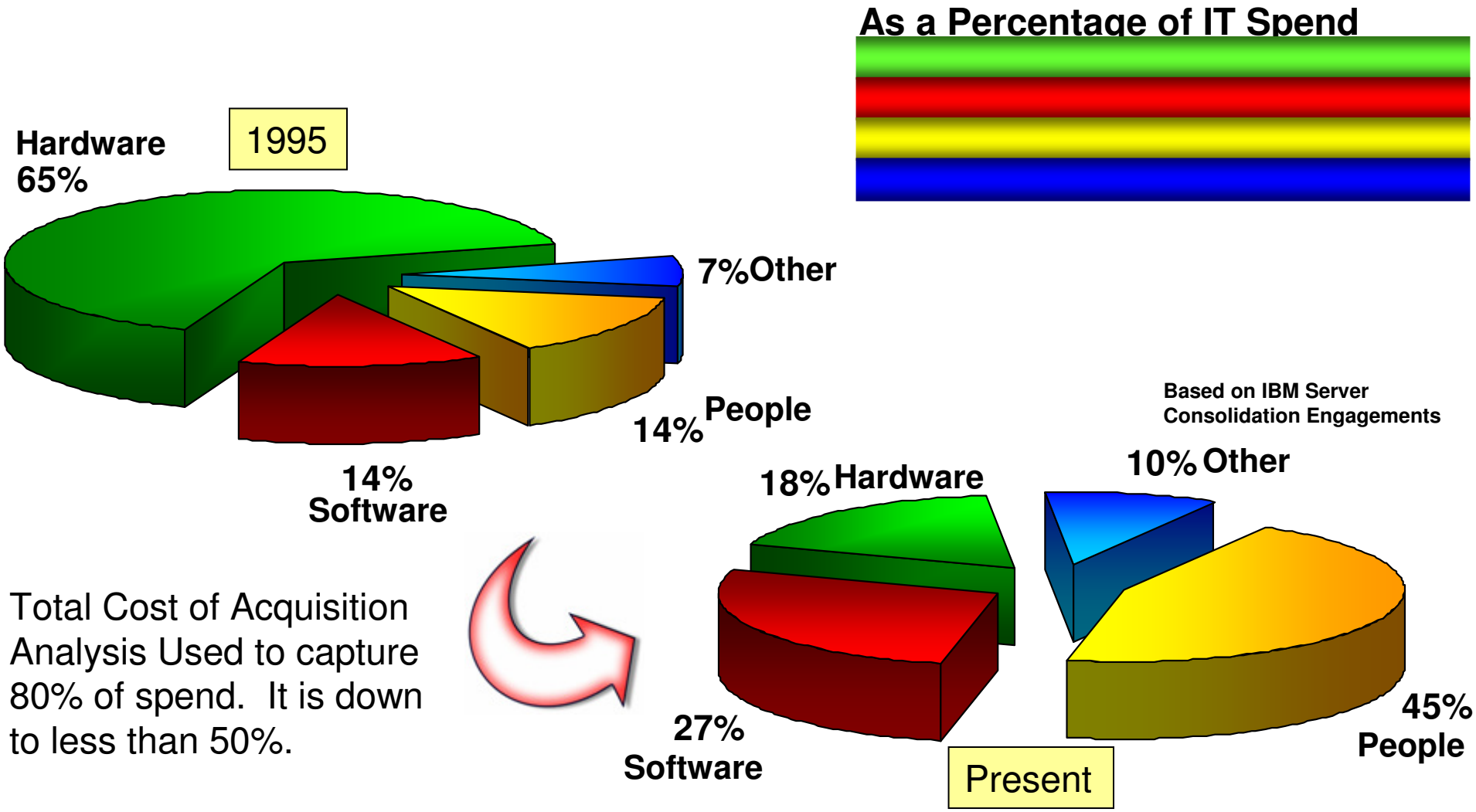
* Excerpted from “The Business of IT”

The Changing Dynamics of Costs



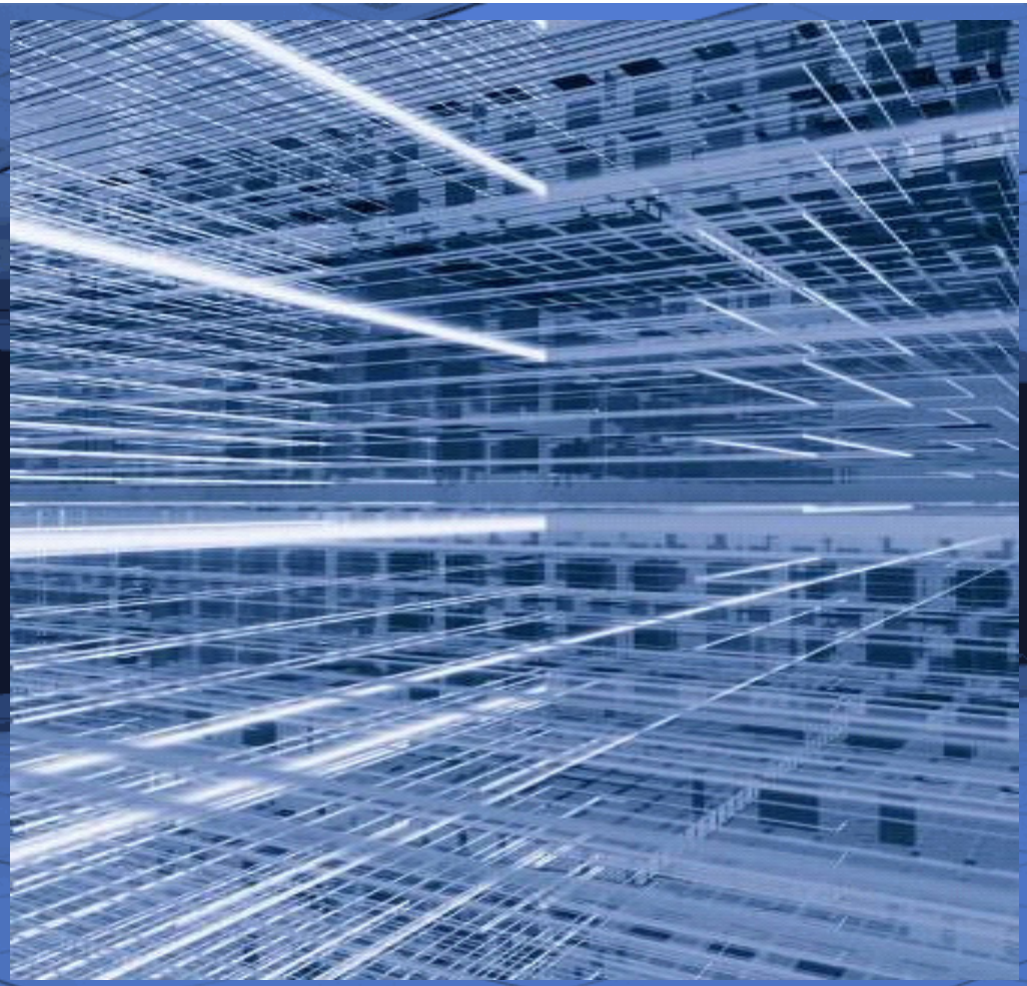
- **IT is growing into one of the top five cost items in corporate America**
- **IT costs are rising faster than corporate profits are growing**
- **IT's value to the organization also continues to grow and moving outside the datacenter**
- **Hardware costs are stabilizing, but facilities, power, and people costs aren't**

The Cost Structure of the Typical Corporate IT Infrastructure Has Shifted Slowly but Dramatically Over the Years



Total Cost of Acquisition Analysis Used to capture 80% of spend. It is down to less than 50%.

Energy Use And Cost Are Bringing Data Centers To Tipping Point



1.5x

Explosion of information driving 54% growth in storage shipments every year.

