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Grid Enabled Services Infrastructure

Enabling the 'Cloud' in the Dynamic Data Center

Agenda

Overview

Process

Implementation

Service Grid

Hardware

Networking Concerns

Storage

Building Xen Machines

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Overview

- History of the Data Center
- Challenges
- Requirements
- Tomorrow's History

History of the Data Center

Virtual Infrastructure Hardware + Virtual Infrastructure Software	Virtual Machines Capabilities developed in more efficient virtual space, but developed with a traditional mind set
Data Center Physical space, power and cooling	Systems Hardware, software, etc.

Challenges

- Satisfying high availability and agility requirements
- Meet Disaster Recovery Objectives
- Unpredictable mission growth
- Exponentially increasing data and rapidly growing user base
- Need to efficiently manage resources within flat IT budgets
- Integrating improved technology solutions
- Approaching size, weight and power (SWaP) limitations
- Costs increasing with user expectations and maintenance needs

Requirements for a community cloud

- Accredited Platform
- Scalable (Elastic)
 - Vertical
 - Horizontal
- More Efficient
 - Power
 - Cooling
 - Floor Space
- More Effective
 - New Service Delivery
 - Leveraging existing capabilities and knowledge
- Agile
 - Infrastructure
 - Software Development
- Cost Effective
- Maintainable
 - Highly available
 - Continual refresh
 - Hardware independent
 - Redundant
- Establish SLO/SLA (Active...Deployable)
 - Availability
 - Scalability
 - Performance

Tomorrow's History

Grid Enabled Services Platform Data Center design and planning (floor space, power and cooling), Hardware, Software, grid storage container, clustered applications server, integrated data source abstraction, grid database container, Directory Server and other capabilities as they are developed and integrated		Services Services Delta
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Process Disciplines

- Capacity Modeling – Identify and model physical constraints and generate resource overlay for environment
- Mission Engineering – Perform Community Analysis, Operations Analysis and Systems Analysis to determine Operational Requirements
- Agile Systems Engineering – Identify or Design and Develop Mission Components according to requirements
- Platform Simulation – Model impact of change
- Platform Integration – Develop integration plan and evaluate simulation results
- Platform Management – Implementation of Service Level Agreements and execution of system changes

