

20|20

Vision in 2010

@QUESTnet

A Model for Dynamic Computing

Jon Farrell
Enterprise Architect
Dimension Data Australia

jon.farrell@didata.com.au

The new normal

“Are we experiencing a conventional economic cycle? Or did the financial crisis of 2008 and subsequent global economic downturn mark the beginning of a **“beginning of a new normal”** fundamental changes in the use of leverage, trajectory of globalization, nature of consumption patterns, and appetite for risk taking?” *McKinsey and Company December 2009*

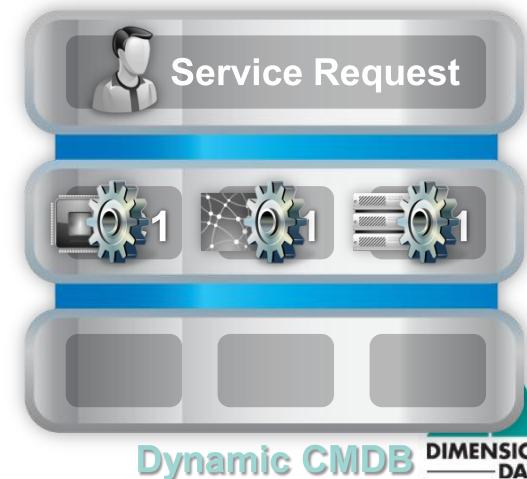
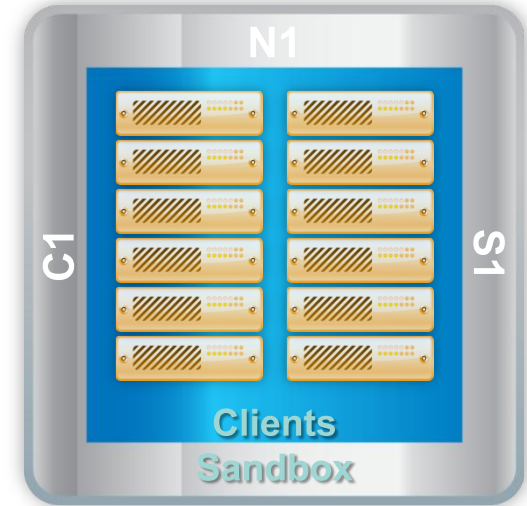
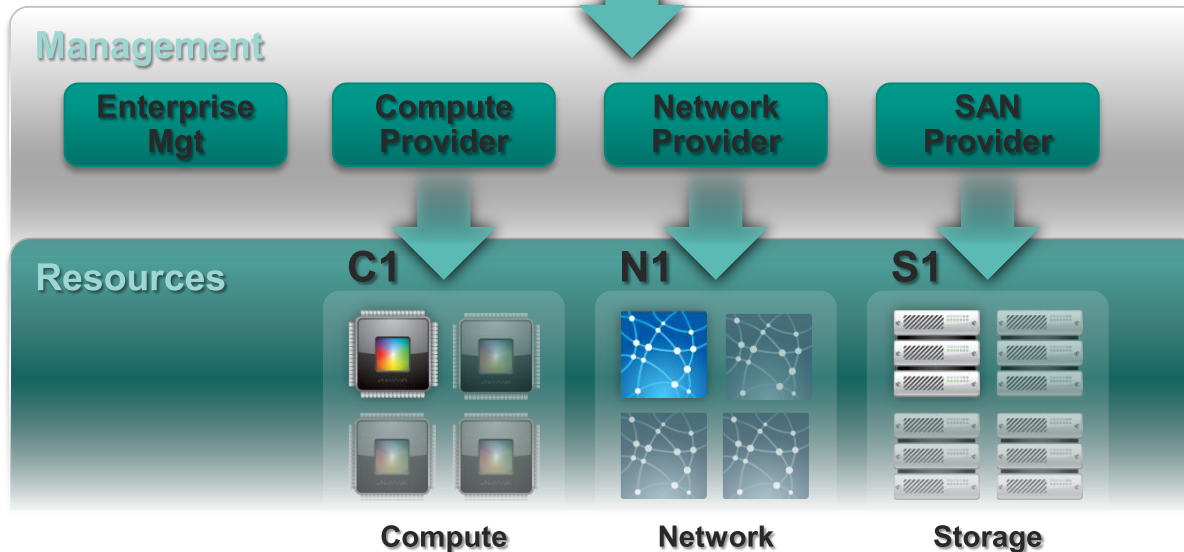
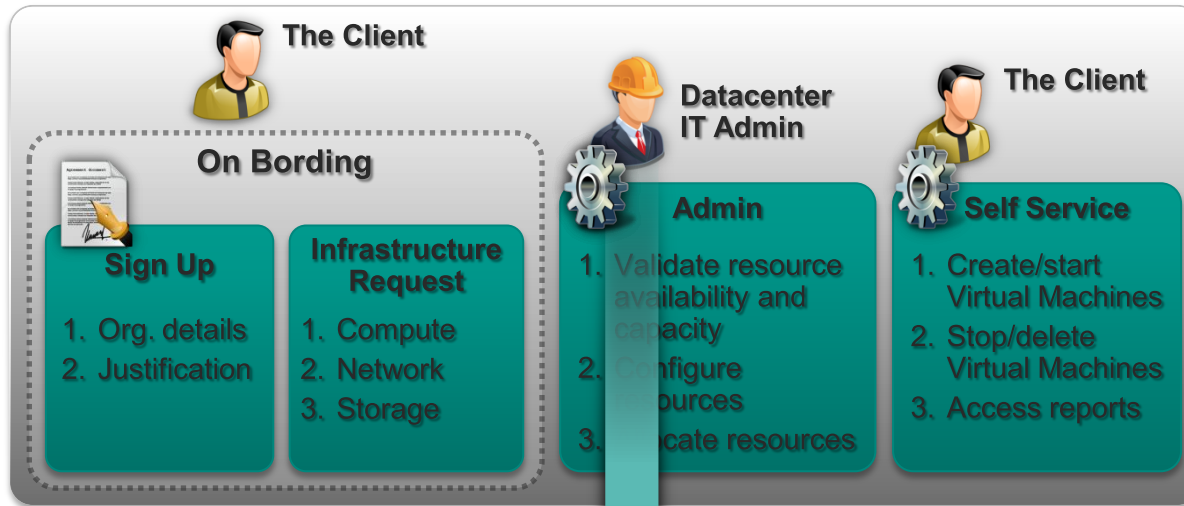
“The world is tentatively emerging from a period of tension and anxiety, but those sentiments are likely to persist through 2010. Other behaviours are permanently changed. The result is a **“behaviours are permanently changed”** New Normal: a transformed status quo to which we must contribute and respond *Burton Group January 2010*

