'Why' Ultra High Availability and Integrated EMC-Brocade Data Replication Networks

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Abstract

The EMC DLm8000 provides a powerful mainframe virtual tape library that is tightly integrated with the EMC VMAX enterprise storage platform, and SRDF data replication. This integration enables consistency of tape & DASD data between production and recovery sites for large, transaction-oriented enterprises such as banking, brokerage and insurance companies, where disaster restart with predictable Recovery Time Objectives (RTOs) is a must. This consistency between tape & DASD data at both production and recovery sites, provides the shortest possible RPO and RTO for critical restart operations. At the heart of a multi-site business continuity architecture is an equally robust, highly available, tightly integrated network. This network consists of Brocade FICON Directors connecting mainframes to VMAX and DLm8000, as well as Brocade FCIP extension technology and MLXe routers for the long distance replication. This session will inform you how to architect and manage the optimal business continuity architecture with these platforms and 'why' it should be considered.

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Agenda-Overview

- Introduction-why worry/ why be prepared?
- IT resilience vs. traditional DR/BC planning
- Virtual tape vs. physical tape
- DLm8000 overview
- DLm8000 replication
- Data Center Networks: FCP/FICON and IP synergy
- Integrated synergistic replication network solutions
- Conclusion and questions.

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Why Worry?

Lightning Strikes

Hurricanes / Cyclones

Earthquake

Tornadoes and other storms

Tsunami

Data theft and security breaches

Overloaded lines and infrastructure

Cut cables and power

Terrorism

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8/13/2013

Where's Your Data Safe?

ISAT GeoStar 45
23:15 EST 14 Aug. 2003

Be prepared

- Data availability and business continuity offer a vital competitive edge that is crucial to the success of organizations.

- Organizations must adopt proven business continuity and recovery management strategies, in addition to storage and network technologies, to successfully address operational risk, availability, and security challenges.

- One way to address these challenges is to plan and implement a resilient IT architecture.

IT resilience

- The ability to rapidly adapt and respond to any internal or external disruption, demand, or threat and continue business operations without significant impact.
  - Continuous/near continuous application availability (CA)
  - Planned and unplanned outages
- Broader in scope than disaster recovery (DR)
  - DR concentrates solely on recovering from unplanned events
- **Bottom Line**
  - **Business continuance is no longer simply IT DR**

Resilient architecture vs. traditional DR planning

- Although it is related to planning for disaster recovery, planning for a resilient IT architecture is much broader in scope.

- A resilient IT architecture requires organizations to go beyond planning for recovering from an unplanned outage.

- Planning a resilient IT architecture implies planning for avoidance of outages, that is planning for business continuance.

- A key component in a resilient IT architecture for zEnterprise mainframe customers is the EMC Disk Library for mainframe (DLm 8000) virtual tape solution with its unique synchronous replication capabilities via SRDF.

VIRTUAL TAPE VS. PHYSICAL TAPE

VIRTUAL TAPE VS. PHYSICAL TAPE

- Floor space
- Tape vaulting costs
- Cost of new tape media
- Moving parts
- Schedule/unsched   ce windows
- Replication v
- SECURIT
- Fast   e for all tape jobs
- R   atch window
- CR   gs

TCO & ROI Proven!

That Train Has Left the Station!

Tape On Disk is more cost effective and has more benefits than Physical Tape

"Customer" Measured CPU & Time Savings
March 2012 SHARE

HSM Migrations
32% reduction in CPU usage
9% more data

Daily Backup
55% reduction in clock time
27% reduction in CPU usage

HSM Recalls
2,000 recalls per day
From 120 sec. to <1 sec.
27% reduction in CPU usage

HSM Recycles Migration Data
58% reduction in CPU usage
38% reduction in clock time

