



# Managing the Content Flood

Tools for handling Content Management Workflow as Dataflow

Presented by: Floyd Christofferson  
*Sr. Business Development Manager*

Proprietary and Confidential

# How to Absorb Lots of Data...?

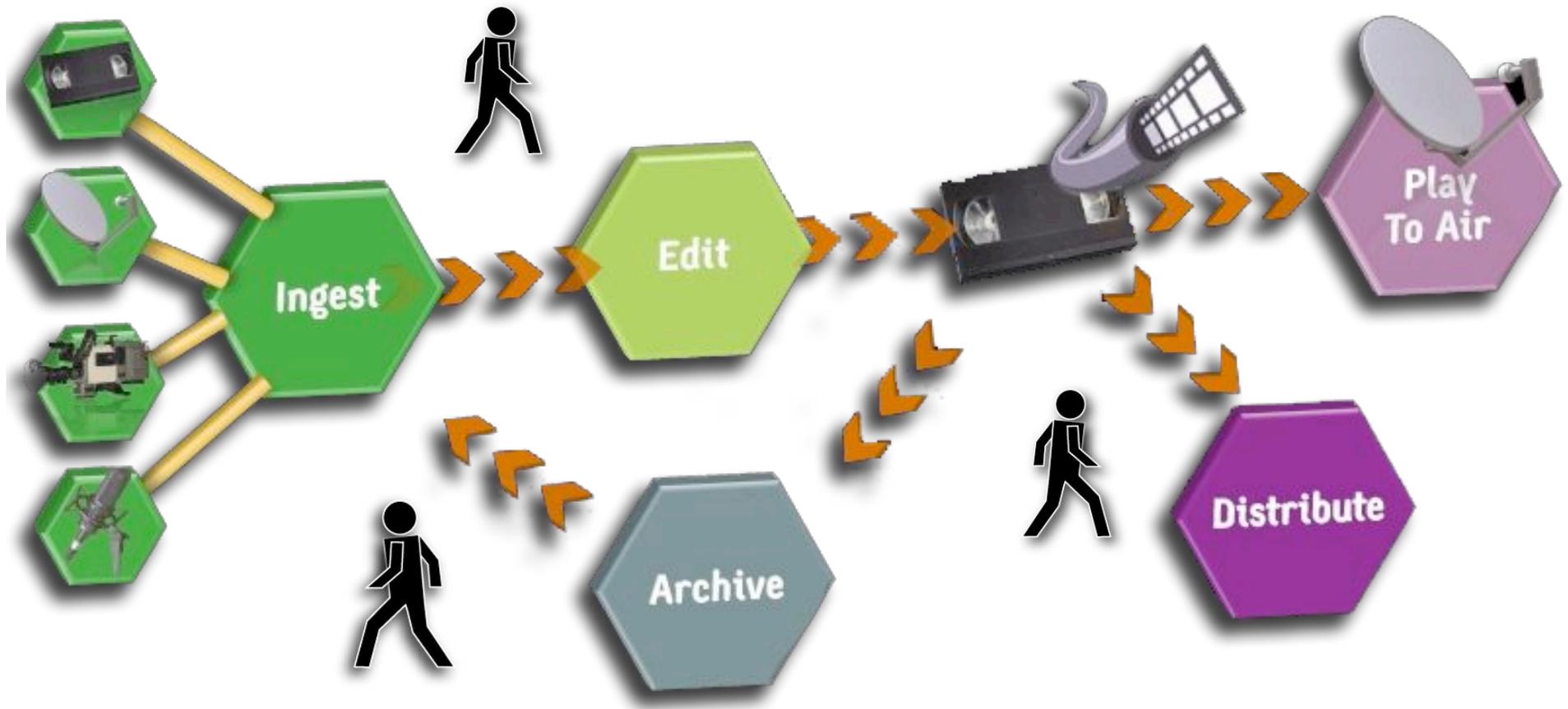
## *Coping with Ever-Increasing Data Flow*



# A Familiar Set of Problems

- How to deal with a rapidly growing flood of new content?
- How to link workflow to an **active archive** of historical content?
- How to find content within multiple tiers of storage?
- How to provide users with secure access, local or remote in a rapid turnaround?
- How to achieve all this while keeping the costs at a minimum?

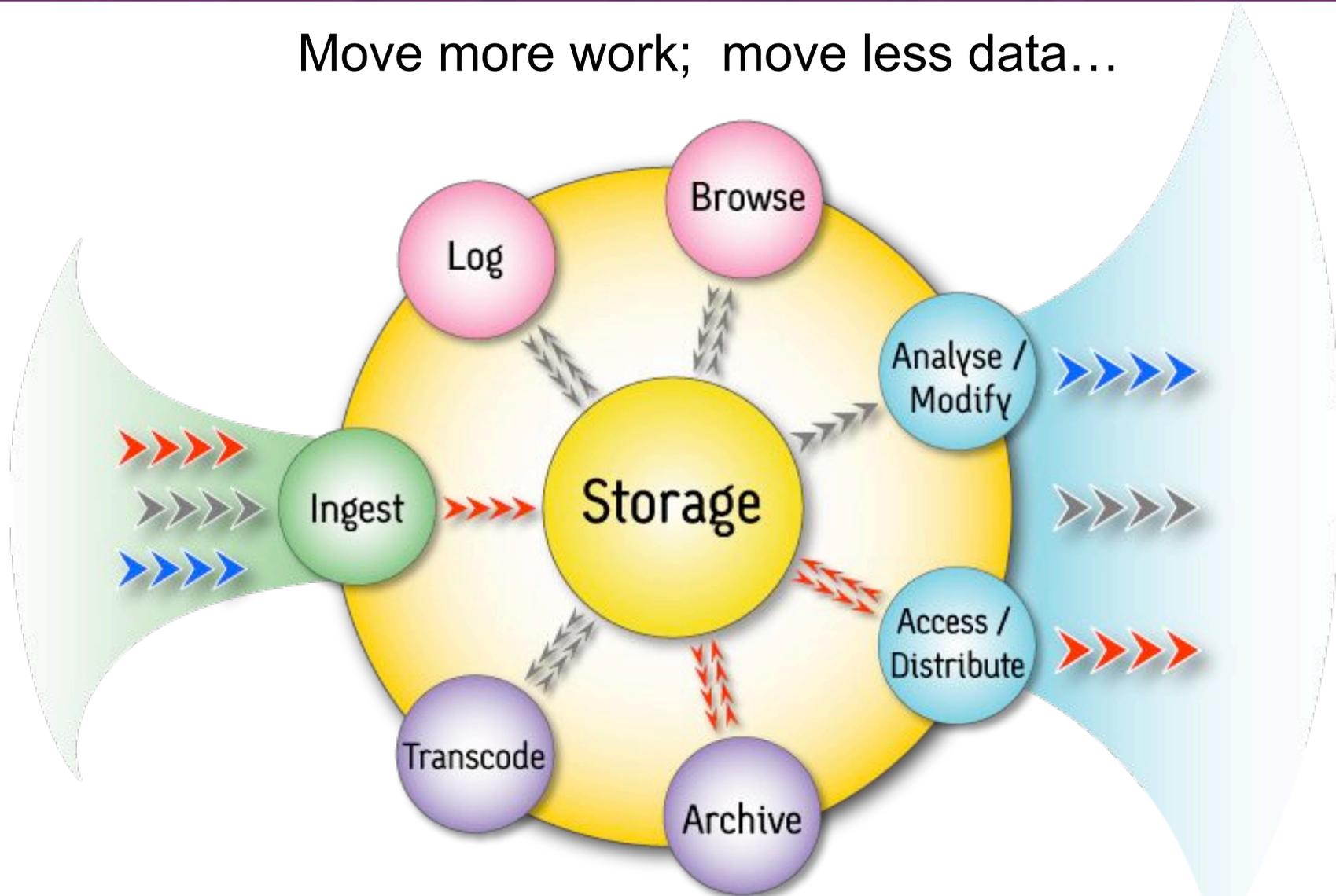
# Old Workflow -- Disjointed, Manual



Repetitive, Slow, Labor-Intensive

# Shared Dataflow Solves the Problem

Move more work; move less data...



Content I/O

5/30/07

Dataflow

Slide 5

Digital Formats



The common theme:

Working with shared data in a  
collaborative environment

Virtually every major Hollywood film  
is resides on SGI platforms  
in the digital workflow



# Hollywood Chooses SGI Storage & Servers



# So why does Hollywood choose SGI?

SGI has repeatedly implemented  
affordable solutions to  
large-scale content management problems.



# Case Studies

## Success Story

### CapitalFX



"We selected SGI for the proprietary CXFS shared filesystem, so that we all can work simultaneously."

— George Ilko, IT director, Capital FX

## Success Story

### Reel FX Creative Studios

"We tried IDE and SCSI RAID, Windows RAID, and NAS and SAN units from a couple of companies, but nothing was designed the way we work, which is very similar to the way a lot of facilities work. Then we started talking to SGI and we found that SGI NAS 2000 was designed the way we work."

— Scott Correll  
IT Director  
Reel FX



## Success Story

### EFILM A Deluxe Company

"Our technology team selected SGI because it's the only supercomputing company that can provide a robust development environment and handle our high-speed data requirements."

— Joe Matza, President, EFILM



## Success Story

### SGI InfiniteStorage Solutions At Pacific Title

"The CXFS API can push the data fast enough so that we no longer have any bottlenecks that bog down the data flow. We chose CXFS because it is simply the only file system that can handle the speed and the throughput we need."

— Andy Tran,  
Senior Executive Vice President  
and Chief Technical Officer,  
Pacific Title & Art Studio



## Success Story

### SGI Technology Drives Faster Parallel Processing of HD, 2K, 4K for Deliverables

"The statistical advantage that we and SGI created with ProdNet is the increase in speed overall. From the time the film is put up on the telecine or scanner to the time the DVD is completed, we have basically reduced the time-to-market by half."

— Kevin Sanders,  
Chief Technical Officer, Media Management  
Services, Ascent Media Group



Ascent Media Group Photos by John Benson Photography

## Ascent Media Group Runs Speedy and Secure with SGI Servers, Storage and Networking

To enable one of the world's most secure film and TV post production facilities, Ascent Media Group (AMG), a long-time customer of Silicon Graphics, selected SGI® server, storage and networking technology as the heart of a new state-of-the-art facility in Burbank, Calif. An industry leader in content creation, post-production and distribution of film and television, AMG purchased the SGI hardware and software to deliver faster parallel processing of 4K and other high-resolution formats as part of their data-centric production network solution, known as ProdNet. The solution offers AMG's studio clients ultra-secure methods for accommodating a large variety of deliverables. With content piracy estimated at \$3.5 billion annually, the 100,000-square-foot building, which was gutted to the walls, has been rebuilt to be one of the most modern, most secure, all-digital facilities in the world. SGI Professional Services worked hand in hand with AMG.

to design and integrate the ProdNet system, which is dedicated to manufacturing, repurposing, and distributing large media assets in huge volumes, with no concession to bandwidth limitations.