“Things have shifted. We ended the last millennium with a shift from an industrial economy to an information economy. And the tools for such success in earlier times no longer work” **“tools for success in earlier times no longer work”** barriers are elusive, and unable to produce sustainable competitive advantage” *Adam Hartung, The Phoenix Principle January 2010*

How does this impact IT?

- Organisational success is now a factor of the speed with which a organisation **responds** to changing conditions; and therefore, by implication, the **speed** with which it can **adapt** to any new environment.
- In order to meet this demand, the role of IT must be reconsidered and just as importantly, the organisation must consider how it wants to embrace technology, and what role technology has in its core activities. The consumerisation of IT has meant that more stakeholders than ever have an opinion as to what is the best way forward for IT.
- *IT must continue to evolve from a support function to a **strategic capability**.....quickly, carefully and cost effectively.*
- *Having the right plan is fundamental.*

A example of IT as a Service



A example of IT as a Service

The Client
On Bording

Datacenter IT Admin

The Client

N1

Log Out Help

[Browse Catalog](#) [Advanced Search](#) [Checkout](#)

Service Catalog

Browse by Category
Standard Services

Search

Provision Data Link
Request a new data link. Data links are provided under a standard 1 year contract.
[View](#) \$5,000.00 Qty

Provision Windows Server
Provisioning of a Windows Server.
[View](#) \$2,500.00 Qty

Your Order
Item(s) have been added to the cart

Item	Qty	Sub-Total	x
Provision Windows Server	1	\$2,500.00	☐

Total \$2,500.00

* To update the quantity of items, you must enter a value in the input field, then click the Update Cart button.

Compute **Network** **Storage**

Dynamic CMDB **DIMENSION DATA**

20|20
Vision in 2010

Blueprint for a Virtualised Data Centre

A model for the future and an action plan for now



NETWORK

Server Networks

Storage Networks

Network
Architecture



STORAGE

Storage
Infrastructure

Data Management



COMPUTE

Server

Desktop



APPLICATIONS

Business Driven
Applications

Application
Optimisation

SECURITY

MANAGEMENT-ORCHESTRATION-OPTIMISATION

Compute - [Prod – Stage - Test]



Server side networking



Storage side networking



Compute



Application services

Action: Virtualise by default

Traditional

- 8 Connections per Server
- Resource Island
 - 1 app per server per 4Kw
 - 15% Utilisation
 - 200 hours to provision

Virtualised

- 2 Connections per Server
- Leveraged Resources
 - 21 VMs per Kw
 - 75% Utilisation*
 - 1 hour to provision