HSM Recycles Backup Data
53% reduction in CPU usage
41% reduction in clock time

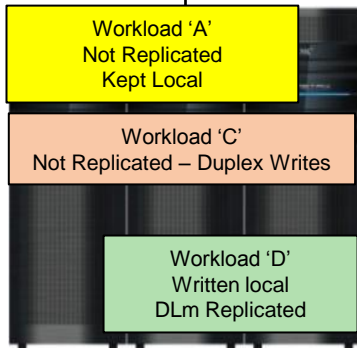# There still are some use cases for tape

MANY WAYS TO DO IT

DLm6000 Virtual Tape Configuration

Local Production Site

3 – z10's
z/OS 1.12
17 LPAR's – 2 Sysplex

Remote Site (~ 800 miles)

FICON Directors Brocade DCX8510 FOS 7.0.0c	FICON Channel Extension	FICON Directors Brocade DCX8510 FOS 7.0.0c

Workload 'A'
Not Replicated
Kept Local

Workload 'C'
Not Replicated – Duplex Writes

Workload 'D'
Written local
DLm Replicated

Workload 'B'
FICON Channel Extension
Not Replicated

Workload 'C'
Not Replicated – Duplex Writes

Workload 'D'
Target
DLm Replicated

DLm IP Replication

DLm

DLm

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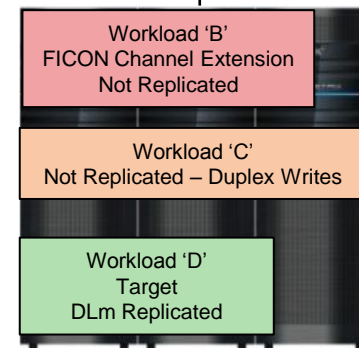
DLM8000 REPLICATION

# EMC DLm8000
Unprecedented scale, resiliency

14330: Virtual tape: What's new with the EMC Disk Library for mainframe? Tuesday, August 13, 2013: 3:00 PM-4:00 PM Room 209

- High-availability (HA) DLm architecture
- 56TB – 1,792TB per VMAX (20K)
- 700MB – 2.8GB/second throughput
  - Up to 8 VTE's
- 512 – 2,048 virtual devices
- 4 –16 FICON attachments
- SRDF/S and SRDF/A replication for tape
- GDDR for automated recovery
  - Geographically Dispersed Disaster Restart
- Universal Data Consistency™ DASD & tape
- Transparent to mainframe
- 3-13 cabinets