Ascent Media Group's deliverables include digital intermediates in HD, 2K or 4K resolution for a host of Hollywood blockbusters, post-production and satellite delivery of television programming as well as digital cinema masters, multi-language versions for home video, DVD, and a variety of entertainment content for the exploding market in wireless mobile devices. With studio clients requiring more efficient post-production workflow for film releases and—in another effort to combat piracy—reduced time-to-market for home video and DVD releases, AMG searched for a partner to facilitate these requirements. AMG chose SGI to provide equipment and services as SGI has

# What does SGI offer?

## 1) **SGI Software:**

- Key tools to enable high-performance workflow

## 2) **SGI Hardware:**

- **Storage:** a complete range of solutions
- **Servers:** from small node to large

## 3) Deep Industry Experience & Partners



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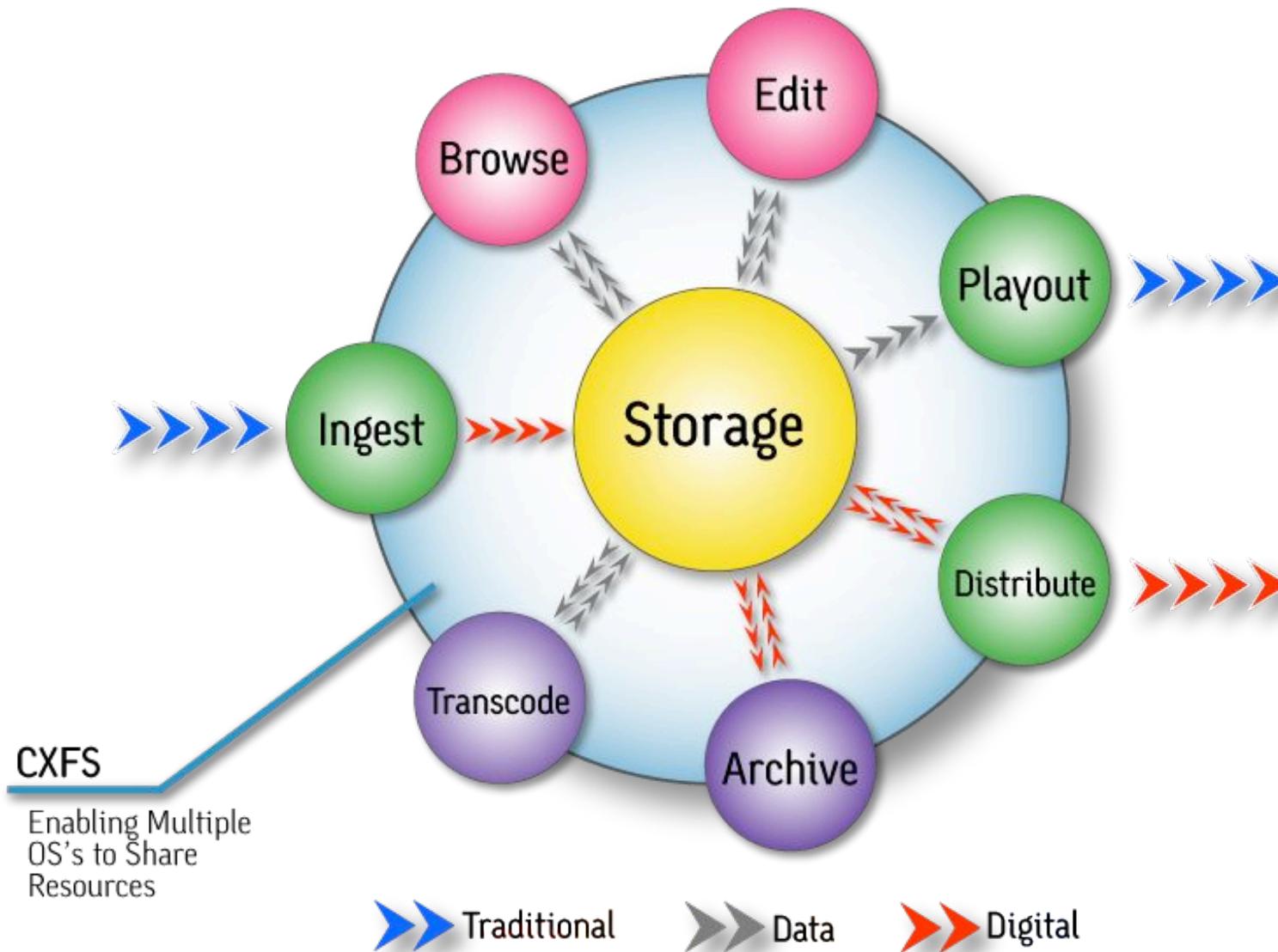
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- **Servers:** from small node to large