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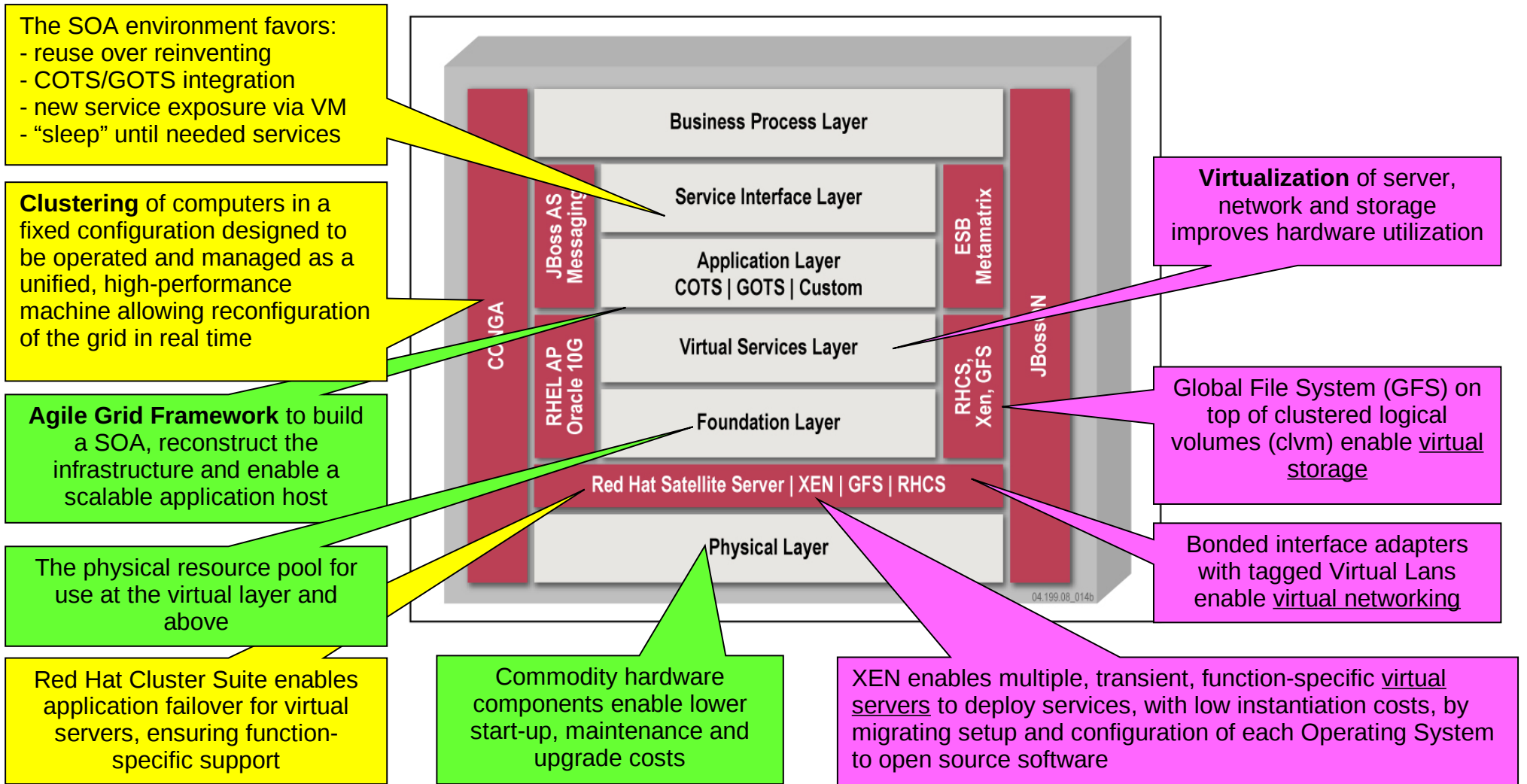
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