DLm8000 - Universal Data Consistency
Data Consistency for Tape and DASD

IBM Mainframe

EMC DLm8000

Compressed Tape Data

EMC VMAX

CKD DASD

Single Consistency Group
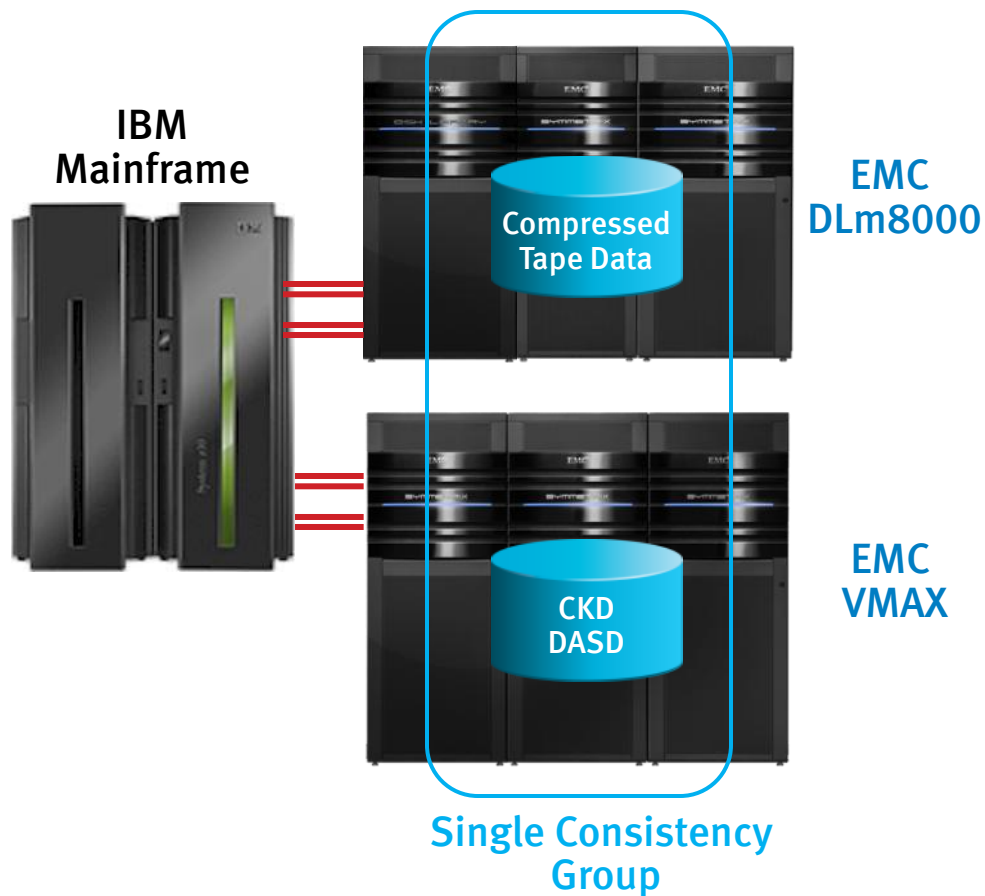
- VMAX storage arrays for both Tape and CKD DASD
- Remote Replication using SRDF/A or SRDF/S
- Local Replication using TimeFinder
- Full Failover Automation using GDDR
  - Planned Failover
  - Unplanned Failover
  - Planned D/R Test
- Single replication methodology
- Tape and DASD Consistent to one another!

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3 Site Star w/SRDF, ConGroup, GDDR*
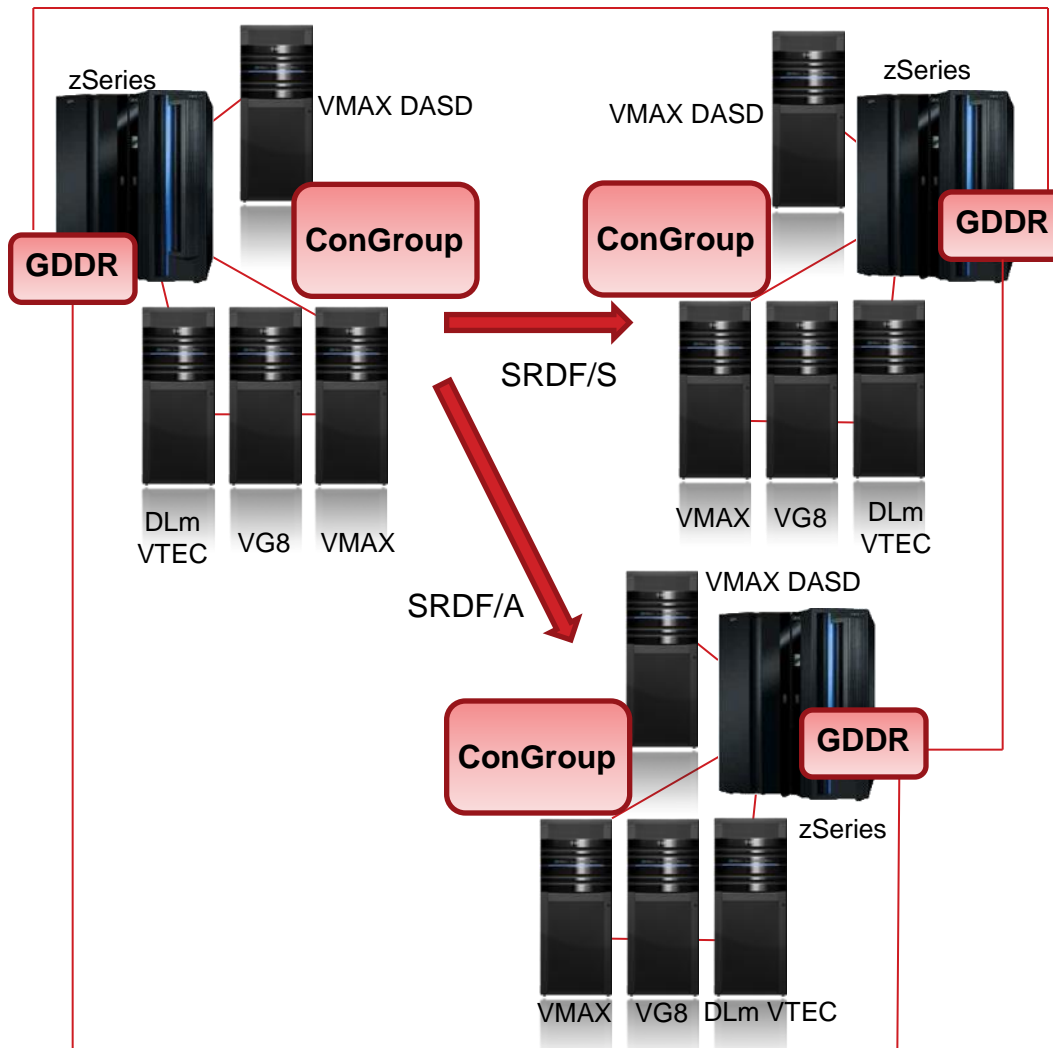
- SRDF/S is used between Primary Site and Local DR Site