## 3) Deep Industry Experience & Partners



# CXFS: True File Sharing...

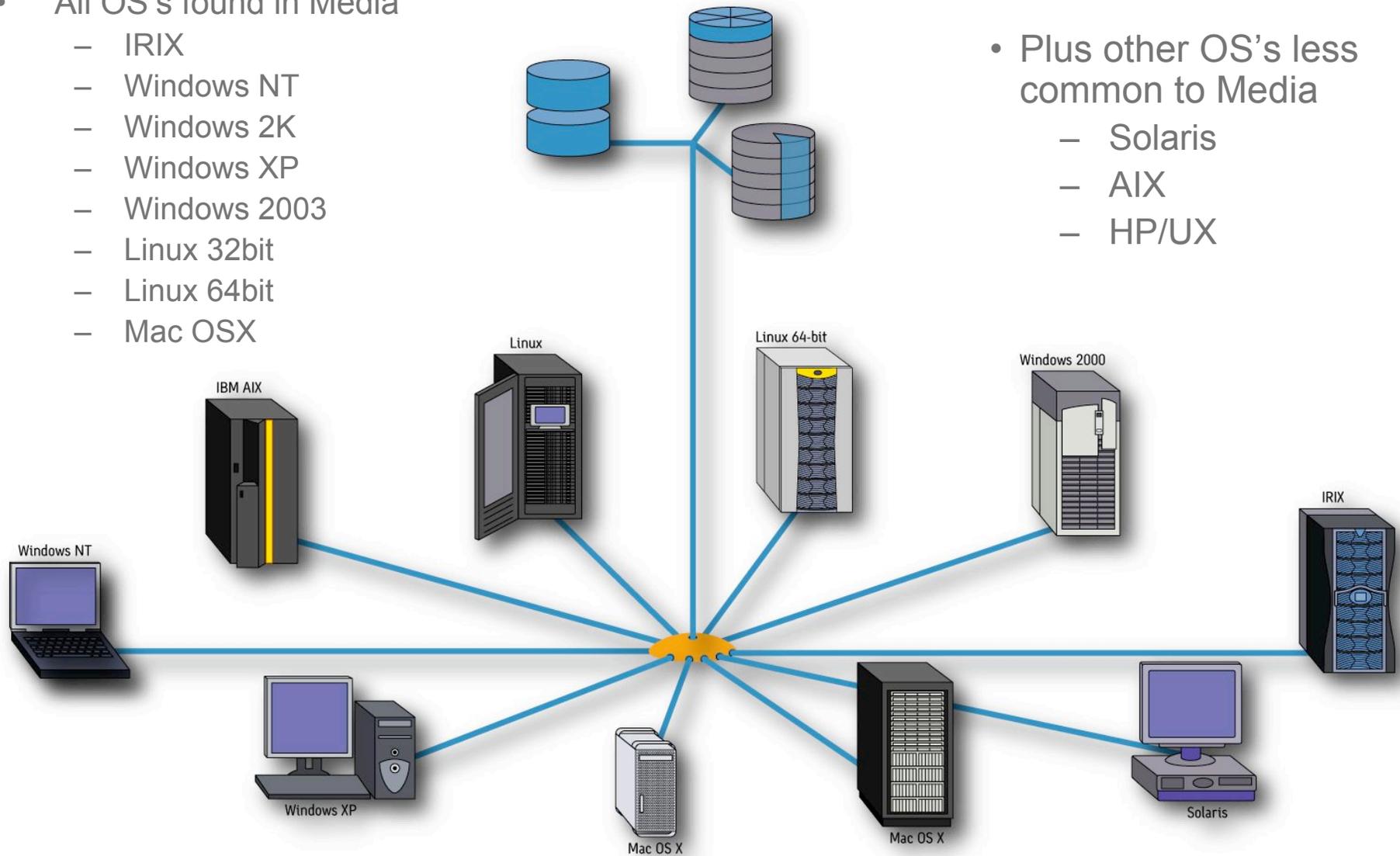


# All Operating Systems Welcome...

Each Client Views Shared Storage as Direct Attached

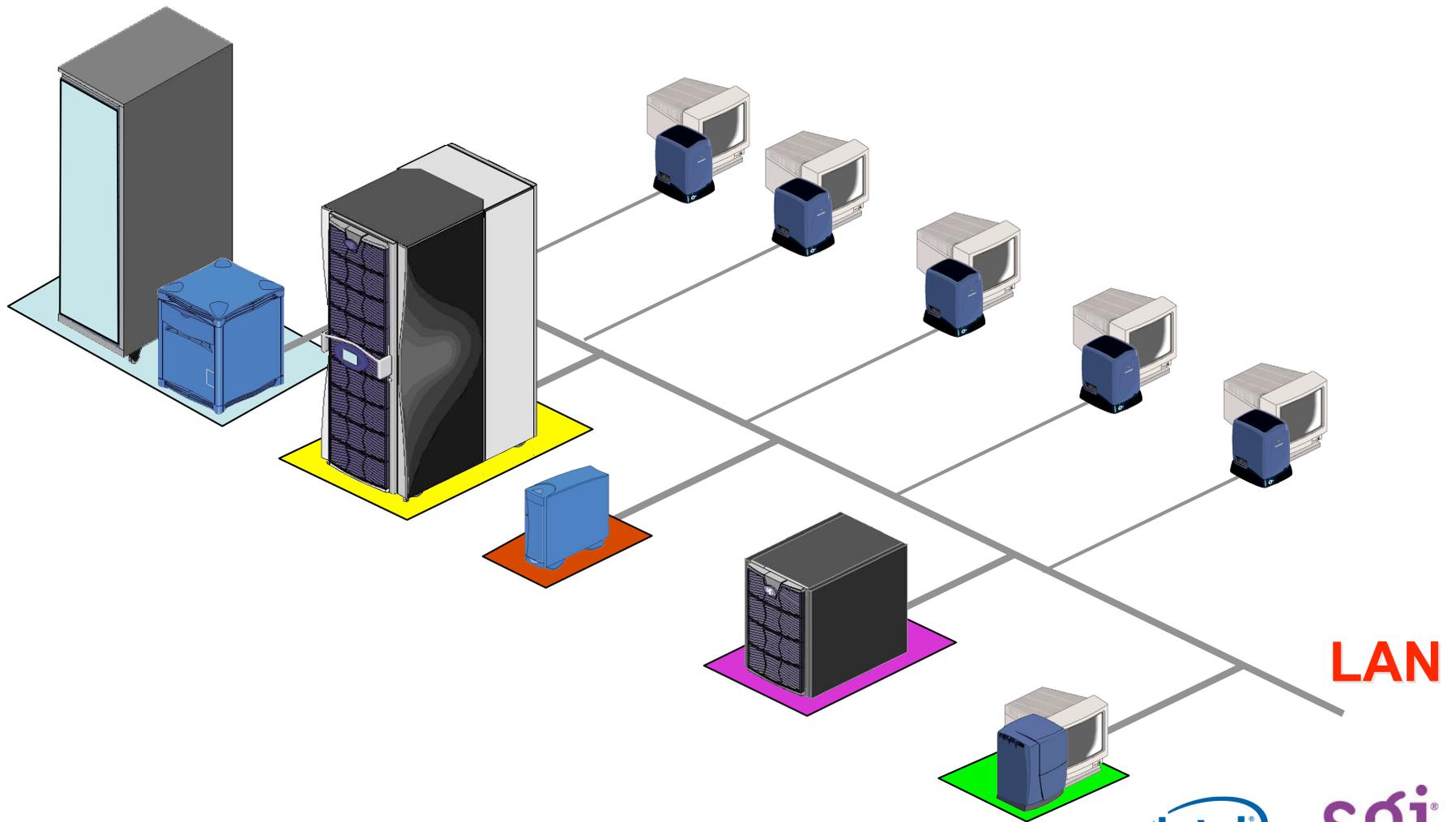
- All OS's found in Media
  - IRIX
  - Windows NT
  - Windows 2K
  - Windows XP
  - Windows 2003
  - Linux 32bit
  - Linux 64bit
  - Mac OSX

- Plus other OS's less common to Media
  - Solaris
  - AIX
  - HP/UX



# Typical LAN-Based File Sharing...

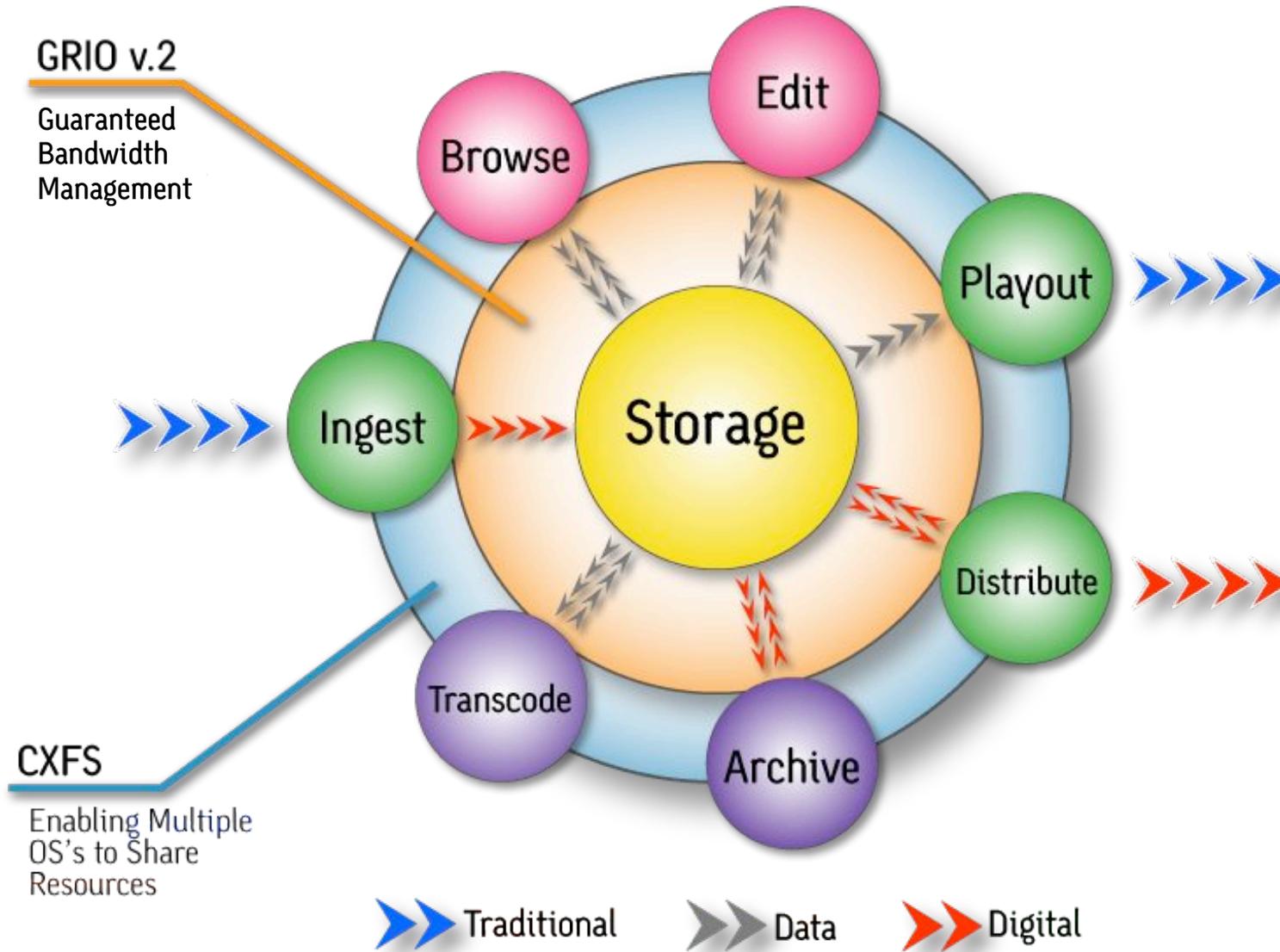
Storage islands, bottlenecked workflow...