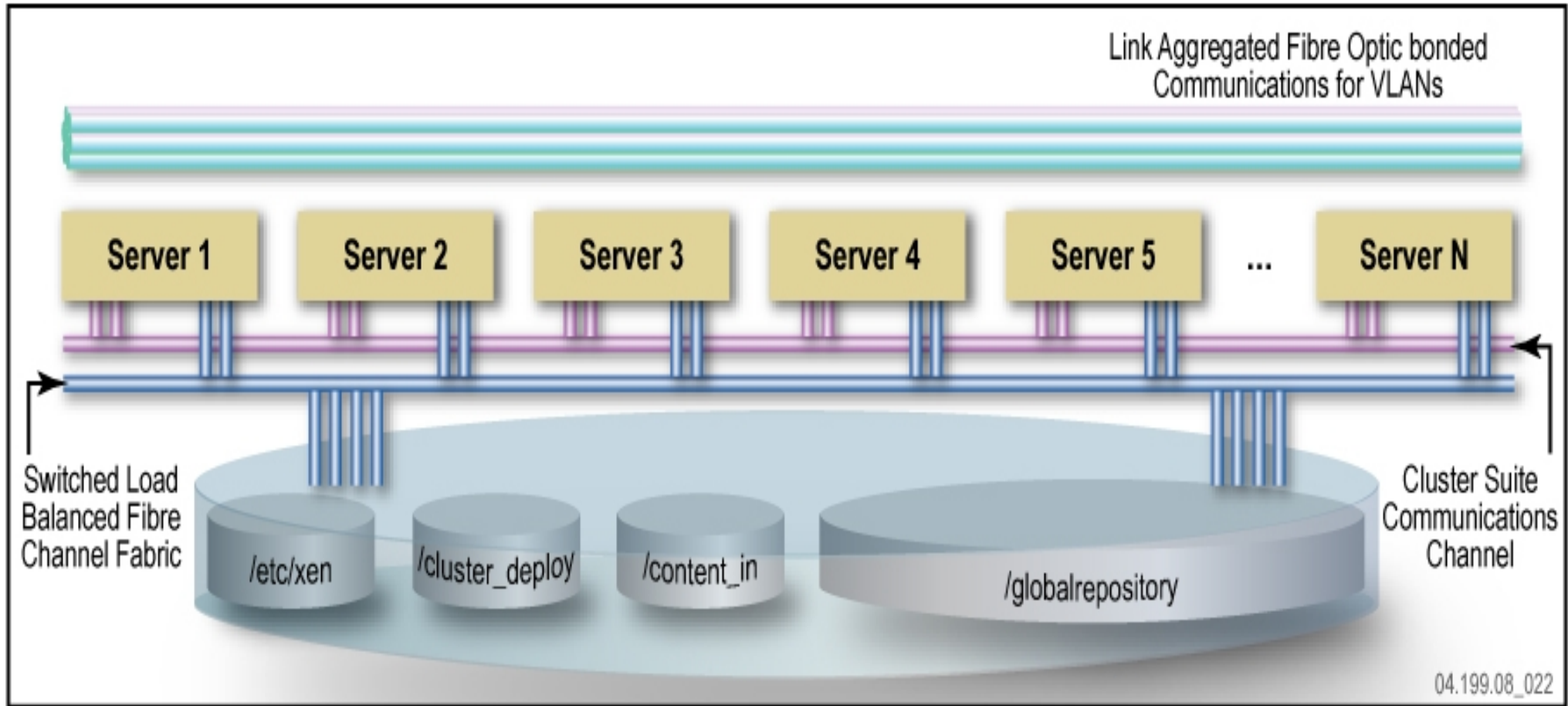
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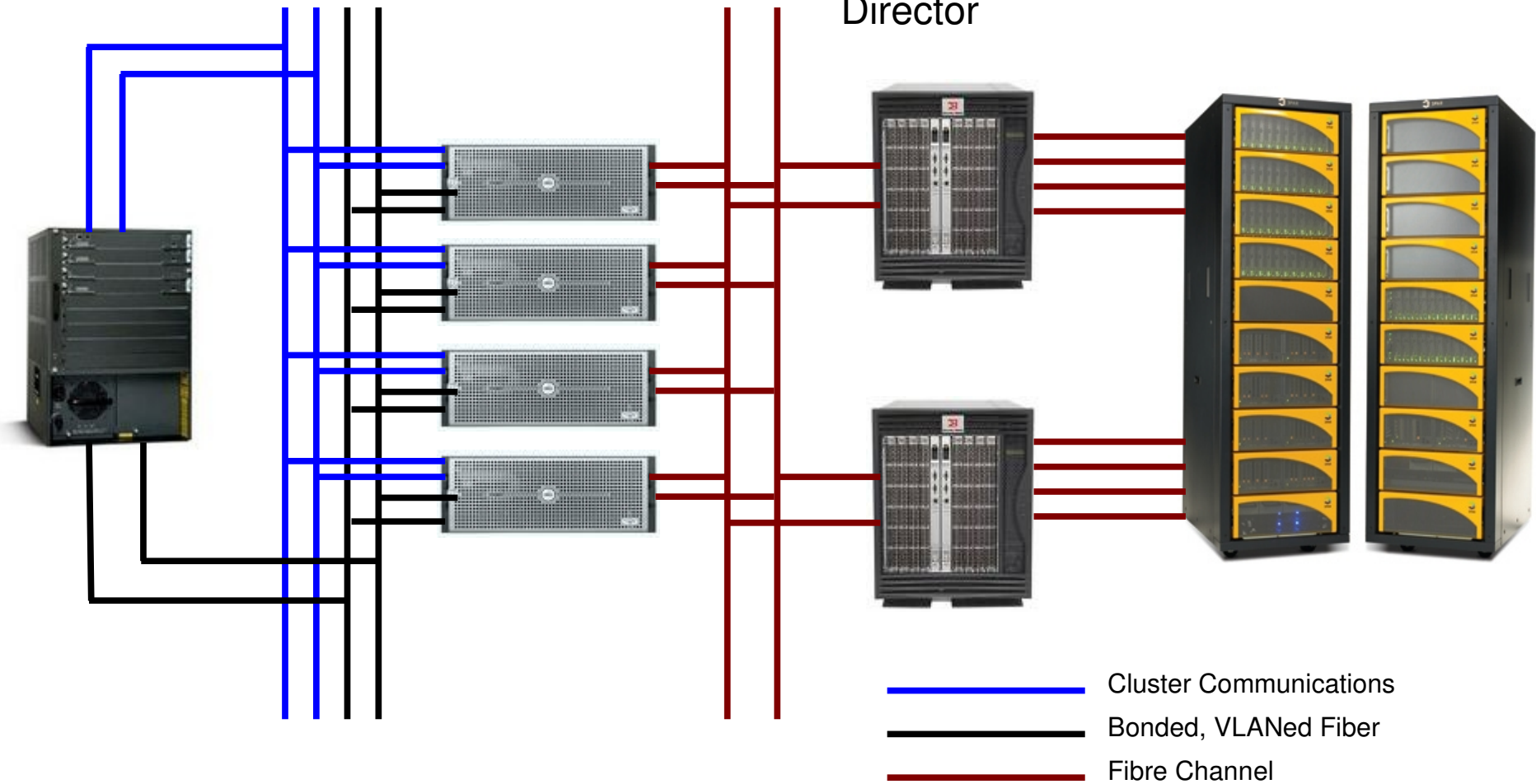
Hardware Configuration