- SRDF/A concurrently replicates between Primary Site and Remote DR Site

- GDDR Monitors all 3 Sites

- GDDR Controls Failover to Either Local or Remote DR Site in the Event of a Failure

- ConGroups ensure DASD & Tape data consistency

* Geographically Dispersed Disaster Restart

Galactic Dispersed Disaster Restart?

Integrated Synergistic Replication Networks

Should Mainframe Professionals Worry About Networks?

Absolutely!

You must take charge of all of the components, including IP, that bring stability, availability and performance to your data center enterprise!

- As mainframe professionals we control EVERYTHING that it is within our power to control – stability is our keystone

- Why?

- Because management requires – our heritage demands – that we provide the most **robust, highly available and performance predictable environment** we possibly can

- In the past we have usually only had to worry about those characteristics as they applied within a data center

- But more and more it is necessary to provide that robust, five-9s of availability, predictability and scalability of our environment across and **between** data centers

- LAN / WAN and FCIP technologies have historically not been highly available or predictable so **YOU** must control it and not allow networking people to affect your operations!

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Questions to ask

- Will Director-class IP switching and redundant connections be deployed to ensure high availability
- Will multiple routes really be isolated from each other
- Will static routing be deployed so that an outage will not find FCIP and the network switches fighting over recovery
- Do the network folks really understand storage?
- Do they always provision for five-9s availability?
- Is their SLA to respond in minutes to errors / issues?
- Do they always advise everyone before changes?
- Do they follow good change control practices?
- Do they always make sure the WAN throughput
- Are maximum and multiple, robust paths are used?