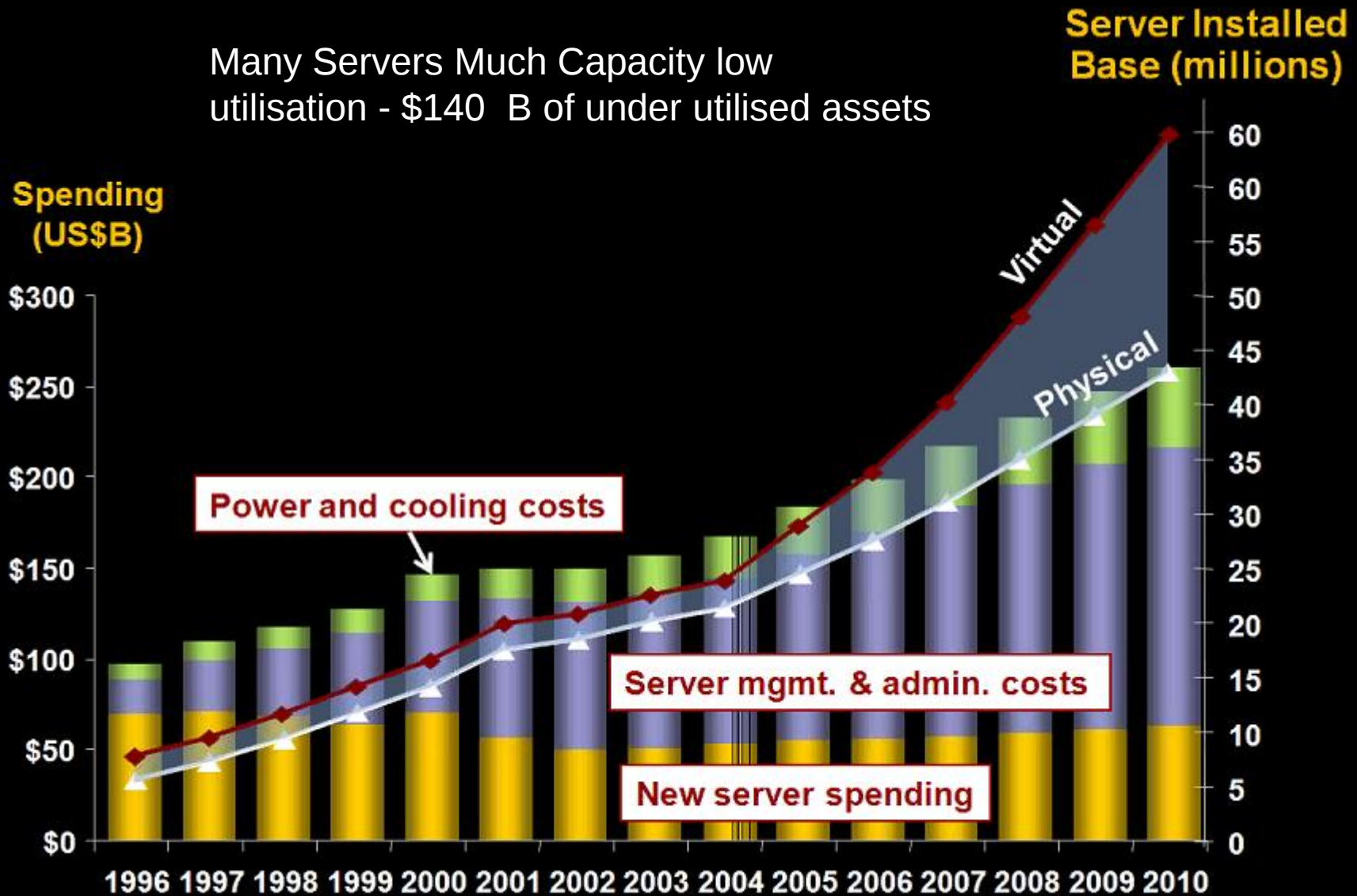
Unified Computing

- Multiple Server per Connection
- Architected for Virtual
 - 76 VMs per KW
 - Optimal utilisation
 - 40 minutes to provision

Entry point can be consolidation, resource utilisation or service agility

....the reality

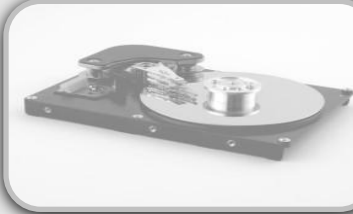
Many Servers Much Capacity low utilisation - \$140 B of under utilised assets



Plan to Save by amortising costs



Server side networking



Storage side networking



Compute



Application services

Action: Understand the cost equation for virtualisation – plan for savings or you will not achieve any!

- Map costs/savings of power, consolidation, etc
- Develop a governance model for approval of new server deployment
- Understand license cost and usage rights for virtualised applications
- Tier virtualised applications to appropriately scaled infrastructure
- Calculating costs not only enables cost savings but is a key enabler for
- Chargeback
- Understand investment inflection points

Challenges

- Dual physical/virtual management tasks
- Potential for increased licensing
- Innovation of Virtual Server becomes keeping the lights on again

Eliminate inefficiencies with automation to reduce net cost



Server side networking



Storage side networking



Compute



Application services

Action: Redesign operational and management processes to realise TCO from server virtualisation

- Capacity planning is key so that investment inflection points are managed
- People, Process operational processes must be reviewed to ensure optimal outcomes
- Give yourself time to prepare – cost effective virtualisation is not a *reactive* IT function

Without proactive management virtual infrastructure risks becoming as expensive and inflexible as the services it designed to replace

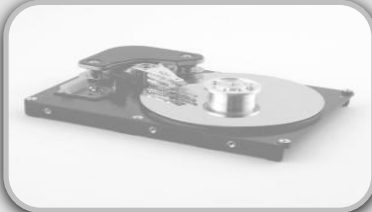
Action: Complete service tiering and performance objective profiling to guide resource allocation

- Resource allocation and service tiering go hand in hand
- DR is the driving force for virtualisation in many clients

On the server-side, Dimension Data recommends building the data centre network on a foundation of 10 Gig Ethernet ...



Server side networking

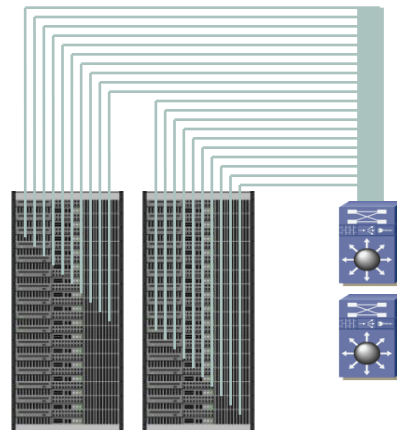


Storage side networking

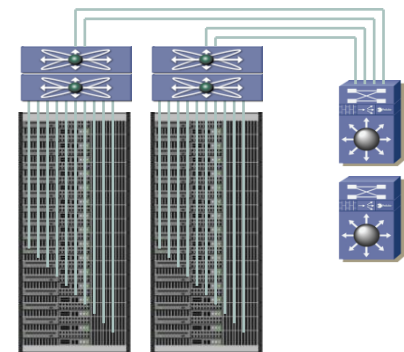
Action: Build your network foundation based on 10G ethernet

- Provides a network that supports virtualisation
- Will scale to support multi-core processors and removes application bottlenecks
- Flexibility to support FE, 1GE and 10GE server connectivity
- Re-architect network with new design approaches
- Forms the foundation for future growth (FCoE, 40GE, 100GE)

End-of-row architecture



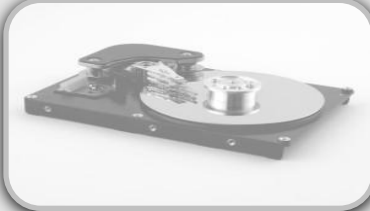
Top-of-rack architecture



... and extending the network edge into the virtual machines ... [VM Switching]