70¢ per $1

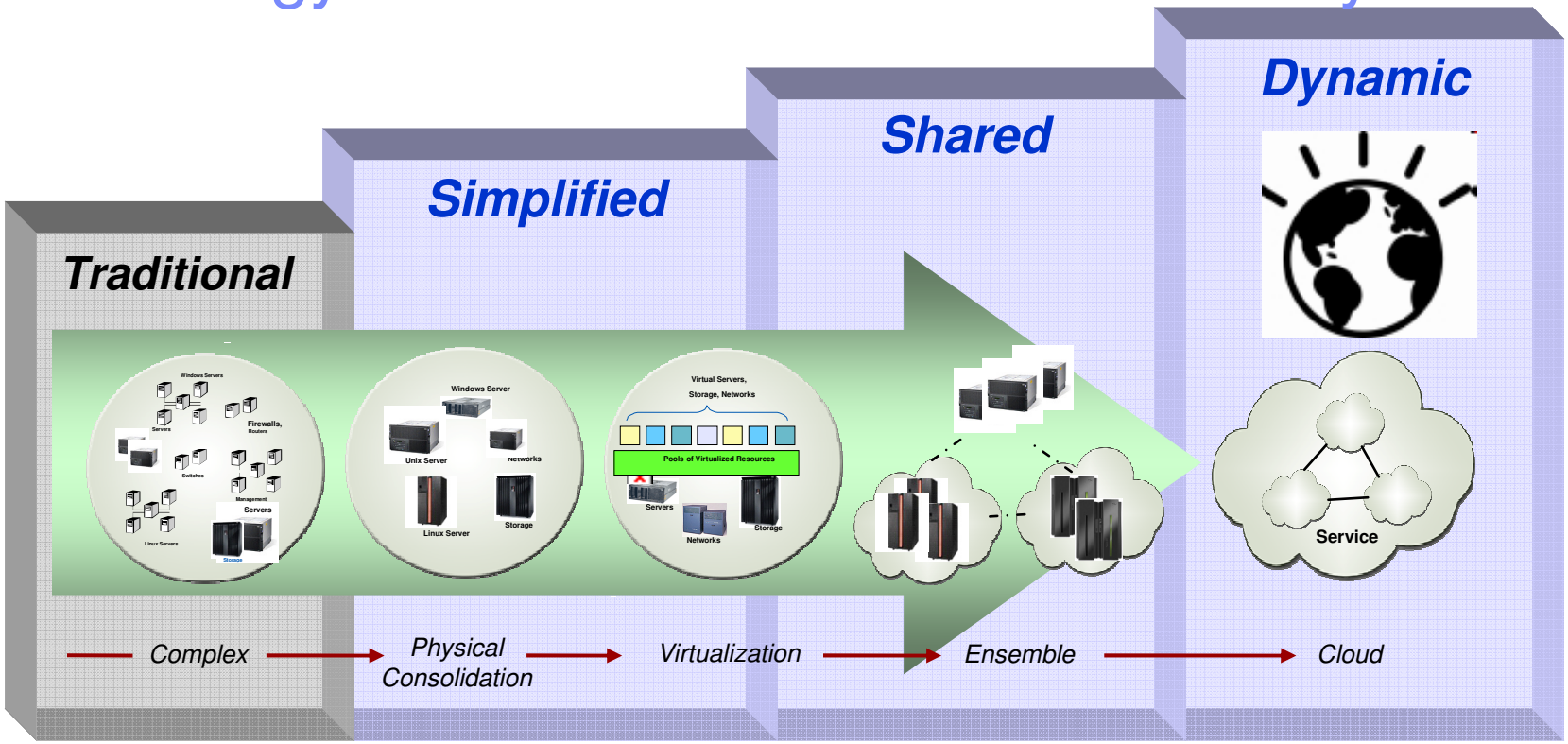
70% on average is spent on maintaining current IT infrastructures versus adding new capabilities.

85% idle

In distributed computing environments, up to 85% of computing capacity sits idle.

1W of application computing requires 27W of Data Center power!

Technology Drivers in the Data Center today



- ✓ **Drive IT efficiency**
- ✓ **Consolidate and simplify the view** of IT operations and physical resources

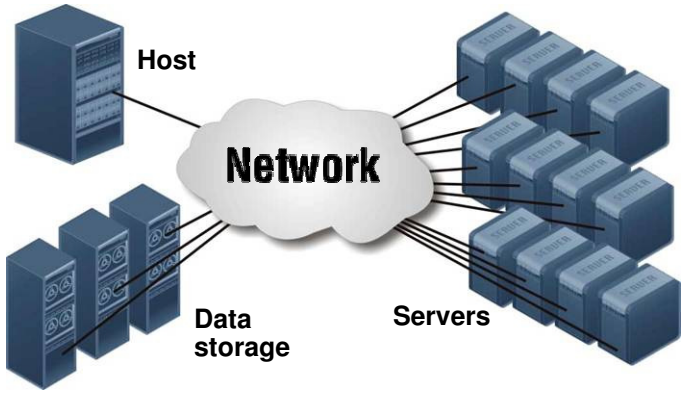
- ✓ **Rapidly deploy**
- ✓ **Build ensembles of services** by decoupling services from the IT infrastructure, and standardizing processes

- ✓ **Respond quickly**
- ✓ **Shift from IT operations (break/fix) to IT business analysts** by breaking down silos and organizing around service delivery and shared environments

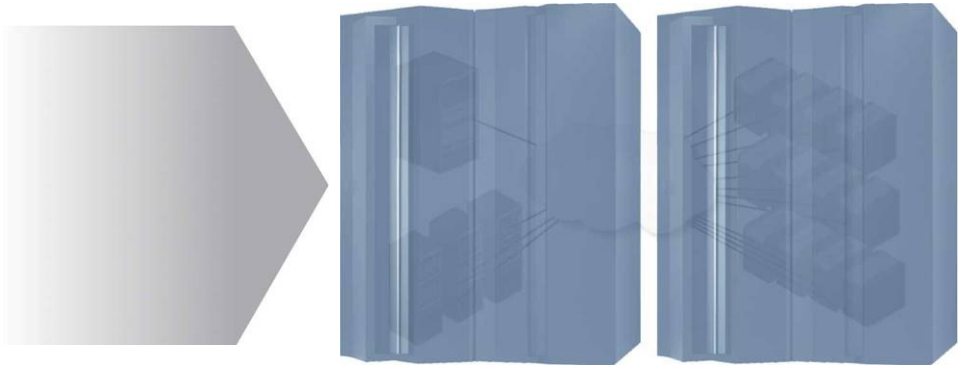
Getting Harder to Truly Know IT benefits vs costs

Virtualization: Significant advantages / new challenges

From Dedicated Systems, Storage, Applications . . .



. . . to Shared Virtualized Environments and SOA



Advantage:

- More simple to account for with a spreadsheet – one machine, one workload, and one cost center

Challenges – Resources are highly underutilized which means:

- Paying more for hardware and software
- Unnecessarily high energy costs
- Using more real estate than required
- More assets that are harder to track, manage, and maintain
- Inflexible to varying peak in demand

Advantages:

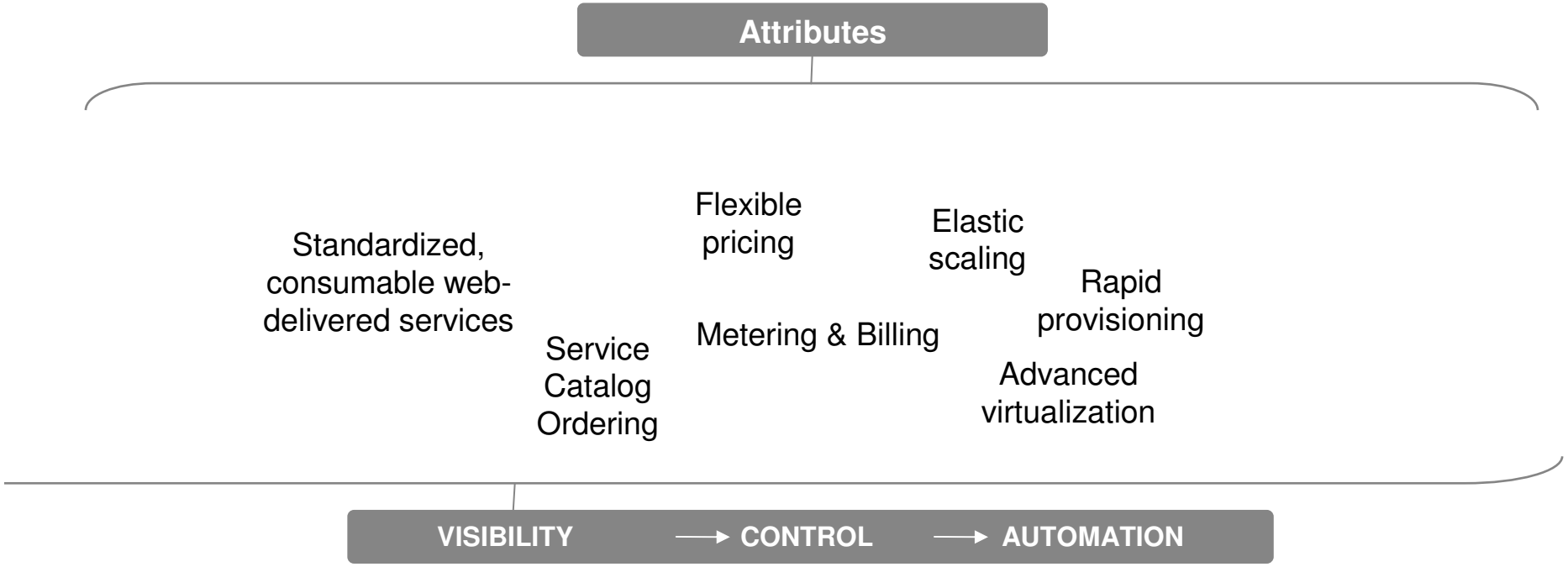
- Better utilization of existing resources so future investments can be deferred
- More cost effective – hardware, software, energy, staff, and floor space
- More responsive to differing peak loads

Challenges:

- How to allocate costs
- Prove to the users they're getting what they deserve

Cloud Computing …

"Cloud" is an emerging consumption and delivery model for many IT-based services, in which the user sees only the service, and has no need to know anything about the technology or implementation