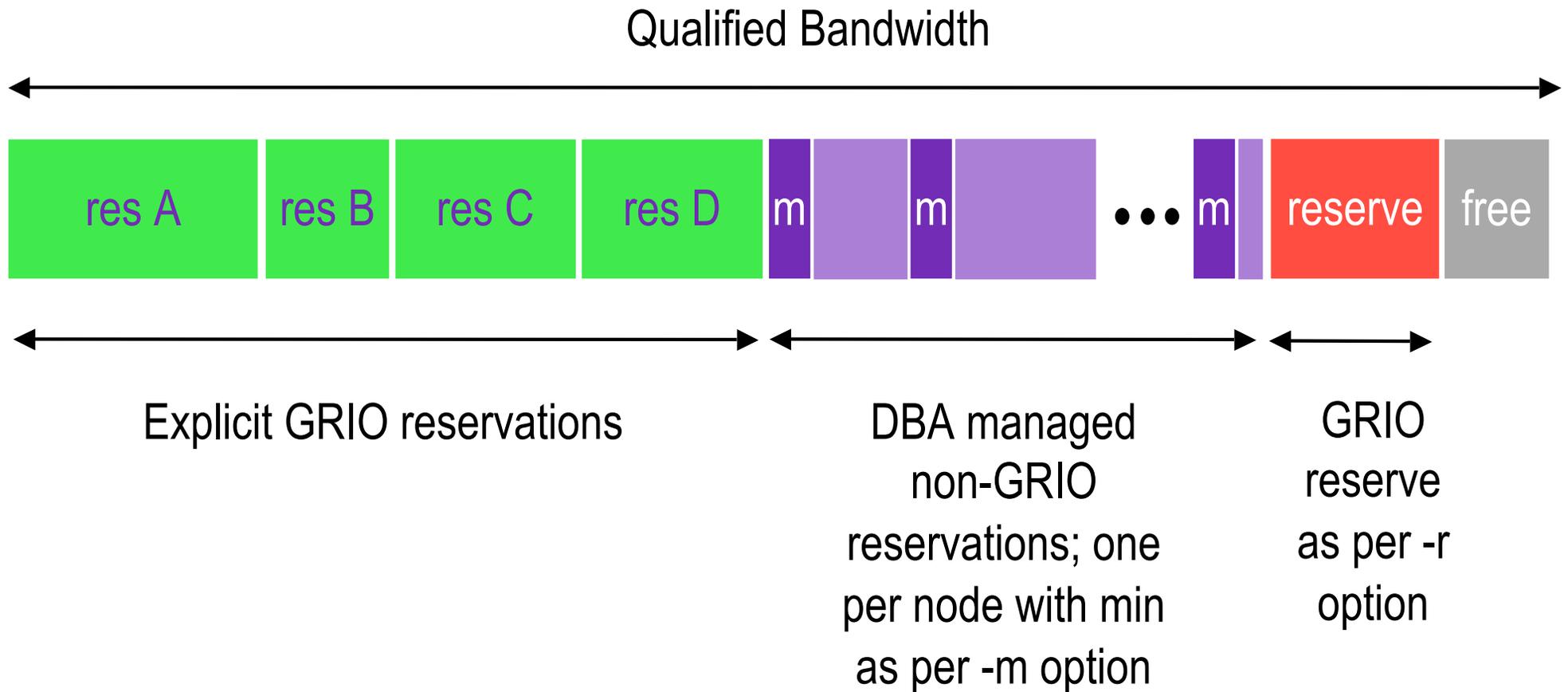




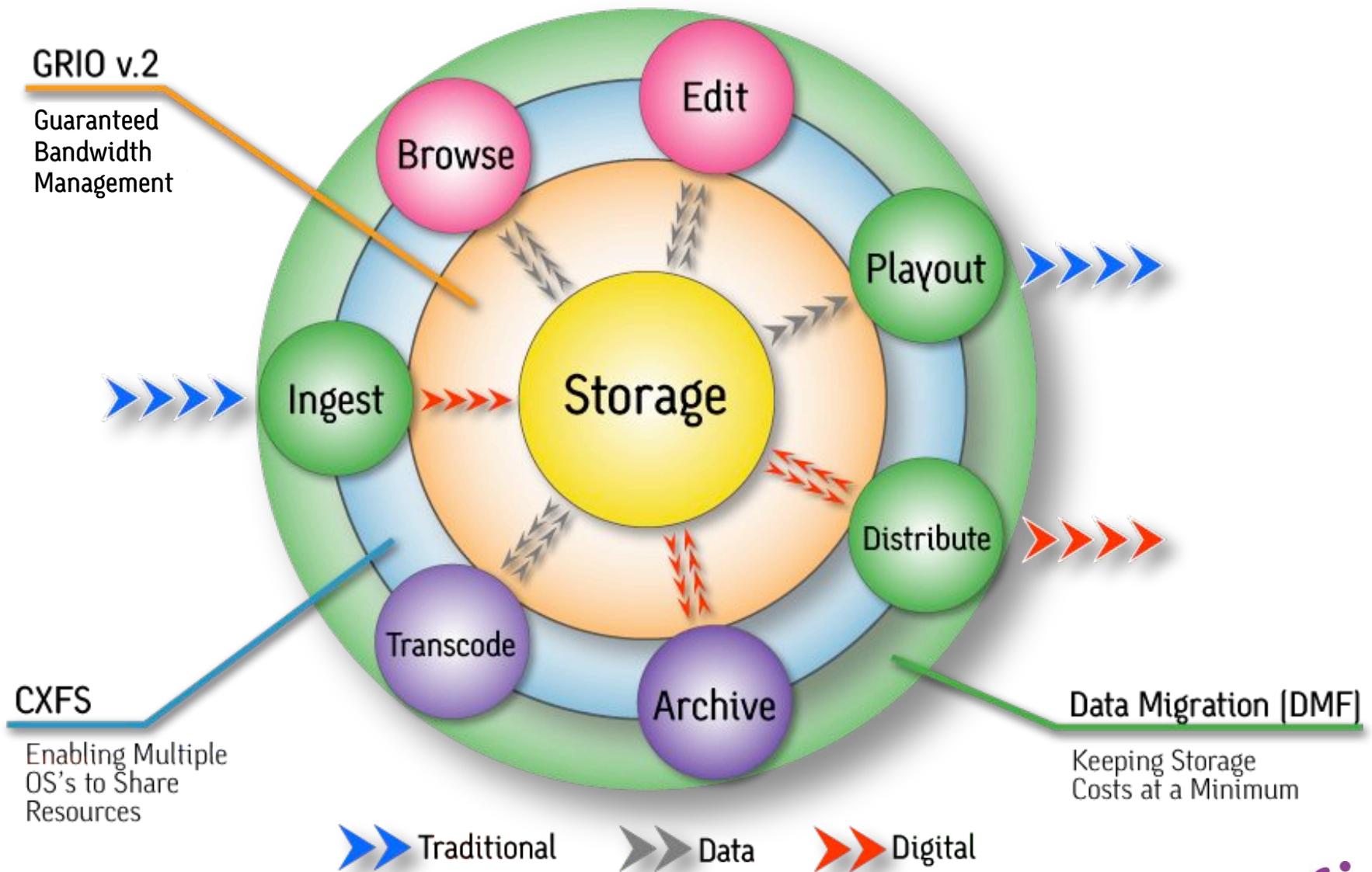
# GRIO: Deterministic Bandwidth Management...



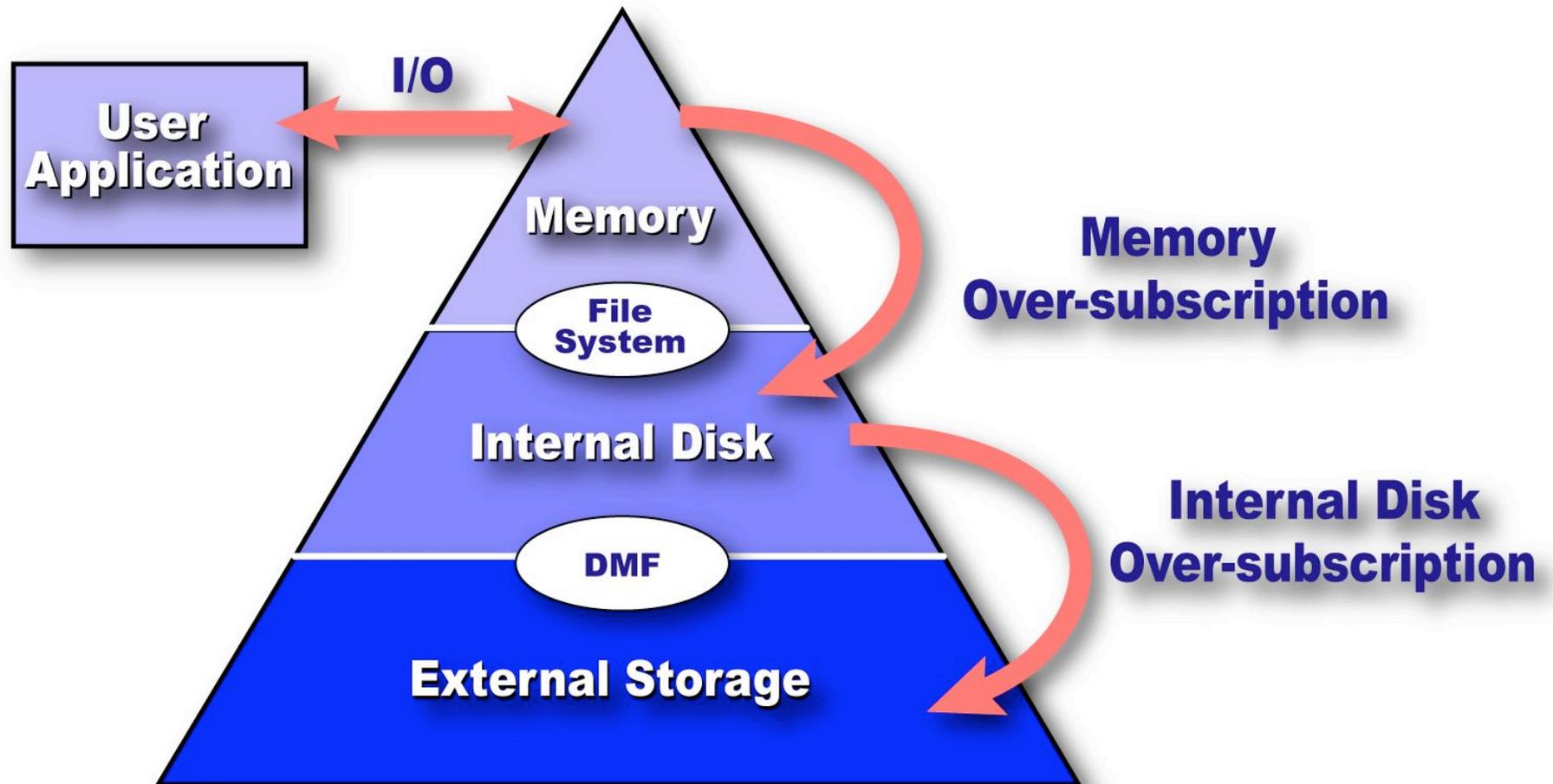
# Bandwidth Management with GRIO V.2



# DMF: Virtualizing multiple tiers of storage as one...



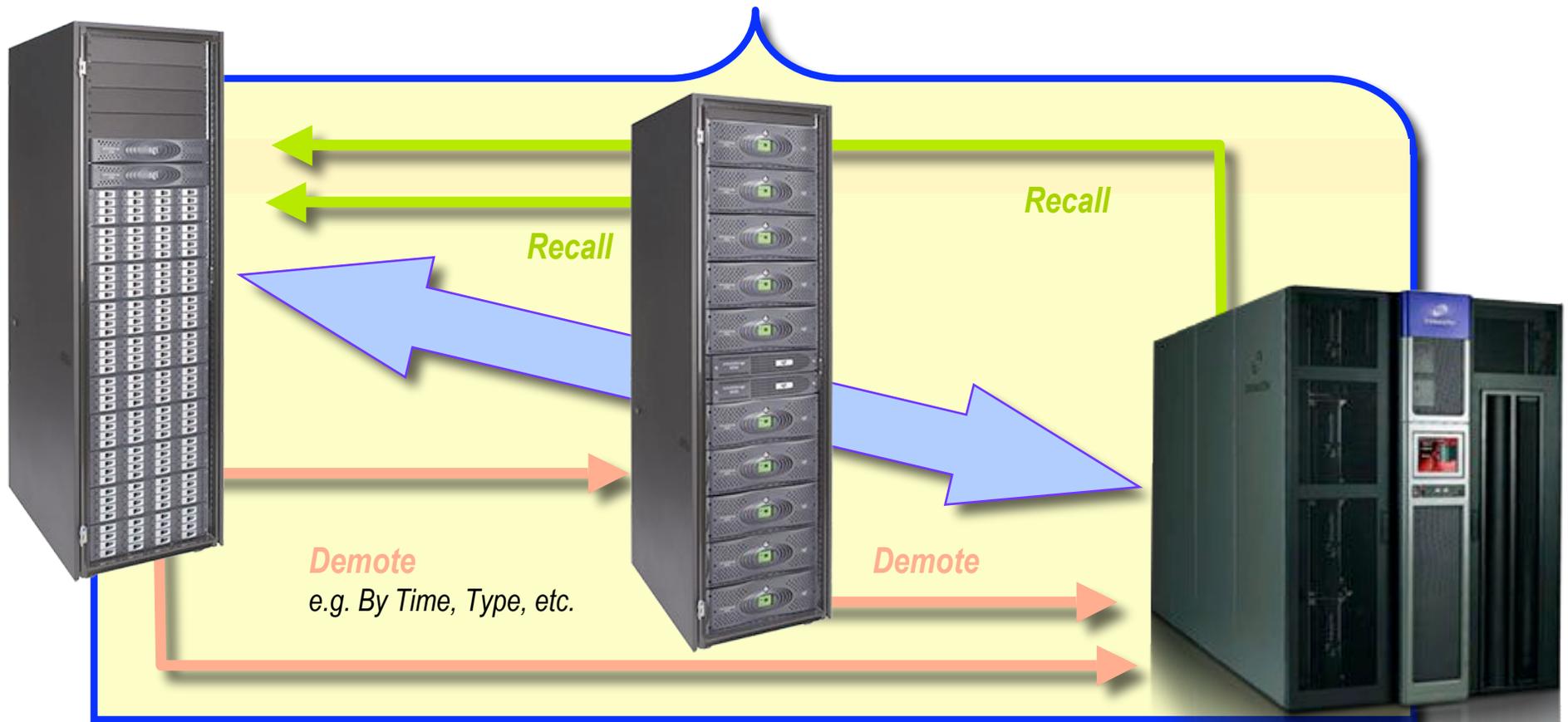
# What does DMF do?