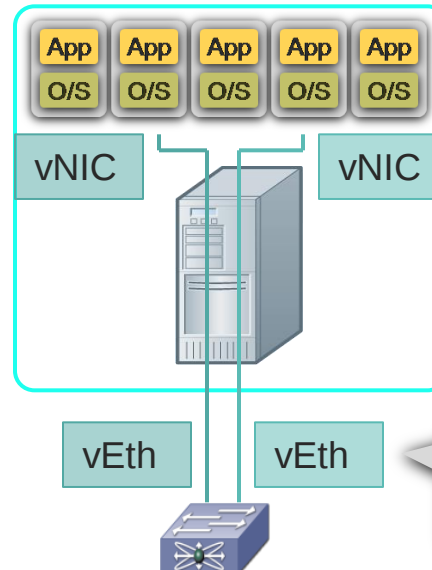
Server side networking



Storage side networking

Action: Extend the network edge into the VMs

- Mesh the Virtual Machines into the network
- More granular policy can be attached to the VMs
- Enables the network and security policy to move with the VMs during VM migration
- Allows for consistent network management across full network infrastructure
- Provides for separation of management duties



Network and security policy is applied to each VM

..and continue to converge the network to a Unified Fabric



Server side networking



Storage side networking

Action: Converge networks on a Unified Fabric *and deploy data centre bridging*

- Utilise the 10GE foundation network for storage traffic
- Better performance and significantly simplified infrastructure with compelling cost benefits
- Provide capacity to meet demand for video, voice and new media
- FCoE standard ratified with broad support from network, storage, blade and interface manufacturers

10Gig Ethernet Network

Applications

Video

Backups

Management

Real Time Comms

Storage Network

Shared storage



Storage

Action: Standardise on shared, tiered storage

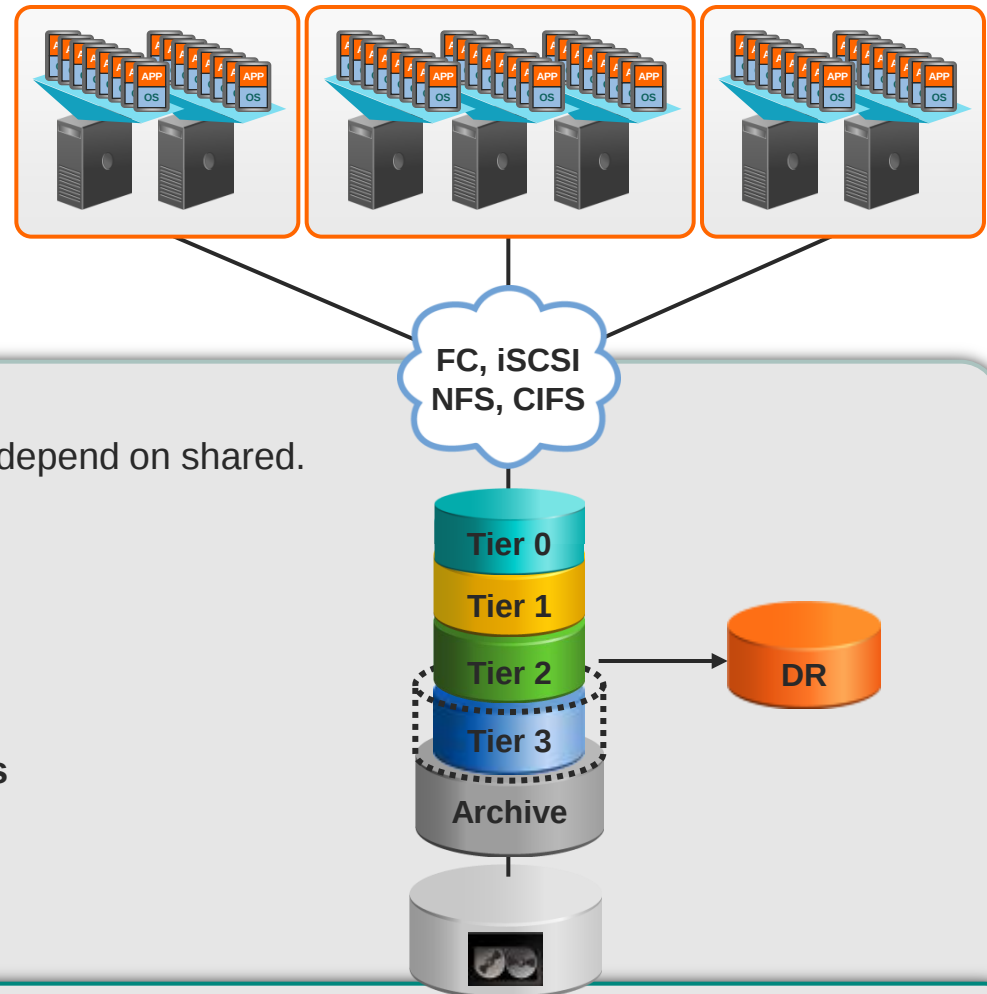
Server Virtualisation, VM Mobility, HA, DR, depend on shared.

More efficient management

Virtual Disks (LUNs),
Virtual (Thin) Provisioning
Virtual Storage

Tier resources to optimise capital investments

Connectivity – FC, iSCSI, NFS, CIFS
Storage Device– SSD, FC, SAS, SATA
Storage Protection – RAID 1, 5, and 6



“Storage typically represents 50% of the cost of a virtualisation project.”

Tier Applications, then Storage...

Requirement	Mission Critical	Business Critical	Business Important	Development
Availability	99.99%	99.90%	99%	97%
Threshold based Automated Provisioning	Up to 20% of current file System allocation within 1 Business Day	Up to 20% of current file System allocation within 2 Business Days	Up to 10% of current file System allocation within 4 Business Days	Up to 20% of current file System allocation within 1 Business Week (Scratch based allocation)
RTO	15 minutes	1 hour	8 hours	24 hours
RPO	1 hour	12 hours	48 hours	96 hours
Restore Requests	100 requests/week	100 requests/week	50 requests/week	50 requests/week
Backup Success Rates	97%	95%	90%	90%
Archive Policy	No access in 90 days	No access in 30 days	No access in 90 days	No access in 180 days
Archive Access Time	Seconds	Seconds	Up to 4 Hours	24-48 Hours
Regulatory Compliance	SOX	HIPPA	None	None
Forecasting	Monthly	Quarterly	Yearly	Yearly
Incident Classification and Notification	Severity 1 < 15 minutes Severity 2 < 30 minutes Severity 3 < 1 day Severity 4 < 1day	Severity 1 < 25 minutes Severity 2 < 40 minutes Severity 3 < 1 day Severity 4 < 1day	Severity 1 < 25 minutes Severity 2 < 40 minutes Severity 3 < 1 day Severity 4 < 1day	Severity 1 < 25 minutes Severity 2 < 40 minutes Severity 3 < 1 day Severity 4 < 1day
Asset Reporting (Chargeback)	Weekly	Bi-weekly	Monthly	Monthly
	\$\$\$\$	\$\$\$	\$\$	\$