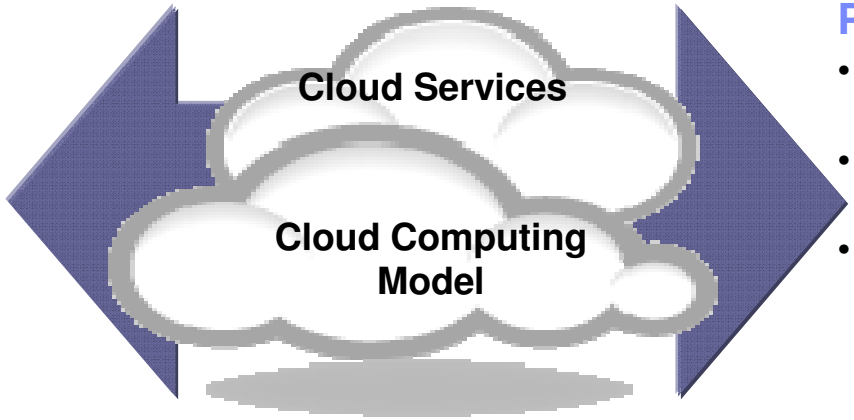
....service oriented and service managed

Cloud Computing …

IAAS | PAAS | Flexible Delivery Model | SAAS | MAAS

Public …

- Service provider owned and managed.
- Access by subscription.
- Delivers select set of standardized business process, application and/or infrastructure services on a flexible price per use basis.



Private …

- Client owned and managed.
- Access limited to client and its partner network.
- Drives efficiency, standardization and best practices while retaining greater customization and control

….Standardization, capital preservation, flexibility and time to deploy

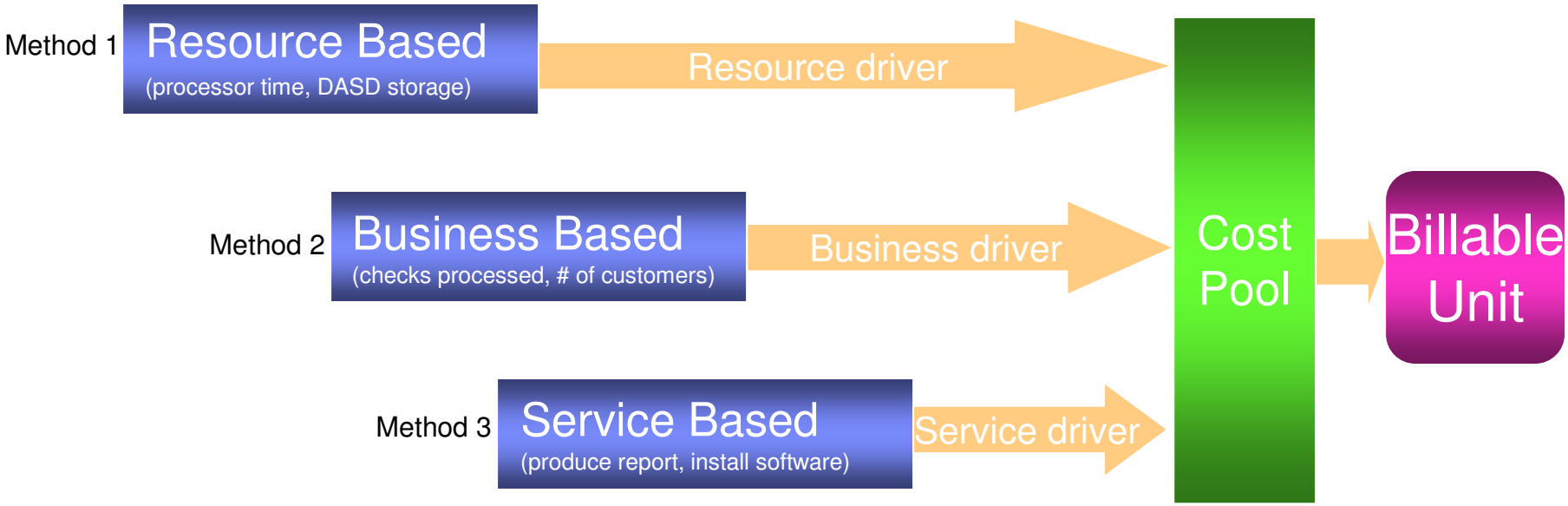
…. Customization, efficiency, availability, resiliency, security and privacy

ORGANIZATION | CULTURE | GOVERNANCE

Driving the necessity of cooperative performance/capacity management and cost accounting!!!

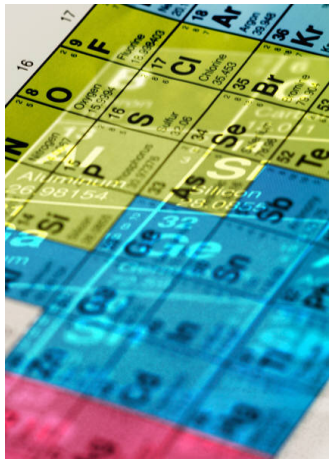
….service sourcing and service value

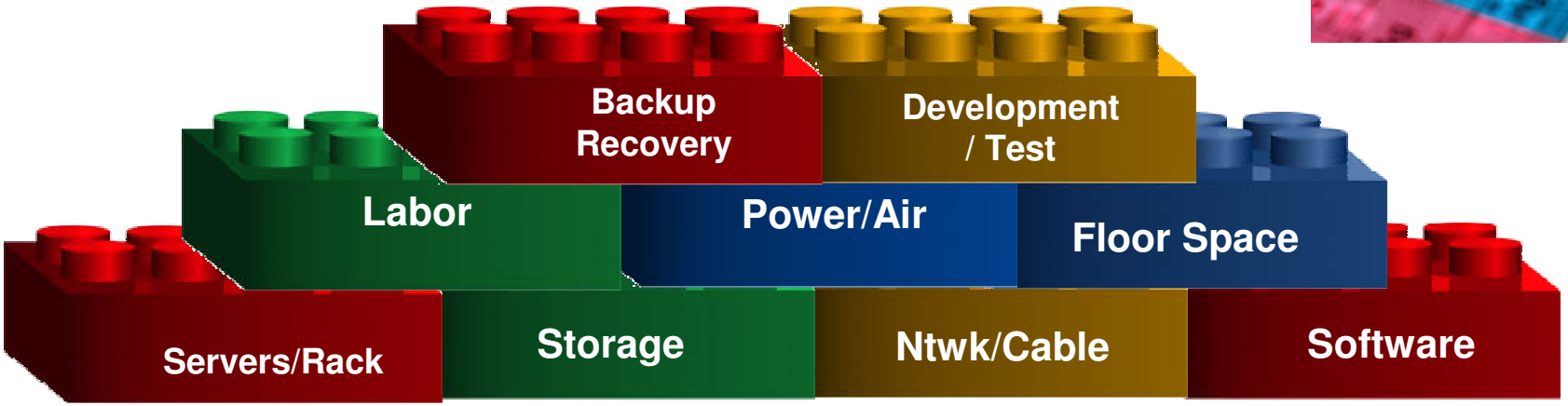
Evolution to a Service Catalog and Services Oriented Delivery Model



- **Resources** are the people and IT equipment, hardware and software.
- **Business** is the business units or volumes that result in resources being used and activities being performed.
- **Services** are all of the things done to carry out work related to the use and maintenance of IT resources and processes.
- **Cost Pools** are the components selected to quantify the cost and to account for costs.
- **Billable Unit** is the measured unit that is used to calculate the charge for either the resource, business item or activity being charged.

Total Cost of Ownership Considerations

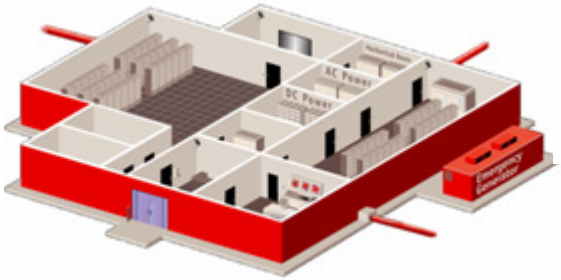




- Looking at each of these in a vacuum can lead to poor decision-making and investments
- Need a balanced view of today's total costs to better future investments

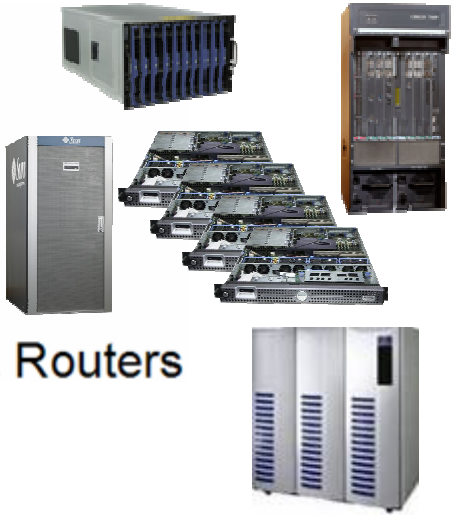
Performance Elements and Costs We Need to Track, Model, and Compare