WAN Network Example

IP Networking group told mainframers that multiple paths connected the two building sites and showed them a diagram like this.
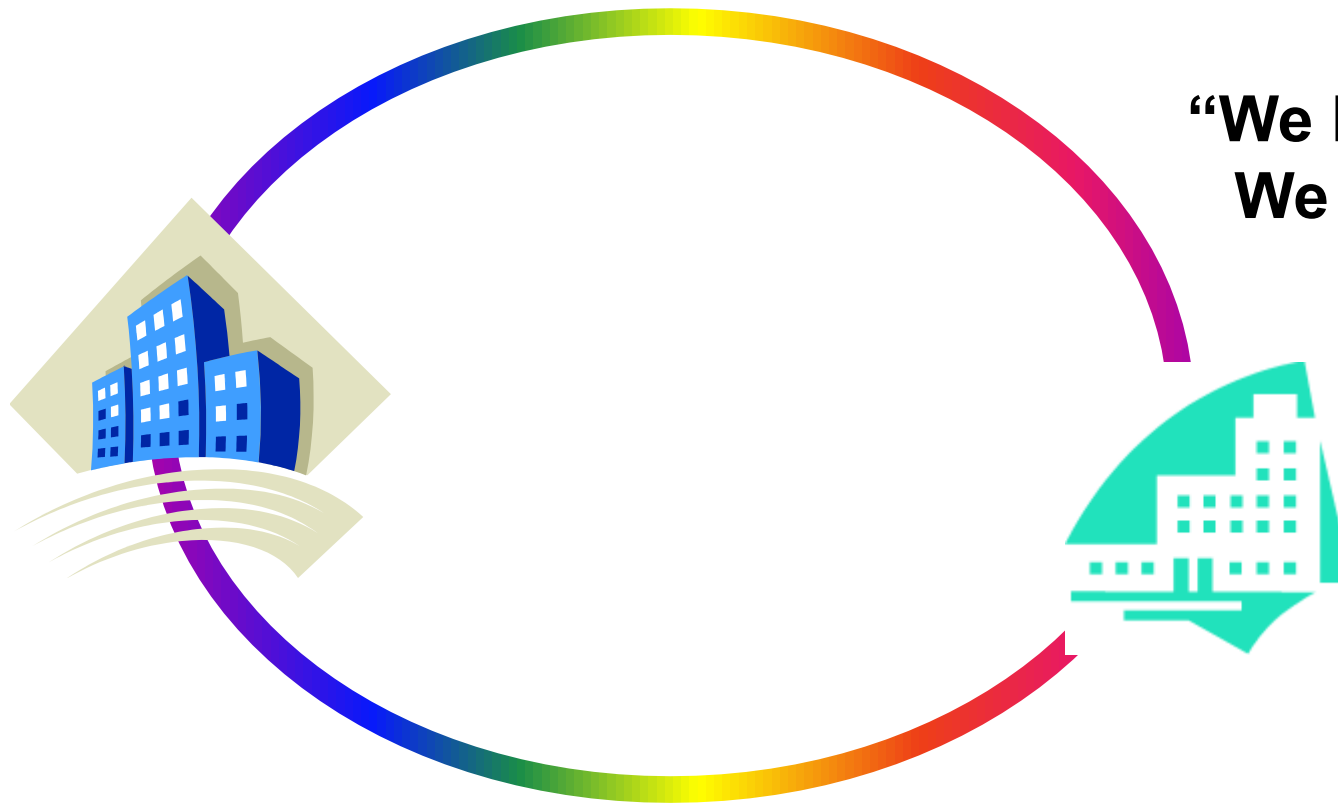
"We have you covered! We have your back"