We must eliminate duplicate data



Storage

Action: De-duplicate everywhere

De-duplicate Backups in the Data Centre

- Capacity Savings of up to 50x

- Replicate data electronically to DR site

- Enables consumption of cloud backup

De-duplicate backups from Remote Offices

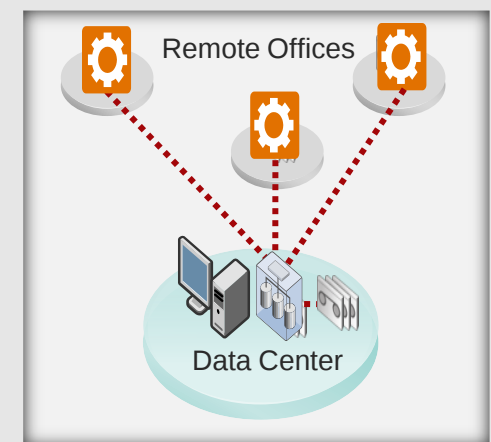
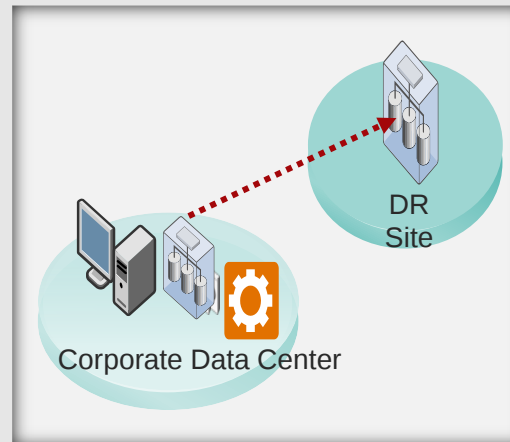
- Operational savings up to 5x

- Bandwidth savings up to 500x

De-duplicate Applications

- Improve app backup and recovery

- Eliminate “collaboration” copies



De-duplication reduces backup to disk capacity requirements by eliminating this need to store multiple copies of the same data.

We must eliminate duplicate data



Storage

Action: De-duplicate everywhere

De-duplicate Backups in the Data Centre

Capacity Savings of up to 50x

Replicate data electronically to DR site

Enables consumption of cloud backup

De-duplicate backups from Remote Offices

Operational savings up to 5x

Bandwidth savings up to 500x

De-duplicate Applications

Improve app backup and recovery

Eliminate "collaboration" copies

Data Mix	Reduction Factor	Amount of Primary Data (GB)	Amount of Data Moved Daily (GB)
Windows file systems	588:1	3,573	6.1
Mix of Windows, Linux & Unix file system	434:1	5,097	11.7
Engineering files on NAS Filers (NDMP backups)	135:1	3,265	24.2
Mix of 20% databases, 80% file systems (Windows & Unix)	120:1	9,583	80.0
Mix of Linux file systems & databases	75:1	7,831	104.2

De-duplication reduces backup to disk capacity requirements by eliminating this need to store multiple copies of the same data.

Building in intelligence will improve application performance to users



Server side networking



Storage side networking



Network services



Application services

Action. Improve application performance through acceleration

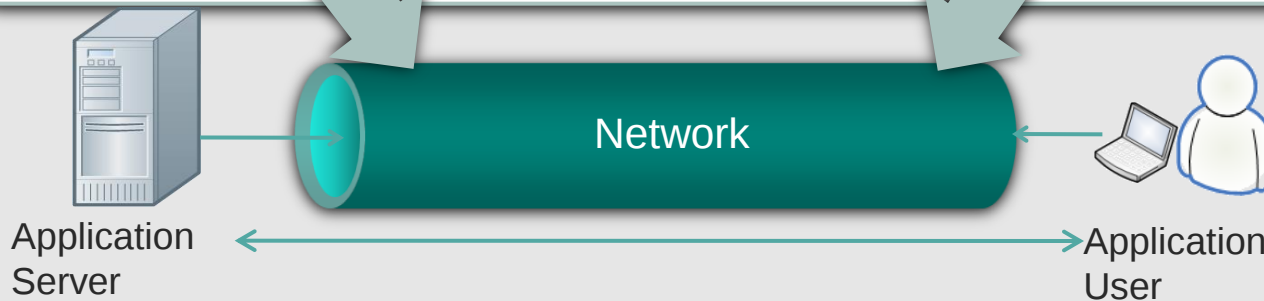
Virtualisation of Application Services

Availability

- Load balancing
- Offload services
- Content transform

Acceleration

- Caching
- Protocol opt
- Compression



The Guiding Principles



NETWORK

Build your network foundation based on 10G ethernet

Extend the Network Edge into the Virtual World

Build your network unified fabric



STORAGE

Standardise on Tiered, shared storage

De-duplicate data - Everywhere



COMPUTE

Virtualise by default

Understand the Virtualisation cost equation

Desktop Virtualisation – assess, consider, targeted



APPLICATIONS

Add intelligence for improved application performance

Centralise application approval and deployment



20|20
Vision in 2010

Security & Systems Management

Virtualisation results in additions to threat matrix

Many risks are the same as faced by physical systems...



Unsecured Accounts

- Null Password, Admin no PW, no PW expiration...