- Facilities
  - Floorspace
  - Power
  - Cooling

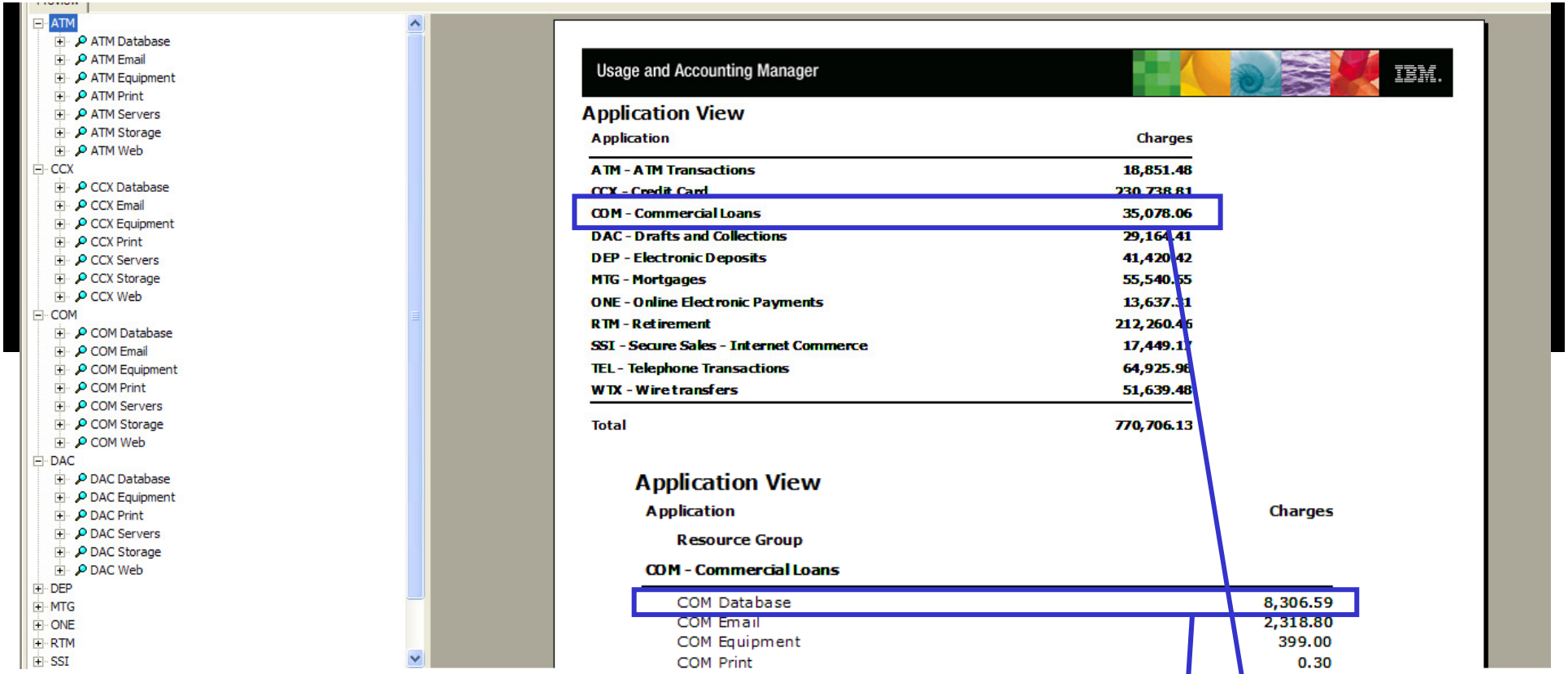


- Software
  - Licenses
  - Support & Subscription

- Hardware
  - Servers
  - Storage
  - Networks
  - Switches & Routers



- Administration
  - Data Centers
  - Servers
  - Software
  - Applications
  - Data