Beyond Basic Hierarchical Storage Management

# DMF (Data Migration Facility)

-- All Users See One Consolidated Storage Environment --



## Primary Storage

Online,  
high-performance disk

## NearLine Storage

High capacity, low cost,  
lower performance disk

## Tape Library

Active Archive

# DMF Sample Customers

## 10 Years, 500 Customers

- GFDL (Geophysical Fluid Dynamics Lab.) - 13.5 PB
- NASA Goddard - 2.0 PB
- NASA Ames (3TB/day , 800TB + 440TB?) - 1.3 PB
- **NBA Digital Media Management** - 1.2 PB
- WETA Digital Ltd. (Wellington, NZ) - 1.0 PB
- INA (French National Institute for Audio & Video) - 850 TB
- PSC (Pittsburgh Supercomputing Center) - 300 TB
- UCLA Lab. for Neurological Imaging - 200 TB
- French Weather Forecaster (FC, SATA, Tapes) - 150 TB
- GM/EDS - 120 TB
- FNMOC (Fleet Numeric, US) - 90 TB
- BMW (with shadow copy) - 42 TB x 2
- SCRIPPS - 45 TB
- TOTAL (Oil & Gas) - 35 TB
- Queensland Parallel Supercomputer Foundation - 20 TB

# NOAA's HPCS at GFDL

October 2006 – April 2008

## Computational Capability & Capacity

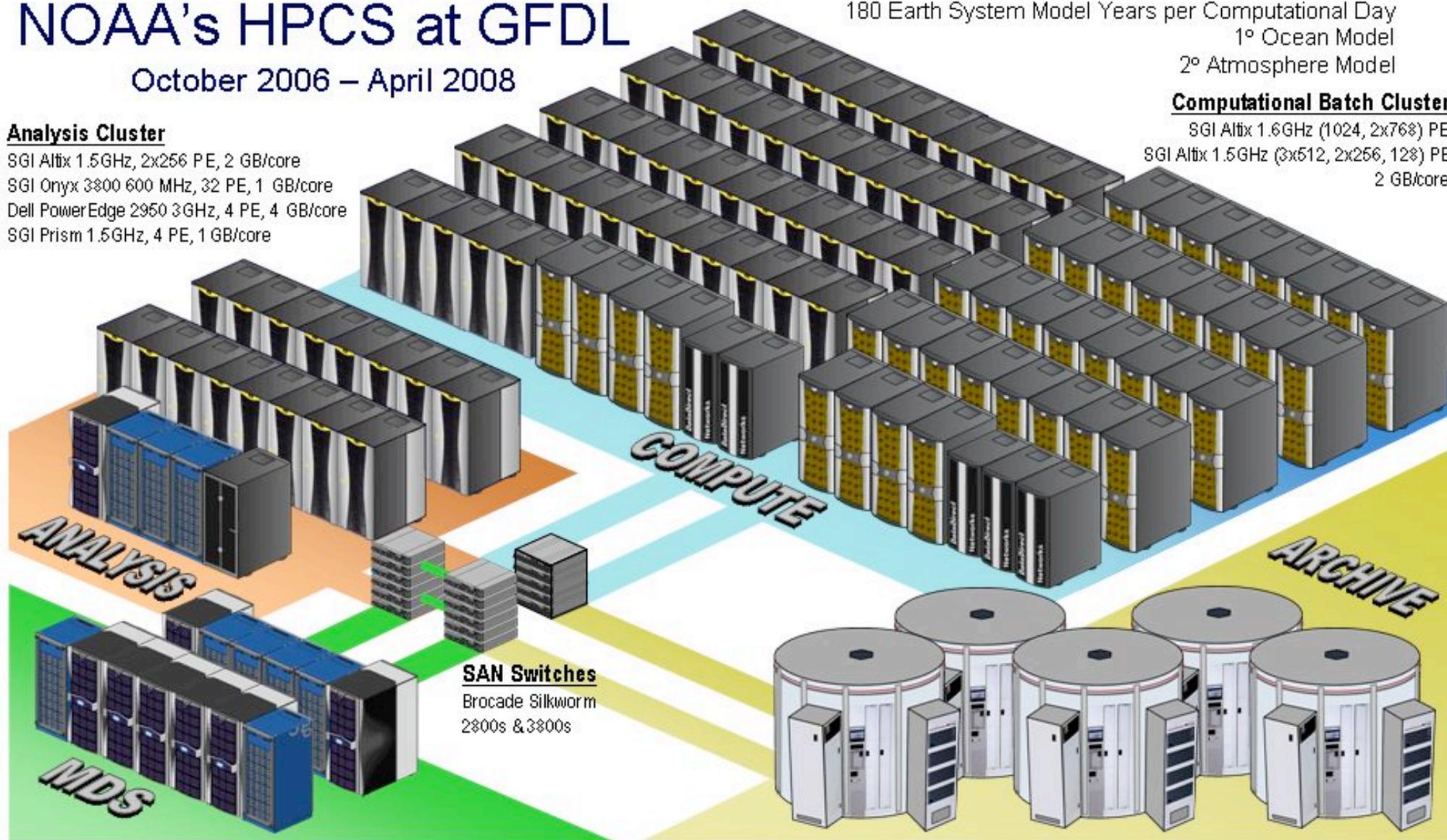
180 Earth System Model Years per Computational Day  
 1° Ocean Model  
 2° Atmosphere Model

## Computational Batch Cluster

SGI Altix 1.6GHz (1024, 2x768) PE  
 SGI Altix 1.5GHz (3x512, 2x256, 128) PE  
 2 GB/core

## Analysis Cluster

SGI Altix 1.5GHz, 2x256 PE, 2 GB/core  
 SGI Onyx 3800 600 MHz, 32 PE, 1 GB/core  
 Dell PowerEdge 2950 3GHz, 4 PE, 4 GB/core  
 SGI Prism 1.5GHz, 4 PE, 1 GB/core



### MetaData Server (MDS)

HFS & HSMS Server  
 SGI Origin 3800, 600 MHz  
 2 Nodes x (96 PE + 96 GB)  
 2 Nodes x (16 PE + 16 GB)  
 Failsafe, DMF, CXFS

### Disk SAN

234 TB SAN Disk  
 w/Dual Controllers  
 2 Gb/s Fibre

### SAN Switches

Brocade Silkstorm  
 2800 / 3800 / 4100

### LAN

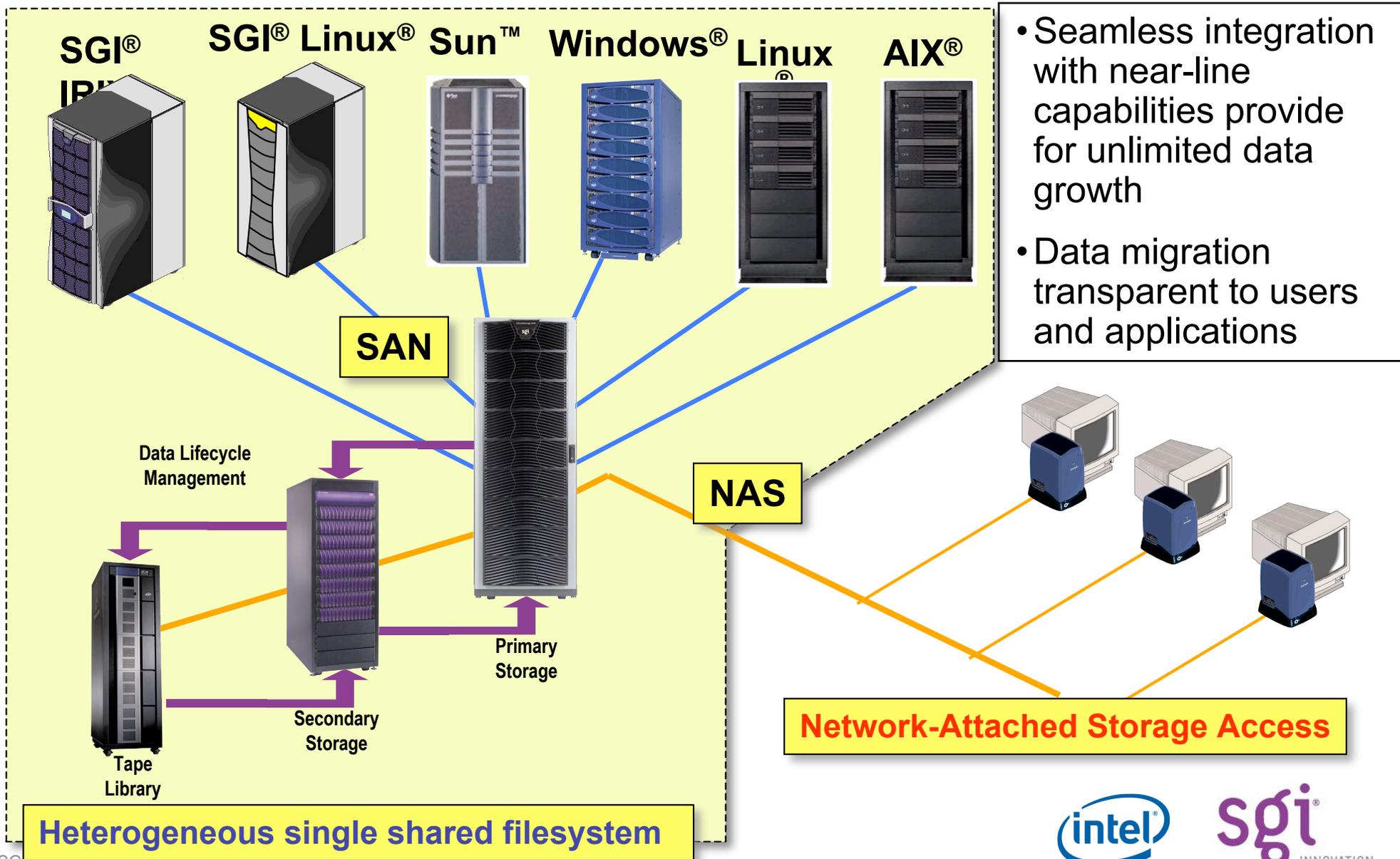
Cisco Catalyst 6513  
 3 x 48 Copper Gb/s  
 2 x 48 SFP Gb/s  
 2 x 4 10 Gb/s  
 2 x FW/SM

### Tape SAN (Archive)

5 x STK 9310 Tape Libraries  
 21 x 10000 Drives (500 GB, 120 MB/s)  
 36 x 9940B Drives (200 GB, 30 MB/s)  
 250 TB nearline disk tier  
 13.5 PB Tape Storage Capacity