Unnecessary Services

- VNC, PCAnywhere, KaZaa, Telnet . . .



Backdoors

- Spyware (KaZaa, DownloadWare, 180 Solutions, GAIN), MyDoom.A, BACKORIFICE, SUBSEVEN . . .



Mis-configurations

- Netbios shares, Anonymous FTP world read/write, hosts.equiv .



Software Defects (Missing Patches)

- Buffer overruns, RPC-DCOM, SQL Injection . . .

.... but many more are unique to virtual systems



Off-line / non-compliant / under-protected virtual machines



VM-aware threats subverting deployed counter-measures



Risk of propagation and activation of infected virtualization images



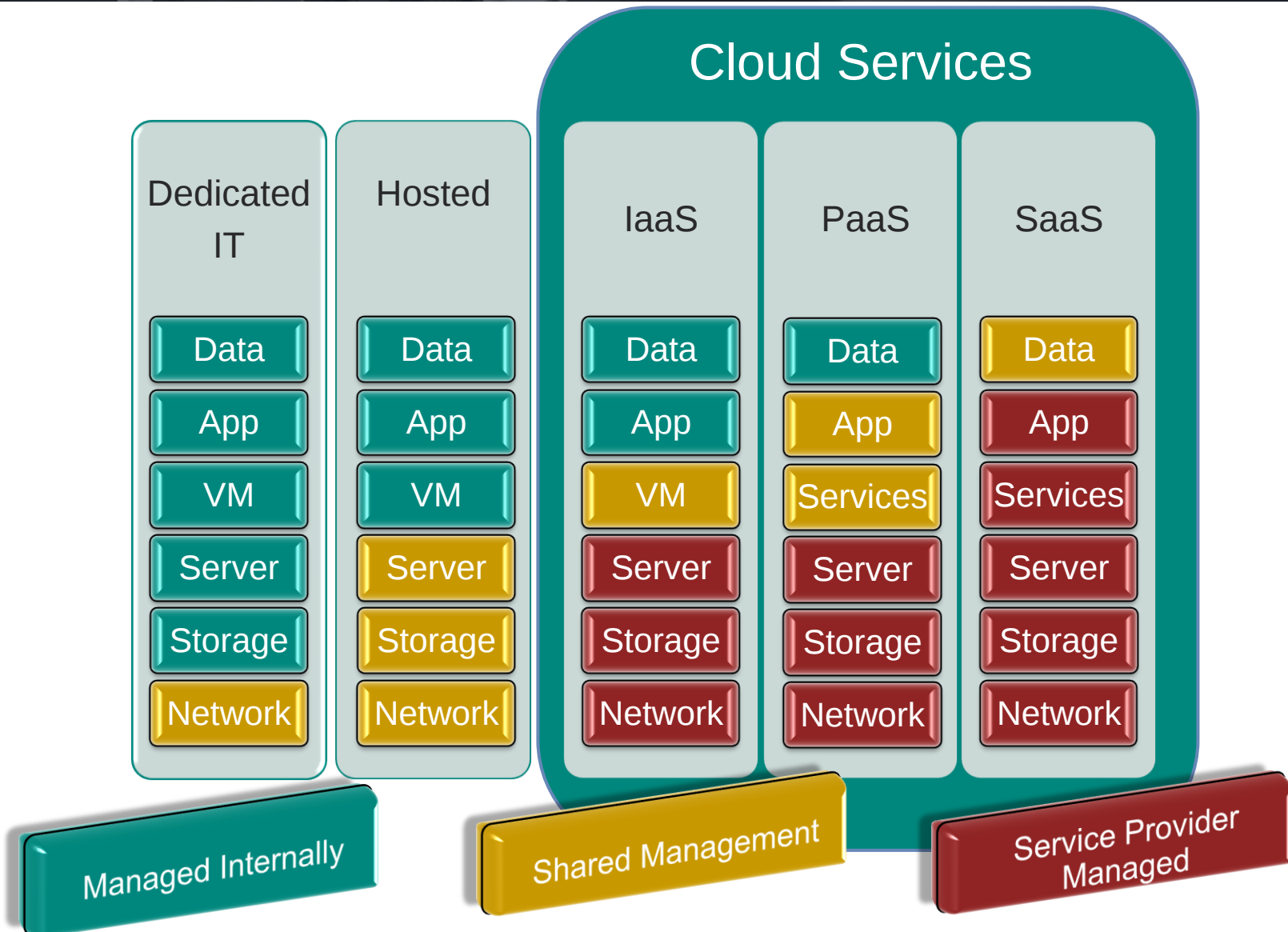
Configuration errors—speed of VM deployments requires care and best practices



New threat model

Virtualisation is not inherently insecure – but is typically deployed insecurely

Questions of control, ownership and the moving security boundary



...requiring a rethink, not reinvention

Action: Work with Operational Security and Risk groups

- Risk appetites vary depending on service, business, etc.
- Define a standard for deployment of virtual technology