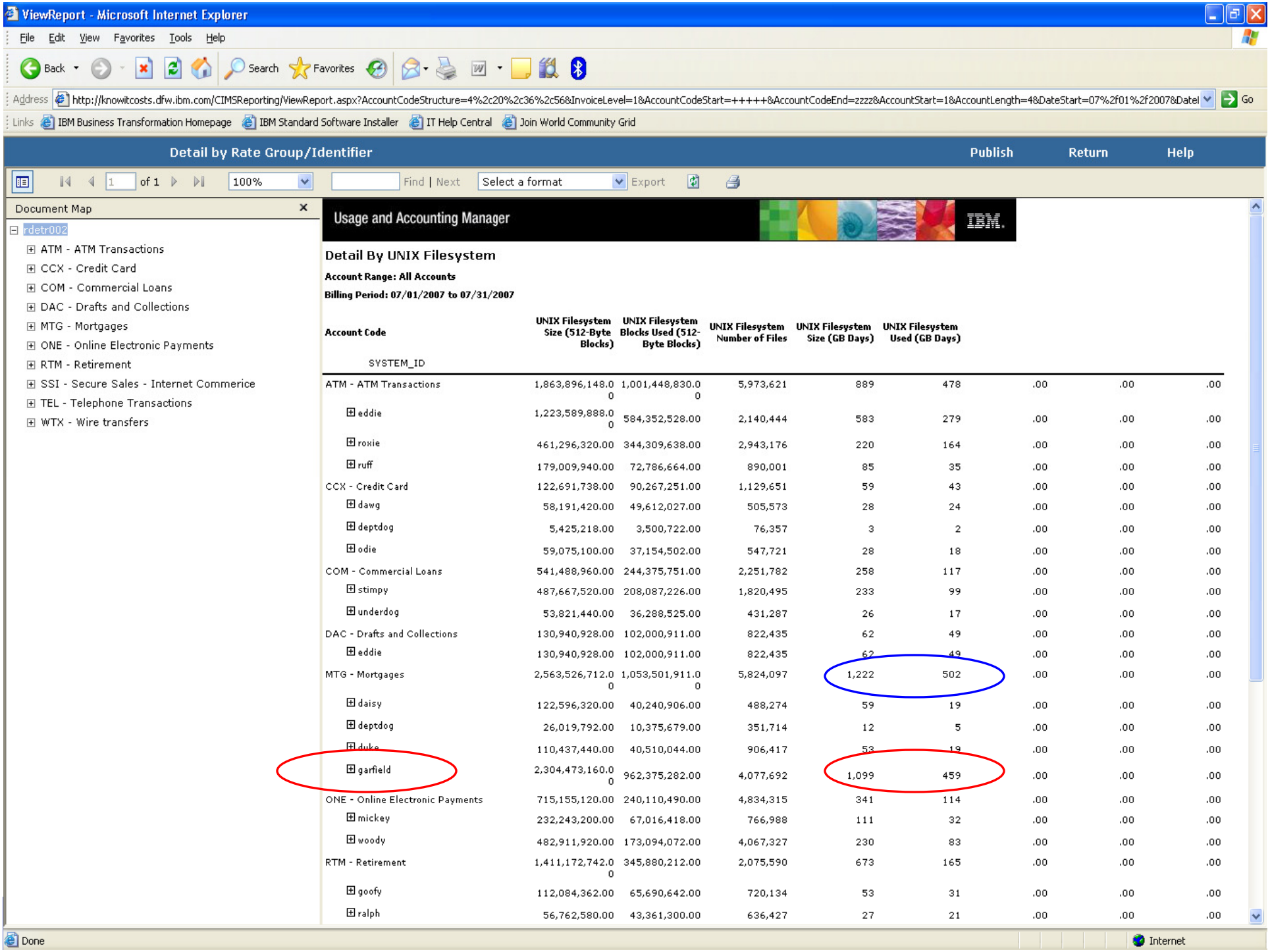


Usage and Accounting Manager

Detail VMware

Account Range: All Accounts
Date Range: 5/1/2006 to 5/31/2006

Account Code	VMware CPU Usage	VMware CPU Usage Guaranteed	VMware Disk Kilobytes Read	VMware Disk Kilobytes Written	VMware Memory Kilobytes Active	VMware Memory Kilobytes Granted	VMware Network Kilobytes Read	VMware Network Kilobytes Transferred
ATM - ATM Transactions	60,940	309,648	44,186	22,740	61,567,961	538,701,536	15,488	66,219
CCX - Credit Card	32,940	316,807	75,743	25,939	47,804,496	323,615,668	59,813	567,798
COM - Commercial Loans	310,787	1,070,378	74,949	76,991	339,788,854	1,691,339,912	22,417	120,073
DAC - Drafts and Collections	16,576	123,328	7,839	11,699	29,095,887	215,481,272	1,723	8,780
DEP - Electronic Deposits	58,949	279,554	14,628	11,614	37,321,207	251,392,808	3,146	23,283
MTG - Mortgages	220,475	795,237	86,667	63,917	185,942,473	1,938,282,868	21,763	105,006
ONE - Online Electronic Payments	17,074	154,123	42,371	17,534	14,120,502	161,267,193	11,196	2,123
RTM - Retirement	444,417	515,898	134,759	63,255	122,419,670	1,042,730,216	14,588	155,275
SSI - Secure Sales - Internet Commerce	154,264	959,894	147,728	29,185	127,079,399	1,833,819,572	133,883	136,530
TEL - Telephone Transactions	50,134	314,557	95,565	44,785	50,117,052	537,463,572	39,072	113,553
Run Total	**1,366,556**	**4,839,424**	**724,435**	**367,659**	**1,015,257,501**	**8,534,094,617**	**323,089**	**1,298,640**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Back Search Favorites
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Links IBM Business Transformation Homepage IBM Standard Software Installer IT Help Central Join World Community Grid
Detail by Rate Group/Identifier
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ATM - ATM Transactions
CCX - Credit Card
COM - Commercial Loans
DAC - Drafts and Collections
MTG - Mortgages
ONE - Online Electronic Payments
RTM - Retirement
SSI - Secure Sales - Internet Commerice
TEL - Telephone Transactions
WTX - Wire transfers
Usage and Accounting Manager
IBM.
Detail By UNIX Filesystem
Account Range: All Accounts
Billing Period: 07/01/2007 to 07/31/2007
Account Code
SYSTEM_ID
UNIX Filesystem Size (512-Byte Blocks)
UNIX Filesystem Blocks Used (512-Byte Blocks)
UNIX Filesystem Number of Files
UNIX Filesystem Size (GB Days)
UNIX Filesystem Used (GB Days)
ATM - ATM Transactions 1,863,896,148.00 1,001,448,830.00 5,973,621 889 478 .00 .00 .00
eddie 1,223,589,888.00 584,352,528.00 2,140,444 583 279 .00 .00 .00
roxie 461,296,320.00 344,309,638.00 2,943,176 220 164 .00 .00 .00
ruff 179,009,940.00 72,786,664.00 890,001 85 35 .00 .00 .00
CCX - Credit Card 122,691,738.00 90,267,251.00 1,129,651 59 43 .00 .00 .00
dawg 58,191,420.00 49,612,027.00 505,573 28 24 .00 .00 .00
deptdog 5,425,218.00 3,500,722.00 76,357 3 2 .00 .00 .00
odie 59,075,100.00 37,154,502.00 547,721 28 18 .00 .00 .00
COM - Commercial Loans 541,488,960.00 244,375,751.00 2,251,782 258 117 .00 .00 .00
stimpy 487,667,520.00 208,087,226.00 1,820,495 233 99 .00 .00 .00
underdog 53,821,440.00 36,288,525.00 431,287 26 17 .00 .00 .00
DAC - Drafts and Collections 130,940,928.00 102,000,911.00 822,435 62 49 .00 .00 .00
eddie 130,940,928.00 102,000,911.00 822,435 62 49 .00 .00 .00
MTG - Mortgages 2,563,526,712.00 1,053,501,911.00 5,824,097 1,222 502 .00 .00 .00
daisy 122,596,320.00 40,240,906.00 488,274 59 19 .00 .00 .00
deptdog 26,019,792.00 10,375,679.00 351,714 12 5 .00 .00 .00
duke 110,437,440.00 40,510,044.00 906,417 53 19 .00 .00 .00
garfield 2,304,473,160.00 962,375,282.00 4,077,692 1,099 459 .00 .00 .00
ONE - Online Electronic Payments 715,155,120.00 240,110,490.00 4,834,315 341 114 .00 .00 .00
mickey 232,243,200.00 67,016,418.00 766,988 111 32 .00 .00 .00
woody 482,911,920.00 173,094,072.00 4,067,327 230 83 .00 .00 .00
RTM - Retirement 1,411,172,742.00 345,880,212.00 2,075,590 673 165 .00 .00 .00
goofy 112,084,362.00 65,690,642.00 720,134 53 31 .00 .00 .00
ralph 56,762,580.00 43,361,300.00 636,427 27 21 .00 .00 .00
Done
Internet

The Wrong Decisions Are Made Based on Total Cost of Acquisition Versus Total Cost of Ownership

- Best practice allocation is to use actual distributed and mainframe costs
- In this example, the mainframe allocation decreased from 71% to 40%

	Typical Allocation – Management Estimates				Best Practice Allocation – Actual Costs			
	Distributed	%	MF	%	Distributed	%	MF	%
Power Cost	$0	0	$15,084	100	$11,917	79	$3,167	21
Labor Cost	$0	0	$350,000	100	$210,000	60	$140,000	40
Floor space	$0	0	$11,620	100	$6,300	54	$5,320	46
Software OTC depreciation	$120,240	60	$102,472	40	$216,194	97	$6518	3
Software S&S and MLC	$168,783	50	$168,783	50	$181,242	54	$156,325	46
Hardware OTC depreciation	$103,691	25	$311,074	75	$184,435	44	$230,330	56
Hardware Maintenance	$20,276	25	$60,829	75	$37,151	46	$43,953	54
Network	$0	0	$4,758	100	$ 4,758	100	$0	0
Total	$412,990	29	$1,024,620	71	$851,997	60	$585,613	40

Sample monthly allocation

Total $1,437,610

Total $1,437,610

Need to more closely join IT production workloads and new workloads to investment alternatives evaluations

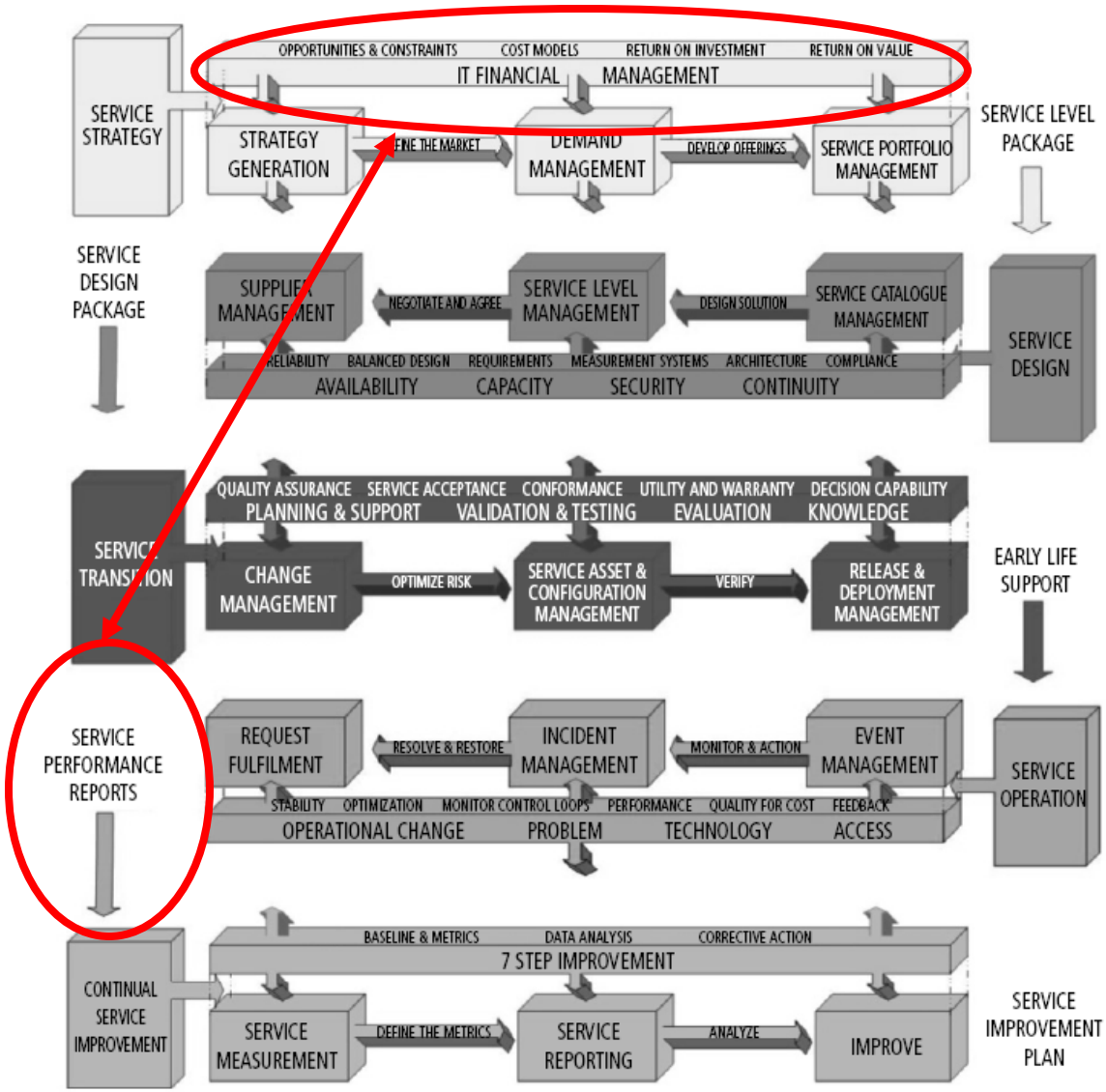
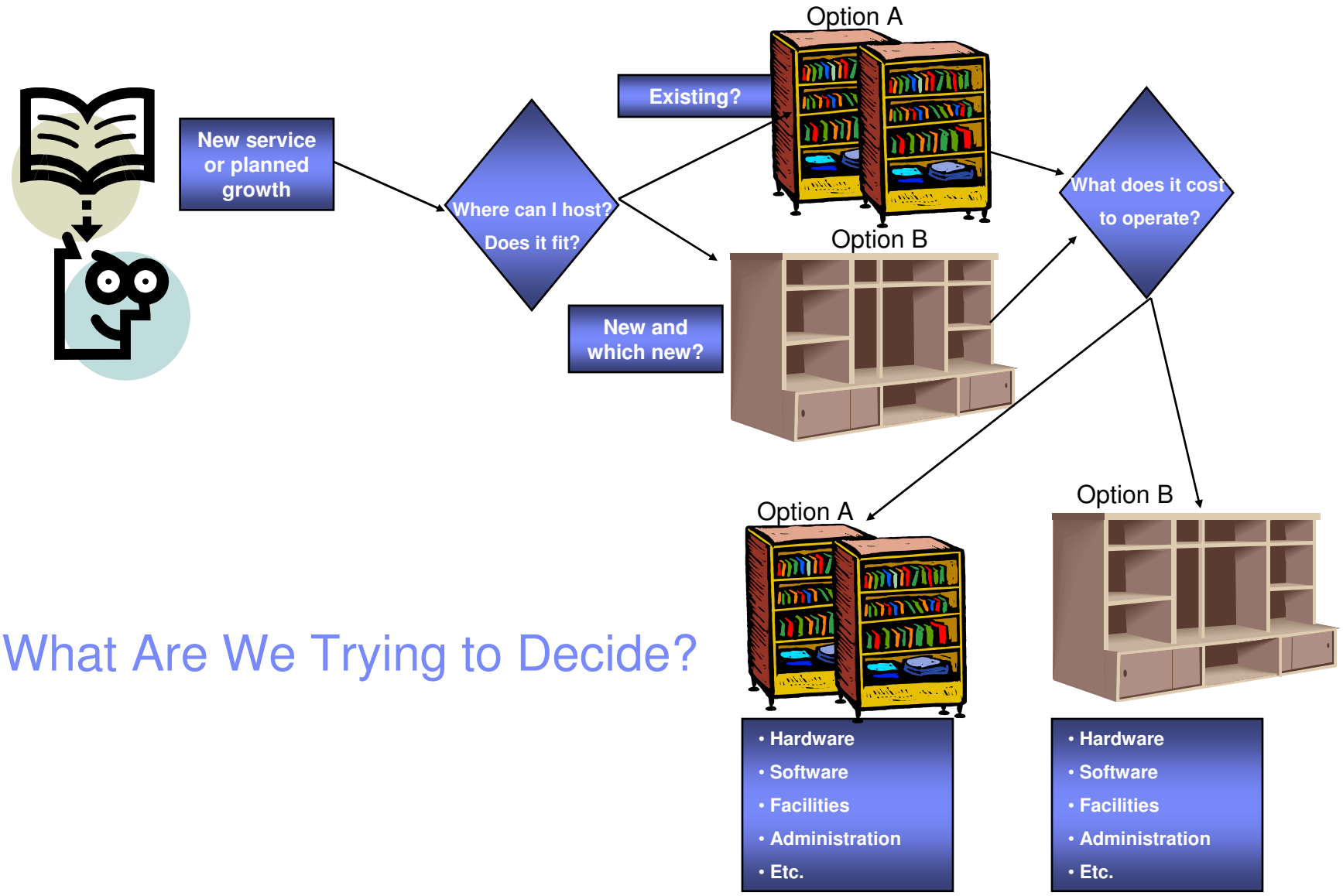