# Converged SAN and NAS

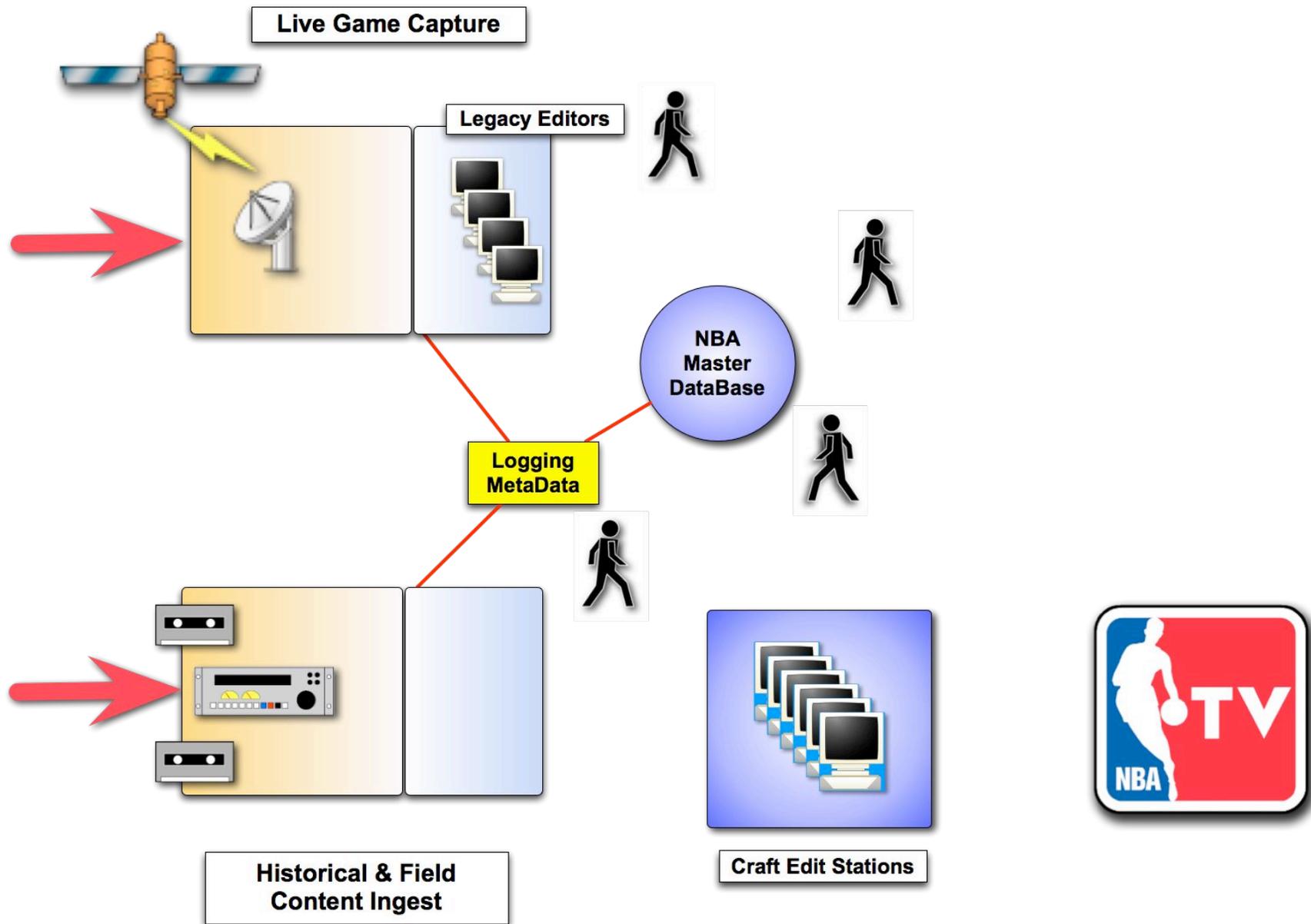


# Case Study: NBA

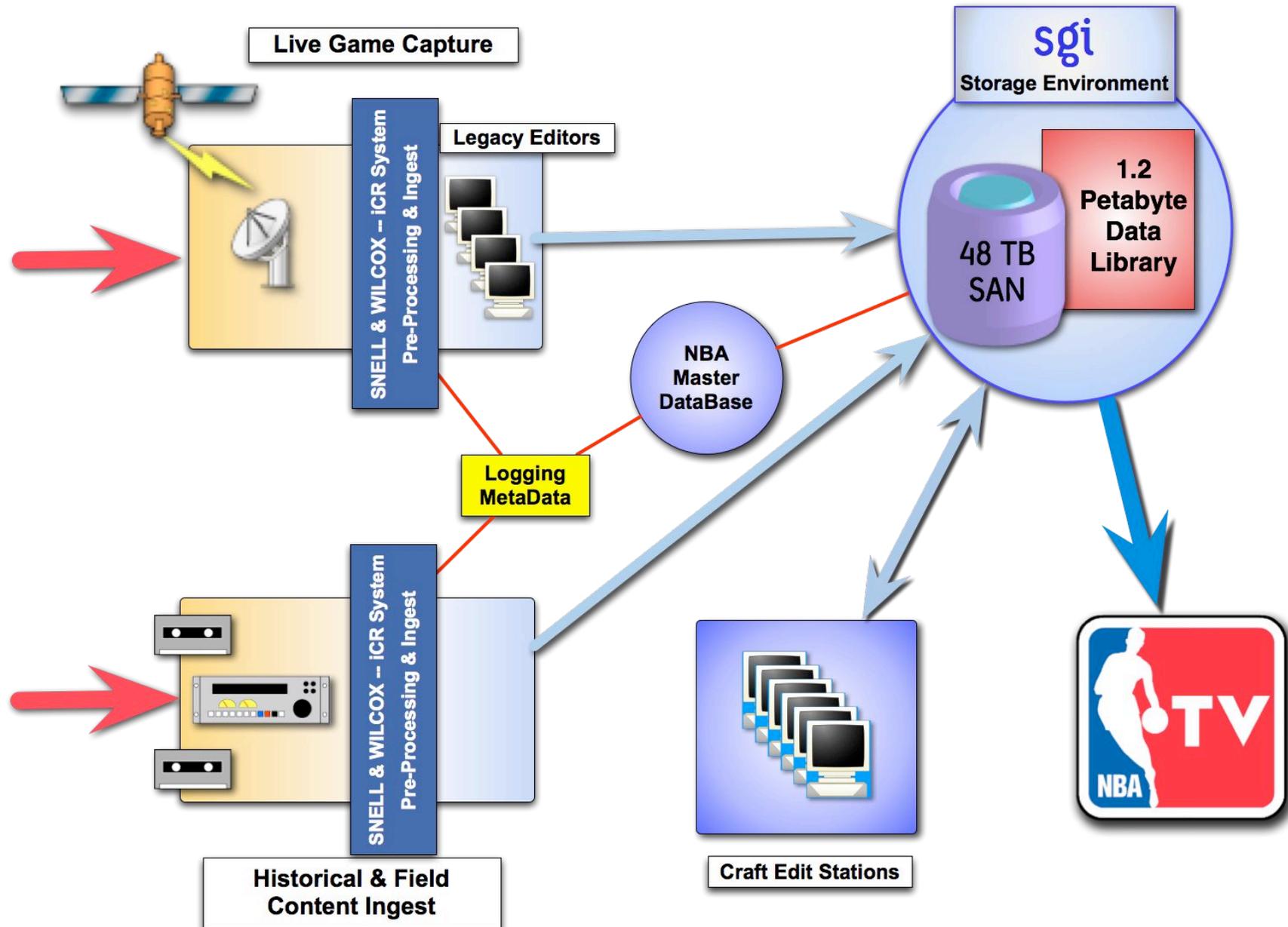


- NBA's Problem:
  - 16 games Played Simultaneously
  - Each game with 9 cameras of SD and HD content
  - Over 500 time-stamped logging events for each game
  - All content and metadata routed to NBAE Secaucus NJ
  - Editors must quickly isolate most interesting content, produce customized packages for NBA.Com, NBA TV, Video on Demand, Wireless handheld devices as well as clips for rebroadcast by news and sports outlets.
- This equals 6-8 TB per week of new content