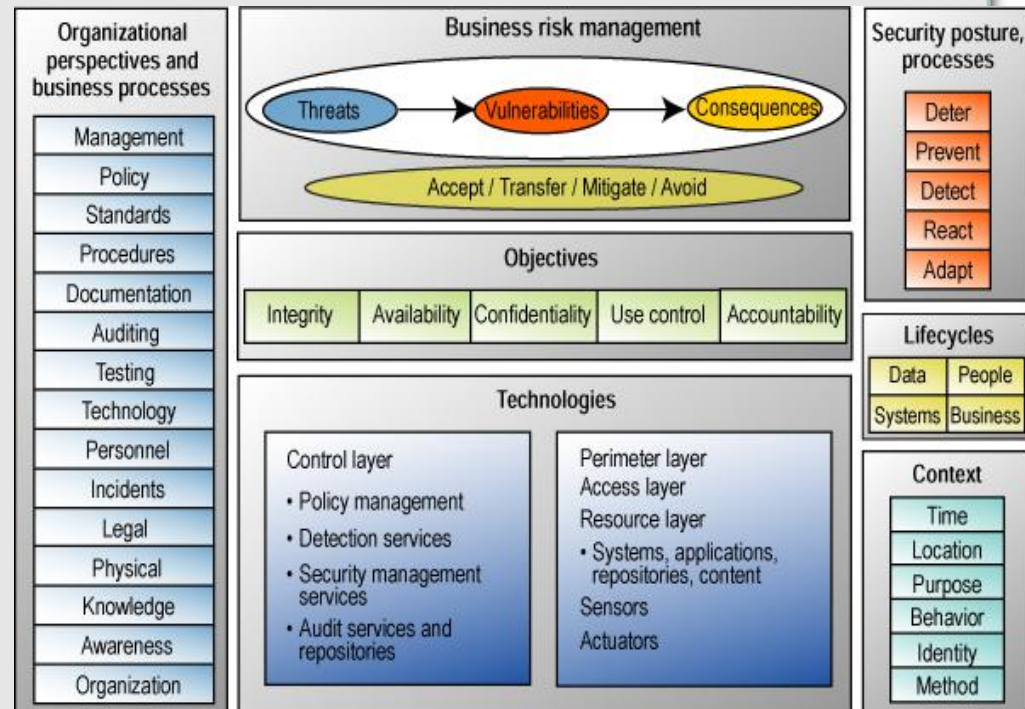
Action Converge Roles and Responsibilities

- Virtualisation requires convergence
- of the Network / Server groups

Action

Secure Virtualisation through:

- Secure Design
- Secure Deployment
- Secure Operations



...considerations for public cloud

Action: Transfer Risks or improve detection and deterrence through -

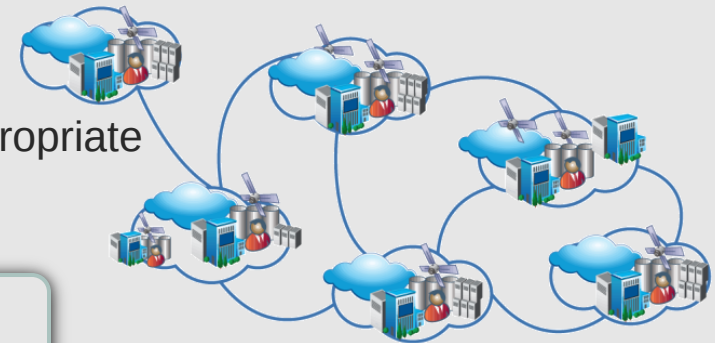
- Through monitoring
- Feedback
- Audit

Action: Adopt standards based identity services

- Tightly held domain based authentication is not appropriate

Action:

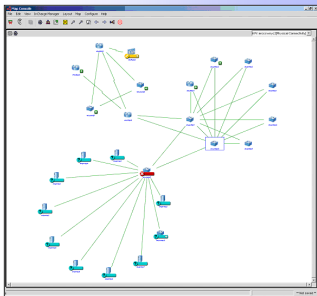
- Enforce Separation of duties
- Monitor Events
- Address staged deployments, change management and change workflows at contract time



Cloud equals less preventative control of the infrastructure

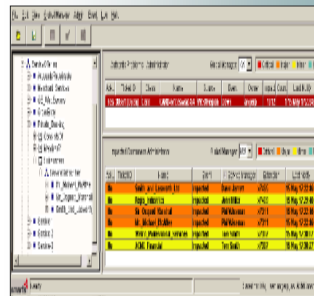
Meeting the Challenges - Operations

What is out there?



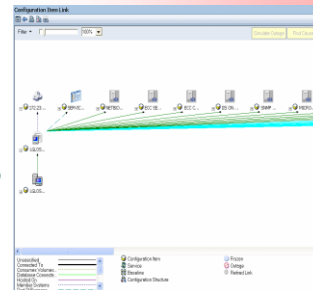
Automated discovery

What is happening?



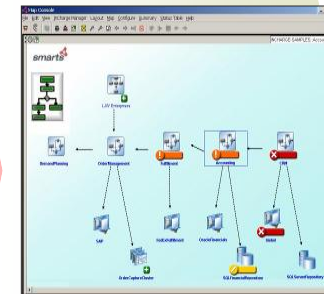
Problem View

What does it affect?



Populating a CMDB

Why does it matter?



Business Impact analysis

What am I doing?

EMC IT Performance Reporter V1.0

Availability By Group Report for Switch,Router,LoadBalancer,MSFC,Firewall,FileServer,Host

Availability from Feb 25, 2008 6:30:00 PM(GMT) to Feb 26, 2008 6:29:59 PM(GMT)