Cisco 6509
with FSM

Dell 2950

Brocade 48000
Fibre Channel
Director

3Par S400



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Networking Concerns

- Xen Bridging
 - Configured to utilize 802.1q VLAN tagging. Bonded interfaces are connected to trunk ports on the switch. Xen bridging is configured to tag packets to match VLAN configuration on the network
- NIC Bonding
 - Link Aggregation Control Protocol (LACP)
 - The networking device manages aggregation. An etherchannel bundle must be configured on the switch.
- Cluster Communication
 - IGMP is utilized to manage the cluster. Close attention to multicasting traffic is required
 - IGMP configuration is required on Cisco switches
 - Cisco Pix, ASA and FWSM utilize security levels to manage multicast traffic.
 - ACL's can be utilized to manage outbound multicast traffic
 - Fencing
 - Fencing operations multicast a fence request. It is important to manage access to participating VLAN's. With Cisco firewalls this is accomplished through security levels of firewall interfaces.

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- SAN Considerations
 - Fabric Design
 - Thin Provisioning (SAN vs Host)
- Host
 - Clvmd
 - /dev/VolGrp01/LV<Xen Machine>
 - GFS
 - /etc/xen
- Xen Machines
 - Clvmd
 - GFS
 - /jbossdeploy
 - /landingzone
 - /contentrepo

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Building a Xen Machine

- Virt-install
 - Media Respository
 - Kick Start
 - Attach to appropriate physical storage
 - Bridge to network segment that has deployment server
 - Post build
 - Reconfigure to `/etc/xen`
 - Add storage
 - Add bridges
 - Add to cluster

Benefits

- Improve performance, availability, and cost-effectiveness of compute and data intensive applications
- Run growing volume of complex, resource-intensive, high-performance computing jobs within existing distributed infrastructure
- Provision additional capacity dynamically as it becomes available, and failover gracefully around unavailable capacity, without interrupting jobs in progress
- Reduces total cost of ownership of ongoing information technology (IT) operations by making more efficient use of available computing , storage, and network capacity
- Postpone the need for deployment of additional capacity to support growing transaction loads
- Provision, scale, and reconfigure virtualized computing resources within a service-oriented environment

Questions?

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