Figure 10: A high level view of the service model

What Are We Trying to Decide?



Build the Cost & Value Milking Stool

The Costs Case (IT Finance)

How do the costs of the new service compare on differing solutions?

Ensure you are comparing like-for-like capabilities. Include all costs that can be identified.

The Value Case (Together)

What are the main value items of your service?

What is the best both short term and longer term technical solution?

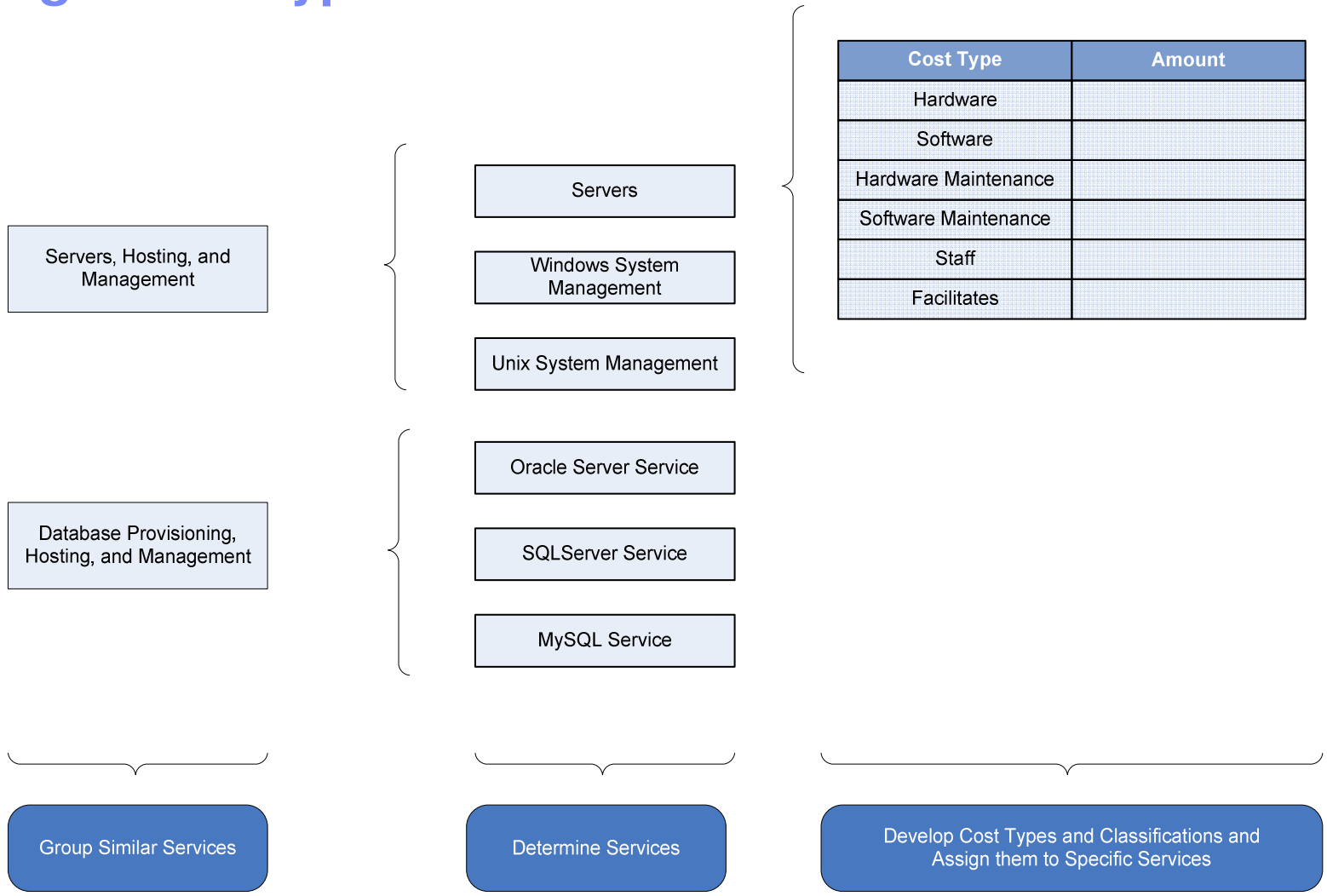
The Technical Case (Operations)

Analyze the impact of a new service or forecasted growth

Build the hardware, personnel, software, and facilities impact cases

Ensure cases cover both operational performance impact and service levels/availability

IT Accounting Assigns Expenses to Specific Services Through Cost Types and Classifications



Recommendations

- **IT Operations**
  - Ensure that you're capturing three levels of technical metrics
    - System level metrics – how much room do I have?
    - Which workload(s) on which server(s)
    - Workload level metrics – what could I move or what is the impact of growth or contractions?
  - Software stacks need to be associated with servers
  - Start associating facilities requirements to servers:
    - Energy
    - Cooling
    - Floor space
    - Cabling
    - Racks
  - What are my people to server ratios?