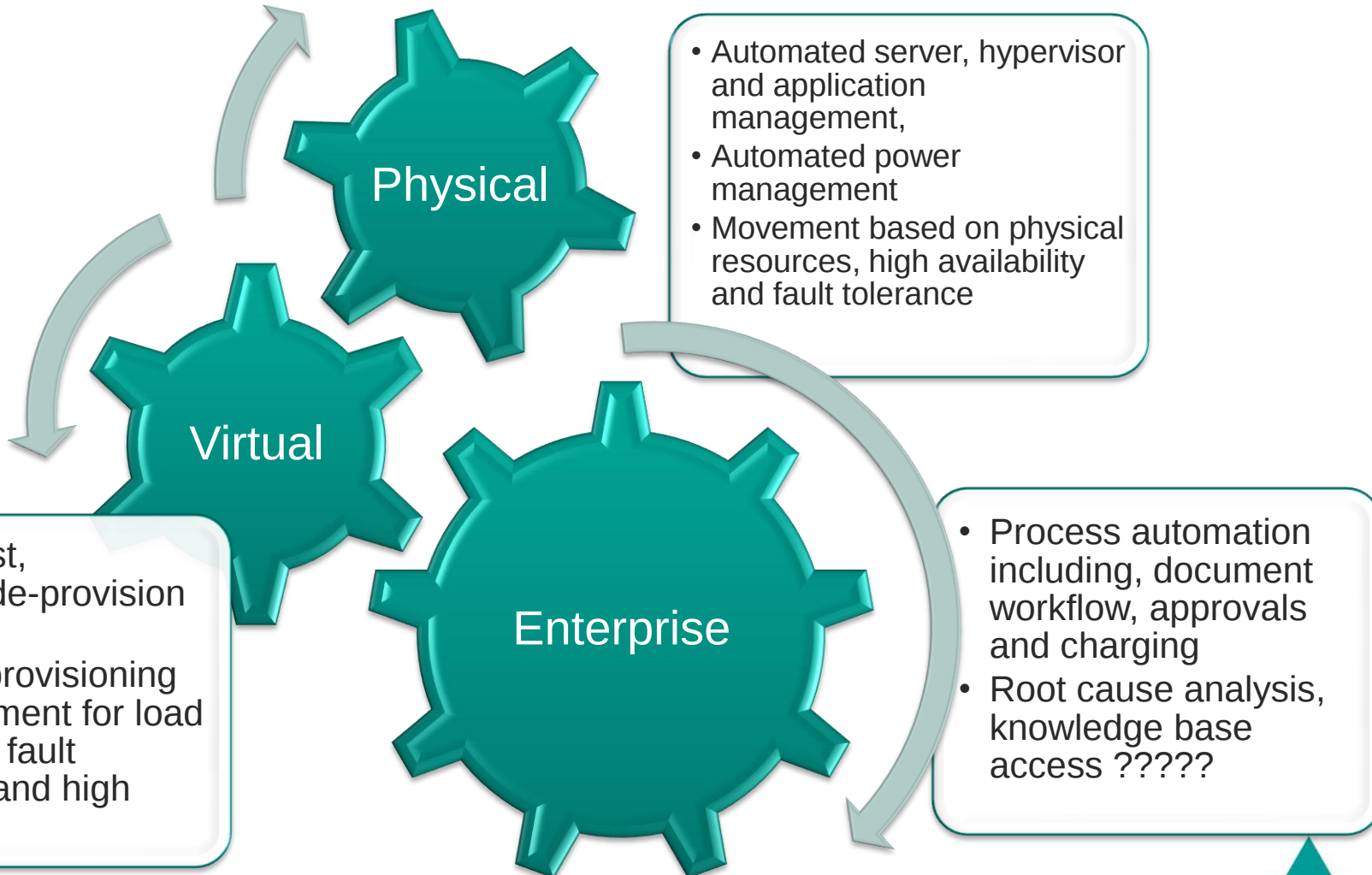
Host: 10.10.10.10

Page: 2 of 5

Summary for Host In Group TTPS	Average availability %	Hours of Downtime
Host: 10.10.10.10	100.0000	0.0000
No. of Devices: 1		
Average Availability % for all devices: 100.0000		
Average Downtime for all devices: 0.0000		
Summary for Host In Group Managed Elements	Average availability %	Hours of Downtime
Host: 10.10.10.10	100.0000	0.0000
Host: 10.10.10.11	100.0000	0.0000
Host: 10.10.10.12	100.0000	0.0000
No. of Devices: 3		
Average Availability % for all devices: 100.0000		
Average Downtime for all devices: 0.0000		

Change / release / incident processes

Orchestration



20|20

Vision in 2010

Transformation

Quick Maturity Assessment

Ad Hoc /Manual	Reactive	Proactive	Service
Little or no documentation	Inaccurate documentation	Fragmented documentation	Accurate / automated CMDB
No standard process for changes	Reliance on Individuals domain knowledge	Standard process for changes	Integrated change-configuration mgt
Outages commonplace	Fragmented monitoring	Basic service accounting	Holistic data centre monitoring
Minimal IT Operations	Incident driven fire fighting	Minimal IT Operations	Service driven management

Virtual Data Centre Consulting

IT Optimisation – ITSM consulting



- Understand journey to private cloud and role of managed service providers
- Ensure virtualisation strategy provides long-term, measurable service management improvements

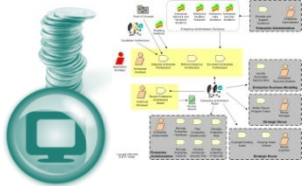
Strategy & Governance



- IT Governance over virtualisation and cloud- strategy
- Internal program management of transformation
- Internal and external service provider alignment

Linkage to cloud strategy, strategic outsourcing, and smart governance

Enterprise Architecture design



- Ensure virtualisation architecture will build the right foundation for private cloud architecture
- Take holistic approach
- Consider chargeback and self-provisioning

Linkage to Operational Readiness



- Understand the impact that Virtualisation will have on service assurance and skills in your organisation? E.g. Server virtualisation saturates the existing 1 GE data centre network (server-side) - 10G is the next evolution
- Determine whether clients' processes and tools are ready to handle the virtual & physical infrastructure

Technology - server virtualisation



- Server consolidation and virtualisation
- Server architecture plan and design

Technology - desktop virtualisation



- Desktop architecture plan and design

Technology - network virtualisation



- Network architecture plan and design

The Guiding Principles



NETWORK



STORAGE



COMPUTE



APPLICATIONS

Rethink security to incorporate virtual

Automate everywhere and link to Enterprise management

Make tactical decisions today based on a target architecture for the future

SECURITY

MANAGEMENT-ORCHESTRATION-OPTIMISATION

The Guiding Principles



NETWORK



STORAGE



COMPUTE



APPLICATIONS

Consolidated, virtualised, automated

Architected, virtual by default, cloud ready

Managed, optimised and power efficient

SECURITY

MANAGEMENT-ORCHESTRATION-OPTIMISATION



20|20
Vision in 2010

A Model for Dynamic Computing

Thank You

Jon Farrell
Enterprise Architect
Dimension Data Australia
jon.farrell@didata.com.au