This mainframe group believed them since they had never worried about WAN connectivity before anyway.
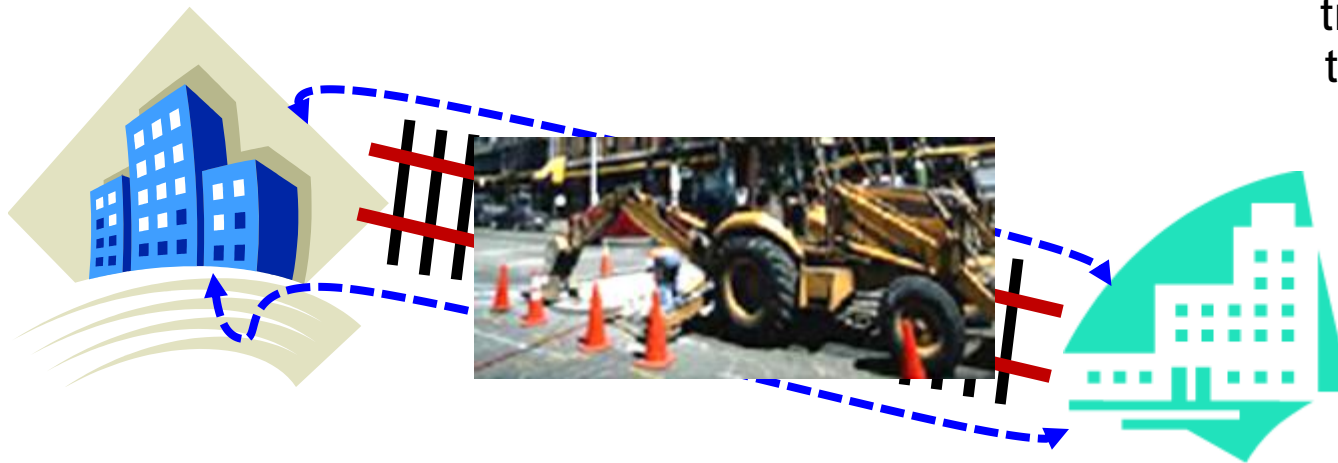
Metro Distances

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WAN Network Example

In reality, the two WAN trunks ran along a railroad right-of-way, one trunk on each side of the tracks. No more than 12 feet separating the trunks.

As luck would have it, and **always** seems to happen, the railroad was working on the tracks and cut both trunks and severed site-to-site communications!

So The Moral Of This Story is:

If you are not in charge of your links
NOBODY IS!

Synergy – All Components Working in Harmony

Multi-Sourcing / Multi-Vendors simply cannot provide a synergistic environment

- Synergy : two or more things functioning together to produce a result not independently obtainable.

- Meeting up-time requirements, reducing costs and ensuring efficiencies – while at the same time architecting for growth and scalability – is a very difficult proposition

- Unless all of the data center components are themselves synergistic (designed to work together), it is almost impossible to meet all of your strategic goals while monitoring, managing and troubleshooting a disparate collection of vendors, hardware and services.

- Achieving high availability in that environment is challenging enough but then consider the complexity of change management, incident management, reporting and reviews.

STRONGER TOGETHER

# Resilience of Data Center Components

Considerations for Single Vendor versus Multi-Sourcing / Multi-Vendors

- Streamline the enterprise through consolidation of resources and new technology

  - provides end-to-end high availability while lowering the overall monthly maintenance cost and other significant operating costs (e.g. energy, footprint, management, etc.)

- "One throat to choke"

- Take back control of your data

- End users usually do not have an integrated suite of monitoring and/or management tools for their systems that cross vendor lines. So there often is no single view of the performance and health of all of the links and devices on the FC as well as the Ethernet LAN/WAN.

Hardware Components

Resilient, synergistic networks
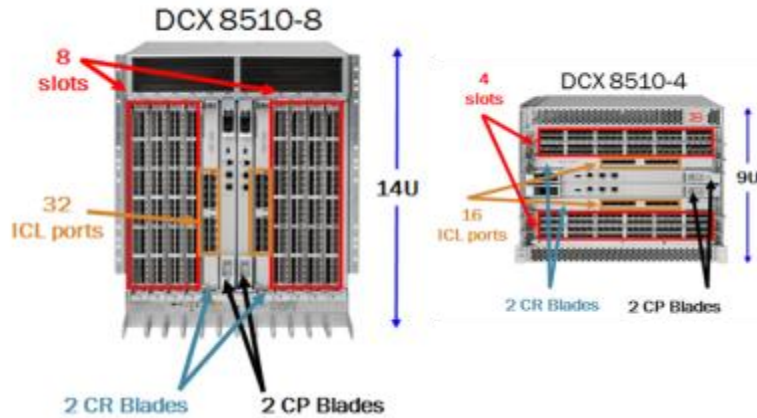
DCX 8510 Gen5 FICON/FCP Directors