# Leveraging Legacy Gear to Advanced Workflow



# Leveraging Legacy Gear to Advanced Workflow



# Isolating Time and Space...

Place



Timeline



00:20:00

02:20:00

04:20:00

06:20:00

08:20:00

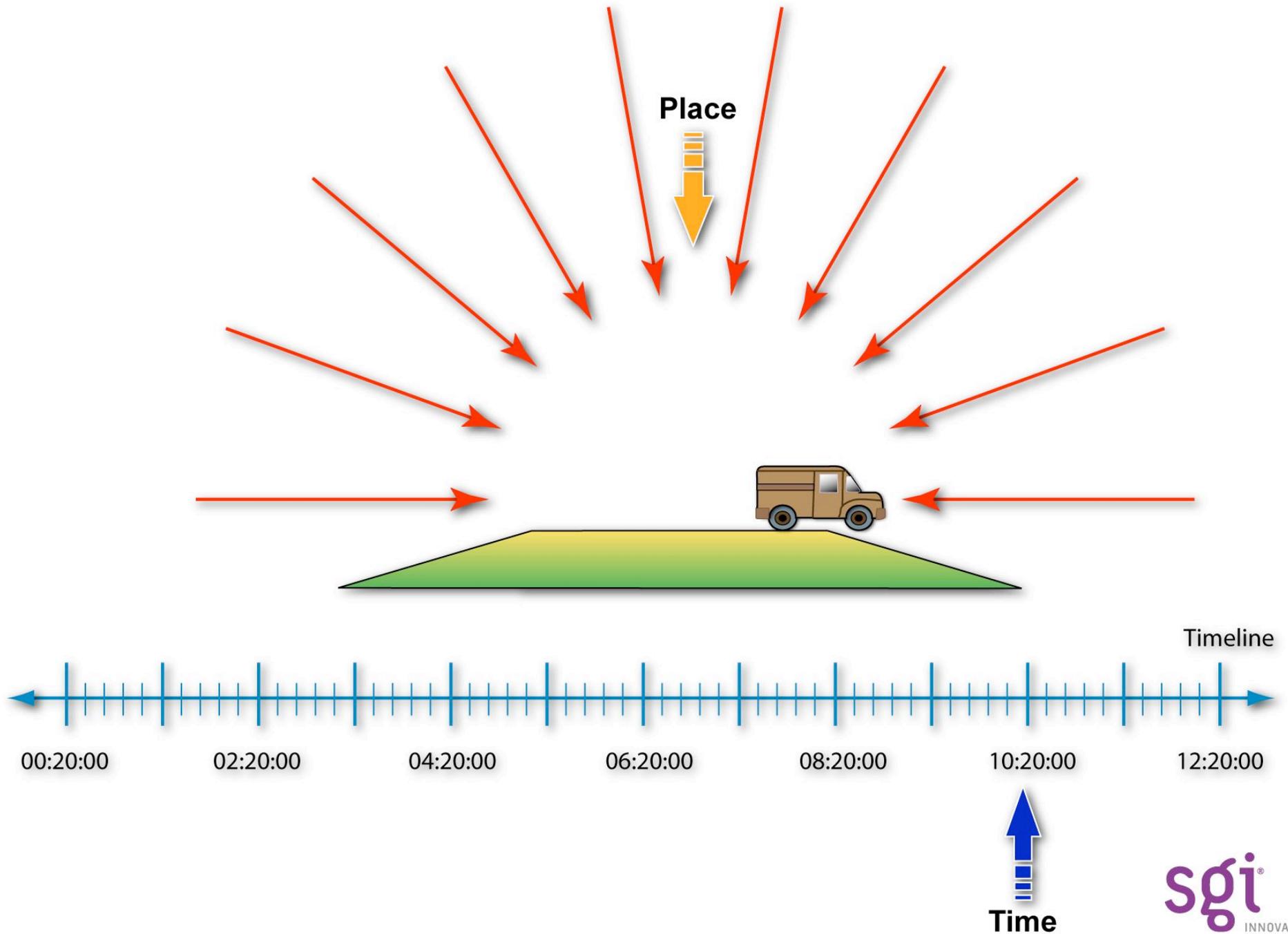
10:20:00

12:20:00

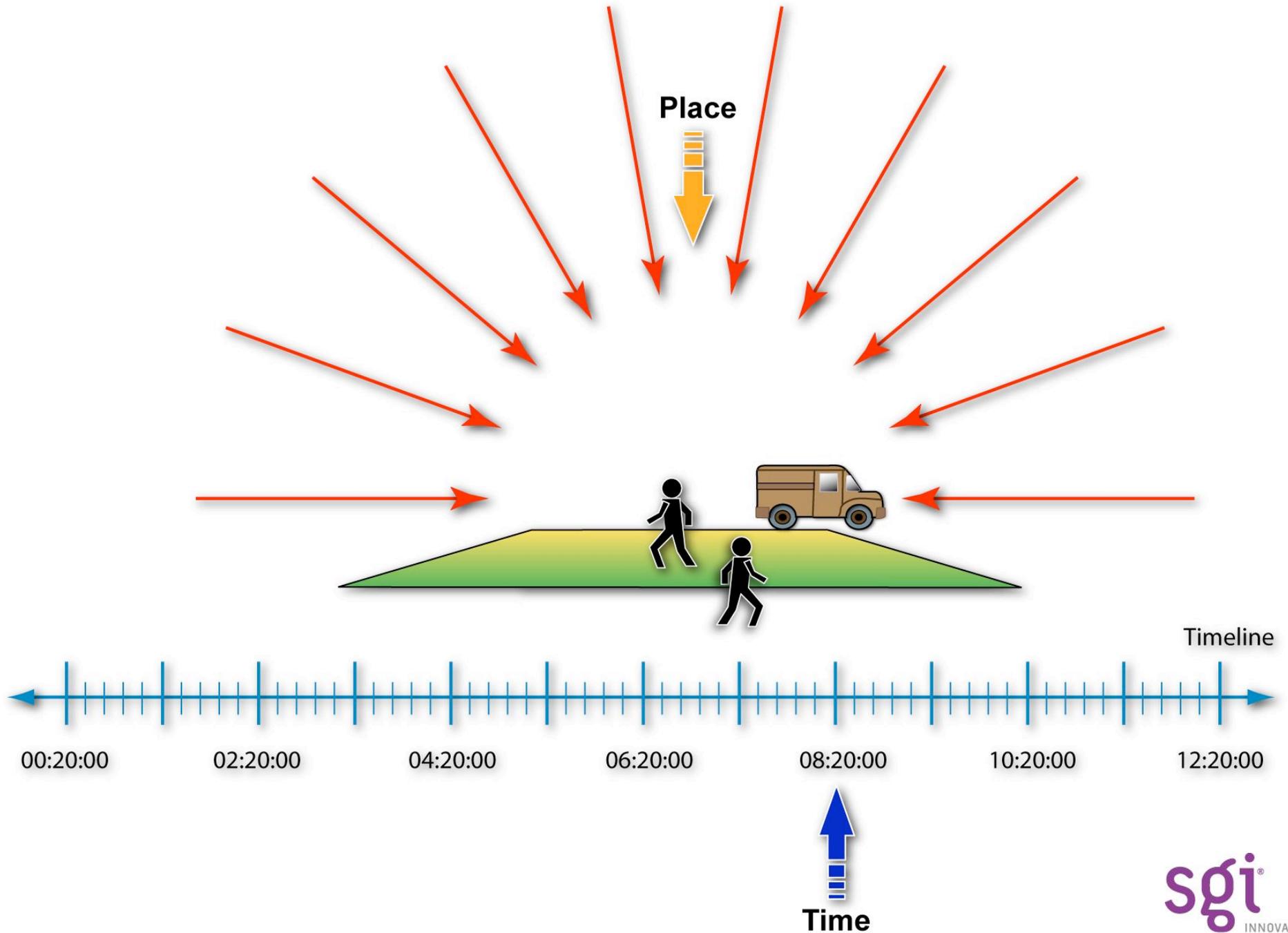


Time

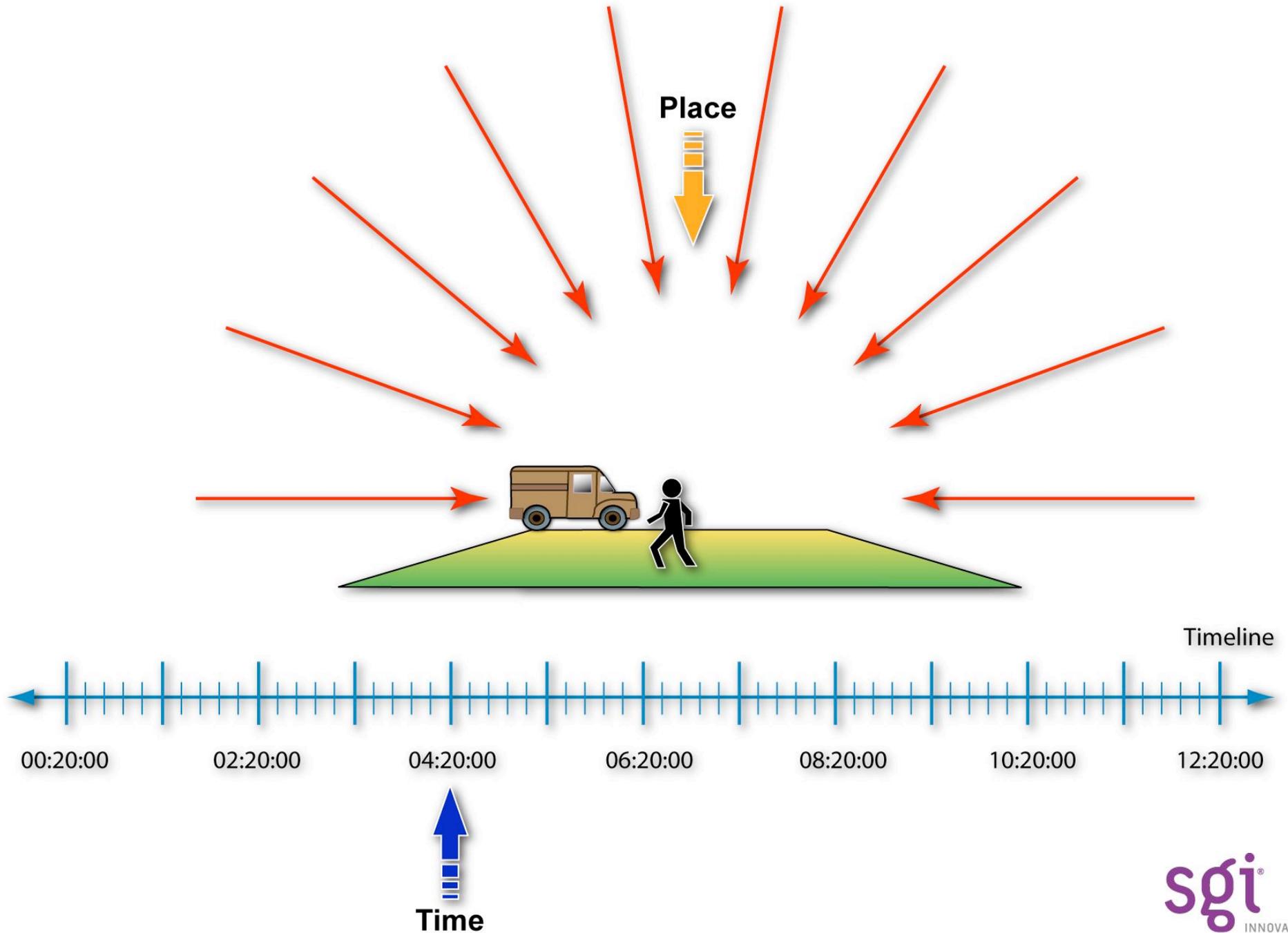
# Isolating Time and Space...