Service	Usage
Hardware	
Software	
Hardware maintenance	
Software maintenance	
Staff	
Rack	
Cabling	
Energy	
Cooling	
Floor Space	

Server	Usage
Hardware	
Software	
Hardware maintenance	
Software maintenance	
Staff	
Rack	
Cabling	
Energy	
Cooling	
Floor Space	

Recommendations

- **IT Finance**
  - Be able to monetize facilities, software, hardware, and administration costs
  - Build investment models covering Total Cost of Ownership rather than Total Cost of Acquisition of service delivery alternatives

Alertnative 1	Amount	Cost Yr1	Cost Yr2	Cost Yr3	Total
Hardware					
Software					
Hardware Maintenance					
Software Maintenance					
Staff					
Rack					
Cabling					
Energy					
Cooling					
Floor space					
	Total				

Alertnative 2	Amount	Cost Yr1	Cost Yr2	Cost Yr3	Total
Hardware					
Software					
Hardware Maintenance					
Software Maintenance					
Staff					
Rack					
Cabling					
Energy					
Cooling					
Floor space					
	Total				

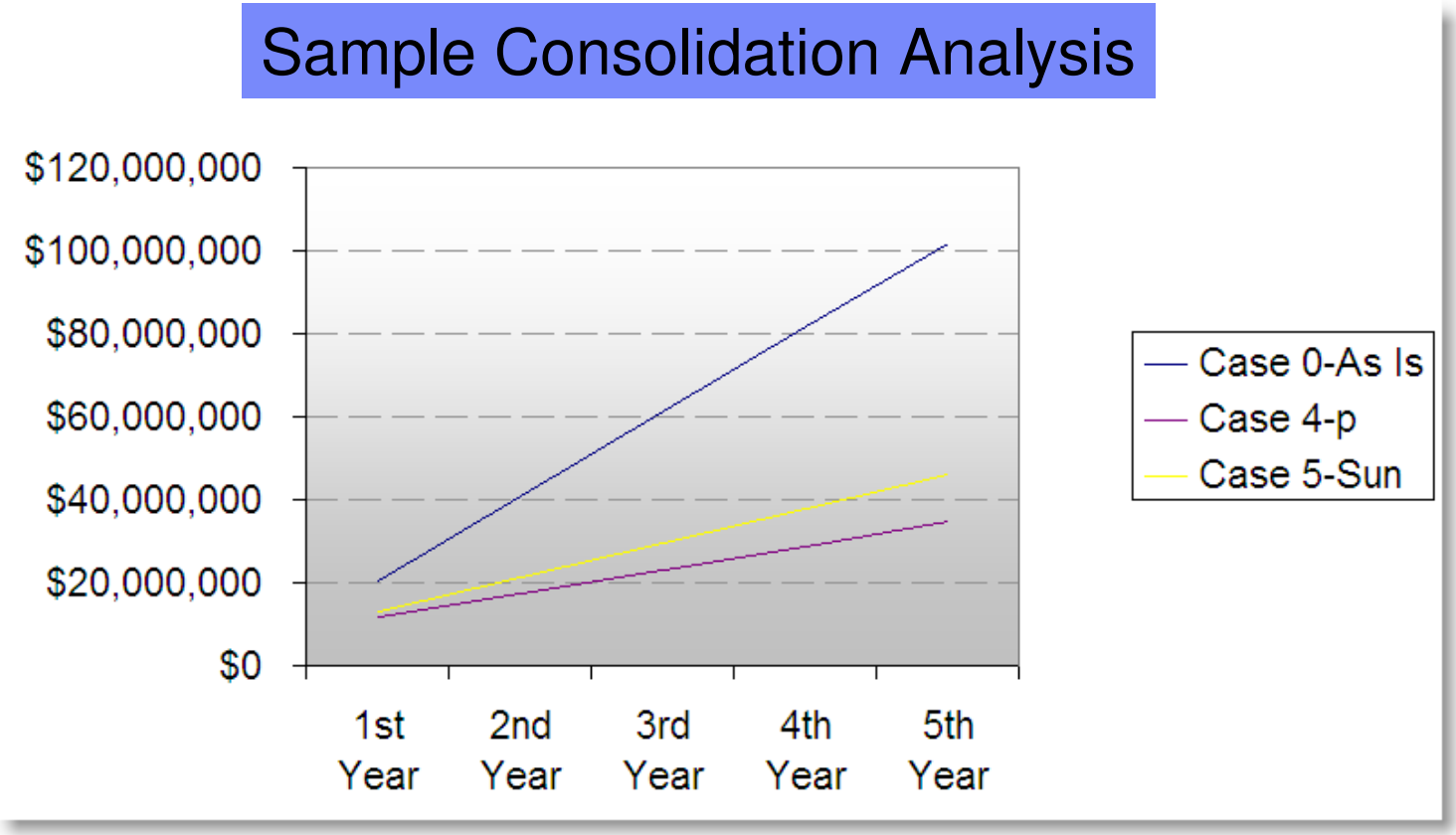
Recommendations

- **Together (Operations and Finance) with services sponsor, balance cost alternatives and version value**

Preferred Alternative	Amount	Cost Yr1	Cost Yr2	Cost Yr3	Total
Hardware					
Software					
Hardware Maintenance					
Software Maintenance					
Staff					
Rack					
Cabling					
Energy					
Cooling					
Floor space					
	Total	$XX	$XX	$XX	Sum of $XX
Service Benefit		$YY	$YY	$YY	Sum of $YY
Return on Investment or Business Benefit		$YY-$XX	$YY-$XX	$YY-$XX	SUM of $YY-$XX

Sample Summation Sheet

Sample Consolidation Analysis



Cumulative Costs Table

No.	Hypervisor	Case ID	1st Year	2nd Year	3rd Year	4th Year	5th Year	Rank	%High
0ai			$20,385,414	$40,770,829	$61,156,243	$81,541,657	$101,927,072	3	195%
4p			$11,803,787	$17,501,967	$23,200,148	$28,898,328	$34,596,509	1	0%
5sun			$12,838,827	$21,136,352	$29,433,877	$37,731,401	$46,028,926	2	33%

As Is Case Calculation

Case 0-As Is

	Manufacturer/Vendor or Other Descriptor	Subject Servers	Num. Servers	600				
	Server/Model or Other Descriptor		Num. Chips	900				
On/Off	Default Case Hypervisor	As-Is Case (No Hypervisor)	Num. Cores	1800				
Switch		1st Year	2nd Year	3rd Year	4th Year	5th Year	Total	%Total
1	Power	429,731	429,731	429,731	429,731	429,731	2,148,653	2.1%
1	Floor Space Analysis	2,640,000	2,640,000	2,640,000	2,640,000	2,640,000	13,200,000	13.0%
1	Facilities Analysis	0	0	0	0	0	0	0.0%
1	Migration and Engineering/Development Costs	0	0	0	0	0	0	0.0%
1	Server Acquisition Analysis	0	0	0	0	0	0	0.0%
1	Connectivity Acquisition Analysis	0	0	0	0	0	0	0.0%
1	Disk Acquisition Analysis	0	0	0	0	0	0	0.0%
1	Annual Server Maintenance Cost Analysis	4,400	4,400	4,400	4,400	4,400	22,000	0.0%
1	Annual Connectivity Maintenance Cost Analysis	553,594	553,594	553,594	553,594	553,594	2,767,969	2.7%
1	Annual Disk Storage Maintenance Cost Analysis	25,800	25,800	25,800	25,800	25,800	129,000	0.1%
1	Software License Cost Analysis	0	0	0	0	0	0	0.0%
1	Annual Software Maintenance Cost Analysis	4,335,290	4,335,290	4,335,290	4,335,290	4,335,290	21,676,450	21.3%
1	Annual Enterprise Network Bandwidth Costs	921,600	921,600	921,600	921,600	921,600	4,608,000	4.5%
1	Annual Sysadmin Cost Analysis	11,475,000	11,475,000	11,475,000	11,475,000	11,475,000	57,375,000	56.3%
1	Disaster Recovery Equipment Acquisition	0	0	0	0	0	0	0.0%
1	Total Annual Cost of DR Equipment	0	0	0	0	0	0	0.0%
1	Annual Cost of Downtime Time	0	0	0	0	0	0	0.0%
	Annual	20,385,414	20,385,414	20,385,414	20,385,414	20,385,414	101,927,072	Total 5-Year Cost
	Cumulative	20,385,414	40,770,829	61,156,243	81,541,657	101,927,072		
	Startup Costs	0					0	
	Operating Costs	20,385,414	20,385,414	20,385,414	20,385,414	20,385,414	101,927,072	