MLX Series High-Performance, Multiservice Routers

Ultra High Performance, Superior RAS


FX8-24 Extension Blade

7800 Extension Switch

Brocade Network Advisor (EMC Connectrix Manager)
Simplified Management for SAN, IP and Converged Networks

- Unified Network Management product for SAN, IP, Application Delivery, and Converged Networks
  - One management GUI across FC, IP, FCoE protocols
  - Custom views based on Operator specialization
  - Flexible user management with Role Based Access Control

- Standards-based architecture

- Provides seamless integration with leading partner Orchestration frameworks
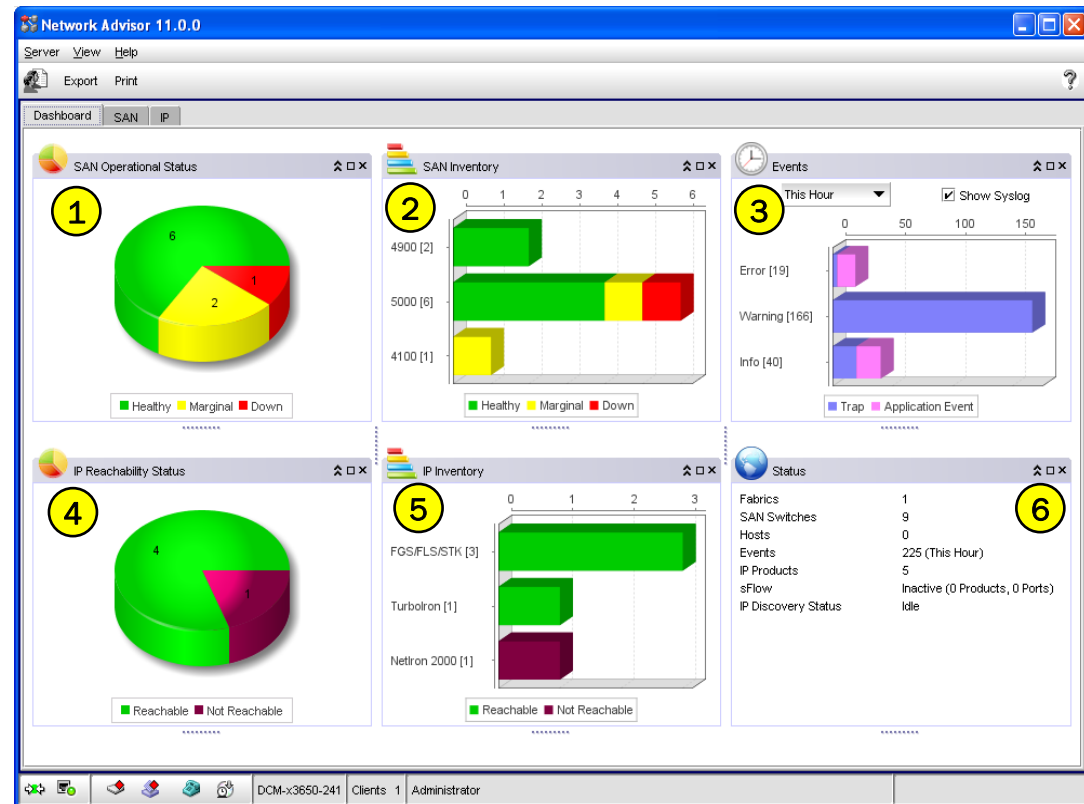
①	SAN Operational Status	④	IP Reachability Status
②	SAN Inventory	⑤	IP Inventory
③	Events Summary	⑥	Status Summary

Summary and Conclusions

- Trend towards planning a resilient architecture
- Take control of your network and decisions
- An integrated network has many advantages
- PPPPPP

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