Alternative 1 Calculation

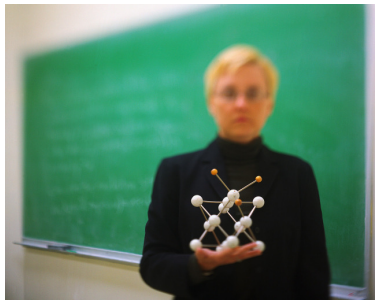
Case 4-p									
	Manufacturer/Vendor or Other Descriptor		Num. Servers	23					
	Server/Model or Other Descriptor		Num. Chips	92					
On/Off	Default Case Hypervisor		Num. Cores	184					
Switch		1st Year	2nd Year	3rd Year	4th Year	5th Year	Total	%Total	
1	Power	44,583	44,583	44,583	44,583	44,583	222,917	0.6%	
1	Floor Space Analysis	660,000	660,000	660,000	660,000	660,000	3,300,000	9.5%	
1	Facilities Analysis	0	0	0	0	0	0	0.0%	
1	Migration and Engineering/Development Costs	0	0	0	0	0	0	0.0%	
1	Server Acquisition Analysis	5,761,000	0	0	0	0	5,761,000	16.7%	
1	Connectivity Acquisition Analysis	0	0	0	0	0	0	0.0%	
1	Disk Acquisition Analysis	506,263	0	0	0	0	506,263	1.5%	
1	Annual Server Maintenance Cost Analysis	1,100	576,100	576,100	576,100	576,100	2,305,500	6.7%	
1	Annual Connectivity Maintenance Cost Analysis	0	0	0	0	0	0	0.0%	
1	Annual Disk Storage Maintenance Cost Analysis	0	25,313	25,313	25,313	25,313	101,253	0.3%	
1	Software License Cost Analysis	438,656	0	0	0	0	438,656	1.3%	
1	Annual Software Maintenance Cost Analysis	860,636	860,636	860,636	860,636	860,636	4,303,180	12.4%	
1	Annual Enterprise Network Bandwidth Costs	891,548	891,548	891,548	891,548	891,548	4,457,739	12.9%	
1	Annual Sysadmin Cost Analysis	2,640,000	2,640,000	2,640,000	2,640,000	2,640,000	13,200,000	38.2%	
1	Disaster Recovery Equipment Acquisition	0	0	0	0	0	0	0.0%	
1	Total Annual Cost of DR Equipment	0	0	0	0	0	0	0.0%	
1	Annual Cost of Downtime Time	0	0	0	0	0	0	0.0%	
	Annual	11,803,787	5,698,181	5,698,181	5,698,181	5,698,181	34,596,509	Total 5-Year Cost	
	Cumulative	11,803,787	17,501,967	23,200,148	28,898,328	34,596,509			
	Startup Costs	6,705,919					6,705,919		
	Operating Costs	5,097,867	5,698,181	5,698,181	5,698,181	5,698,181	27,890,590		

Alternative 2 Calculation

Case 5-Sun

	Manufacturer/Vendor or Other Descriptor		Num. Servers	45				
	Server/Model or Other Descriptor		Num. Chips	180				
On/Off	Default Case Hypervisor		Num. Cores	720				
Switch		1st Year	2nd Year	3rd Year	4th Year	5th Year	Total	%Total
1	Power	116,431	116,431	116,431	116,431	116,431	582,155	1.3%
1	Floor Space Analysis	600,000	600,000	600,000	600,000	600,000	3,000,000	6.5%
1	Facilities Analysis	0	0	0	0	0	0	0.0%
1	Migration and Engineering/Development Costs	0	0	0	0	0	0	0.0%
1	Server Acquisition Analysis	4,510,000	0	0	0	0	4,510,000	9.8%
1	Connectivity Acquisition Analysis	0	0	0	0	0	0	0.0%
1	Disk Acquisition Analysis	506,634	0	0	0	0	506,634	1.1%
1	Annual Server Maintenance Cost Analysis	1,000	451,000	451,000	451,000	451,000	1,805,000	3.9%
1	Annual Connectivity Maintenance Cost Analysis	0	0	0	0	0	0	0.0%
1	Annual Disk Storage Maintenance Cost Analysis	0	25,332	25,332	25,332	25,332	101,327	0.2%
1	Software License Cost Analysis	0	0	0	0	0	0	0.0%
1	Annual Software Maintenance Cost Analysis	2,718,522	2,718,522	2,718,522	2,718,522	2,718,522	13,592,610	29.5%
1	Annual Enterprise Network Bandwidth Costs	906,240	906,240	906,240	906,240	906,240	4,531,200	9.8%
1	Annual Sysadmin Cost Analysis	3,480,000	3,480,000	3,480,000	3,480,000	3,480,000	17,400,000	37.8%
1	Disaster Recovery Equipment Acquisition	0	0	0	0	0	0	0.0%
1	Total Annual Cost of DR Equipment	0	0	0	0	0	0	0.0%
1	Annual Cost of Downtime Time	0	0	0	0	0	0	0.0%
	Annual	12,838,827	8,297,525	8,297,525	8,297,525	8,297,525	46,028,926	Total 5-Year Cost
	Cumulative	12,838,827	21,136,352	29,433,877	37,731,401	46,028,926		
	Startup Costs	5,016,634					5,016,634	
	Operating Costs	7,822,193	8,297,525	8,297,525	8,297,525	8,297,525	41,012,291	

IT Service Management Financial Management Model



Entity's Strategy and Financing

Planning and Budgeting

Cost Accounting

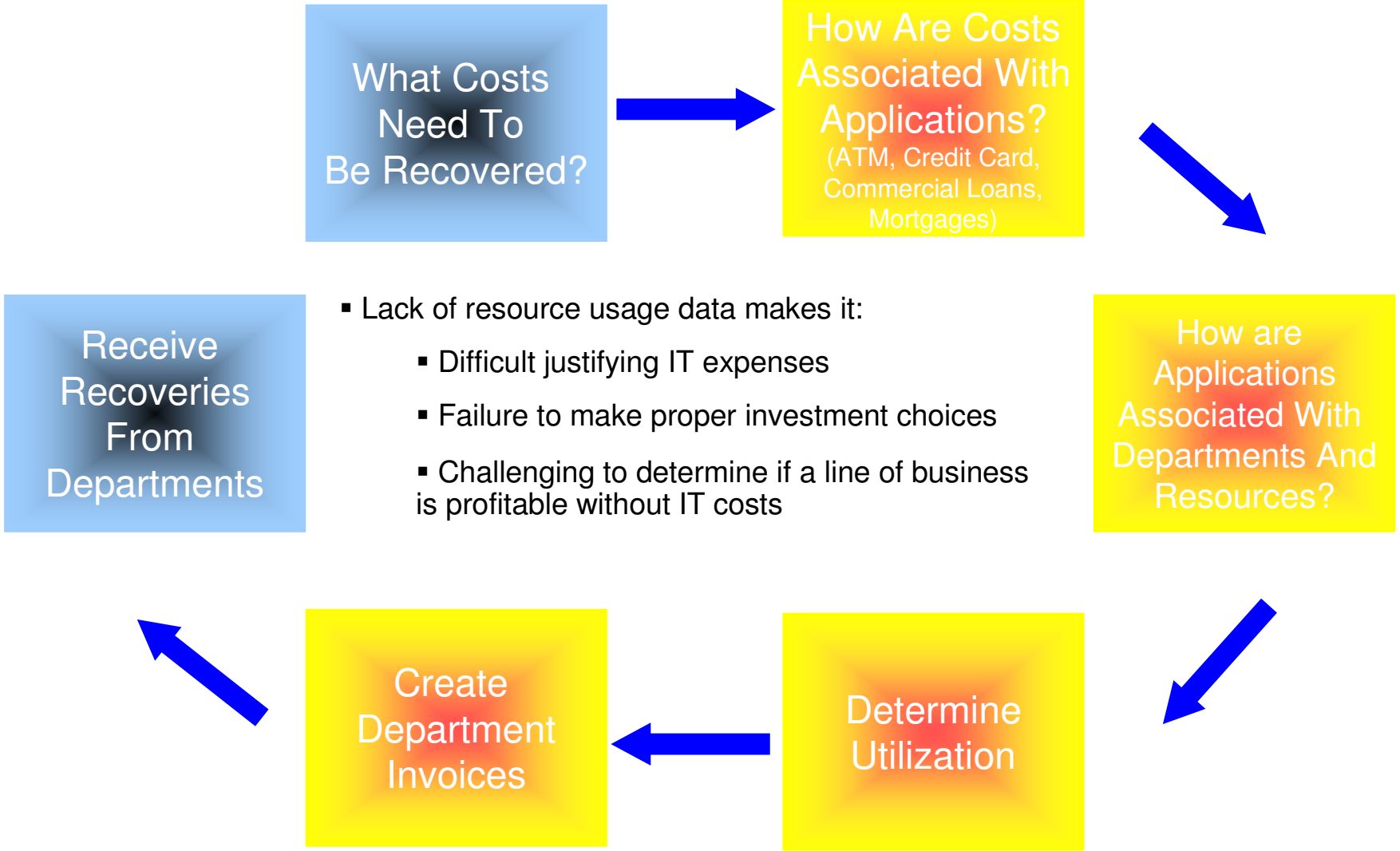
Actual vs Budget Tracking And Exception Handling

Reporting and Possibly Chargeback

Investment Analysis

IT Service Management Financial Management

Failure to Accurately Allocate and Distribute Costs can Lead to False Economics



Summary

- The compute delivery model is evolving, so our investment models must evolve
- Pressure continues to optimize costs while communicating value (contribution)
- Performance management continues to be important, but must now look at workloads and servers/storage/network utilization
- IT Finance needs to took at TCO cost models with assistance from IT Operations
- Both need to work with Service Sponsors to explain cost optimization as well as value delivered