# Isolating Time and Space...

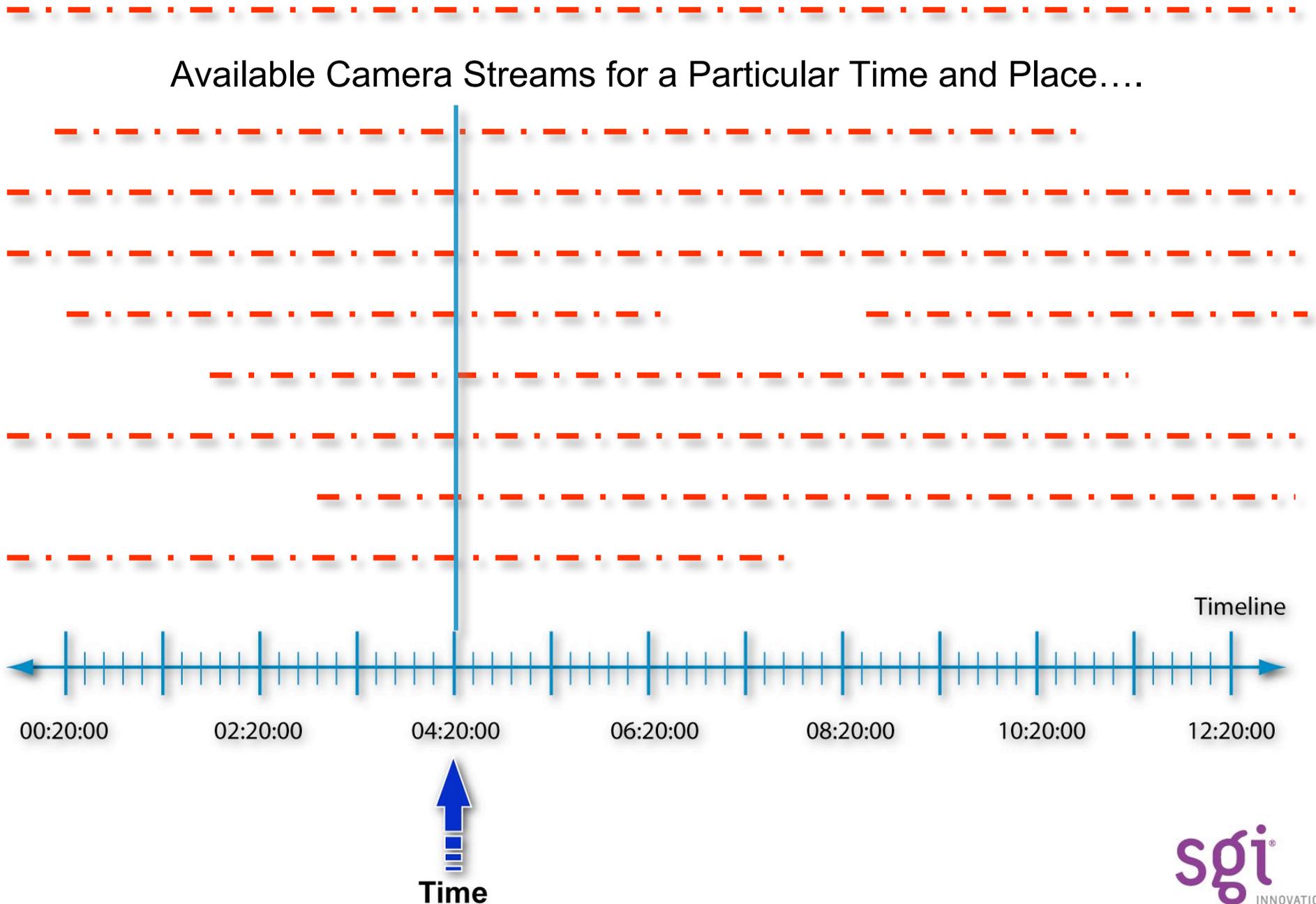


# Isolating Time and Space...



# Parsing Content as a Data Stream

Available Camera Streams for a Particular Time and Place....



# DIGITAL MOTION

high quality film and video for your next project

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## QUICK SEARCH

New clips are added daily. [Call or email](#) if you can't find what you're looking for.

GO

Use Keywords, Clip ID#, Concepts, Categories, etc.

SEARCH TIPS

## ADVANCED SEARCH

Keyword

Clip ID #

Original Capture Method

Camera Speed

Category

Concept

Era

Location

CLEAR

GO

## BROWSE CATEGORIES

GO

SEARCH ALL RIGHTS MANAGED CLIPS

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Archival

B&W  
Color

Real Time  
Time Lapse

Slow Motion

Fully released without restrictions

Search Results 46 clips found for: Video

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C318-073



Duration -00:0-1

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# What does SGI offer?

## 1) SGI Software:

- Key tools to enable high-performance workflow

## 2) SGI Hardware:

- **Storage:** a complete range of solutions
- **Servers:** from small node to large

## 3) Deep Industry Experience & Partners



# SGI R&D focuses on key problems

- Increased density, decreased power
  - Focusing on reducing Data Center costs while increasing capacity...
- Seamless scalability to suit the workflow & budget
  - Not all problems are the same size...
- Engineering affordable solutions
  - Competitive pricing
  - Reducing total cost of operation
  - Integration with key partners



# SGI InfiniteStorage: Different tools for different tasks

## Multi-purpose RAID Systems

### IS-4500

- Max performance
- 4Gb FC or IB
- Enterprise S/W
- FC RAID / SATA



## Streaming Real-time RAID

### IS-6700

- Multiple high resolution streaming
- Isochronous



## Low Cost SATA RAID

### IS-350

- 4 Gb connectivity
- 500GB SATA drives



## Entry level RAID

### IS-220

- 4 Gb FC/SAS
- 2 - 48 drives



## Ultra-dense RAID

### IS-10000

- Ultra-high density
- Tape complement or replacement
- One rack - 240 - 360 TB



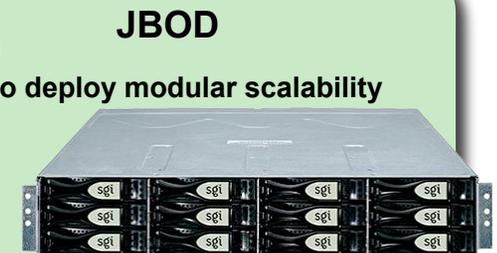
### IS-4000

- 4Gb Fibre Channel
- Ultimate Price/Performance
- FC RAID / SATA



### IS-120

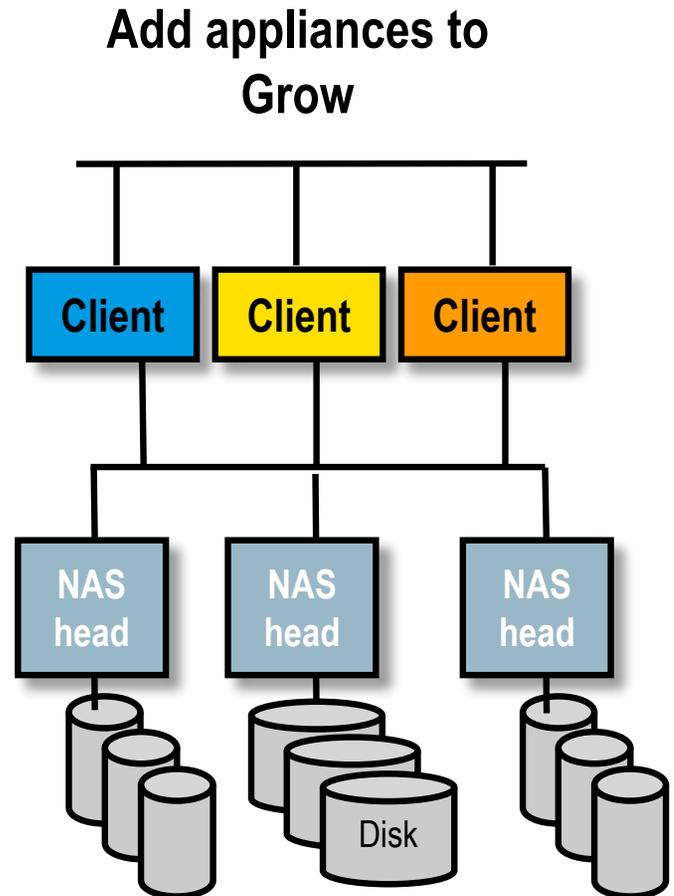
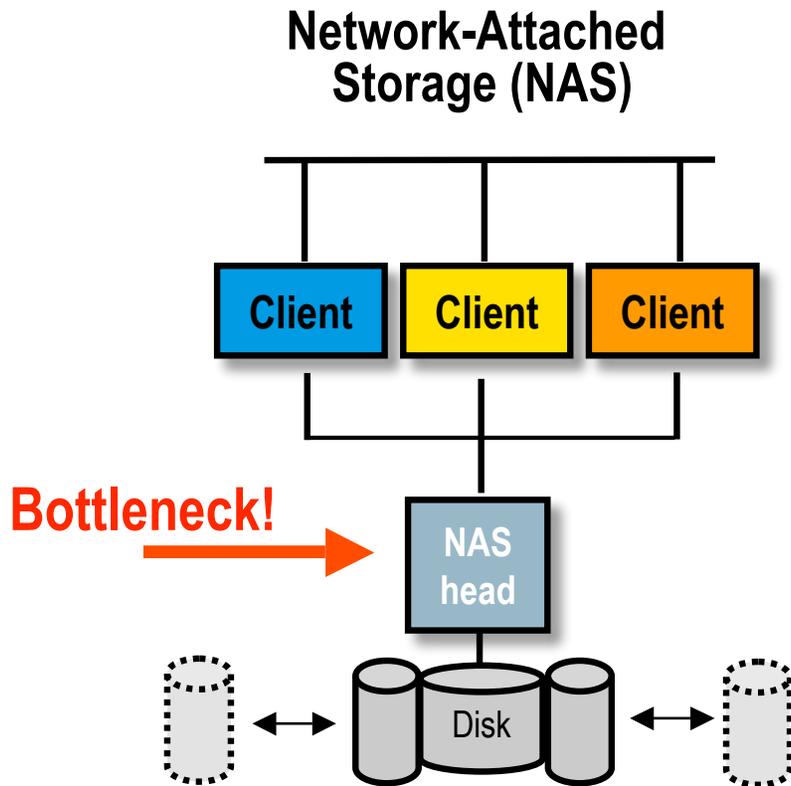
- Easy to deploy modular scalability



## JBOD

# SGI Eliminates NAS Bottleneck:

## Traditional NAS Growth



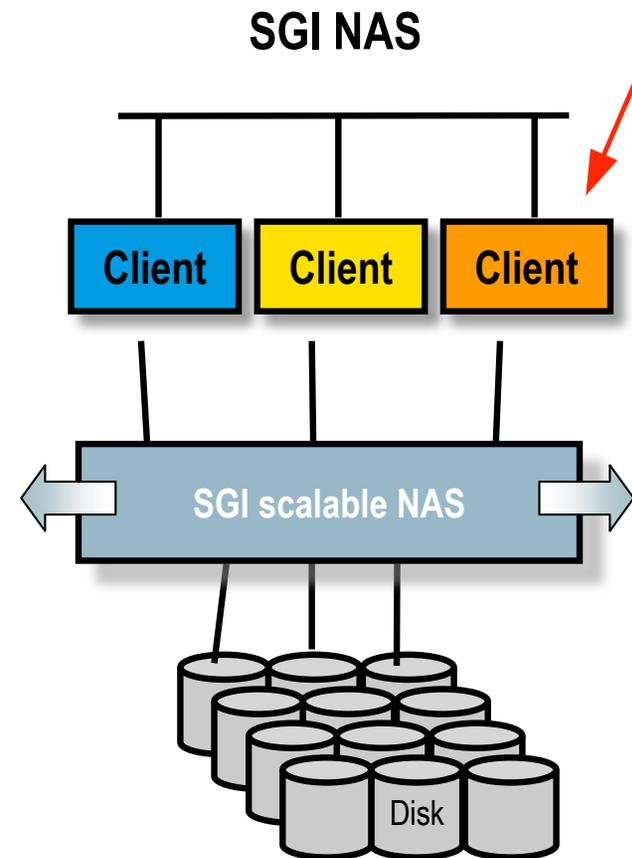
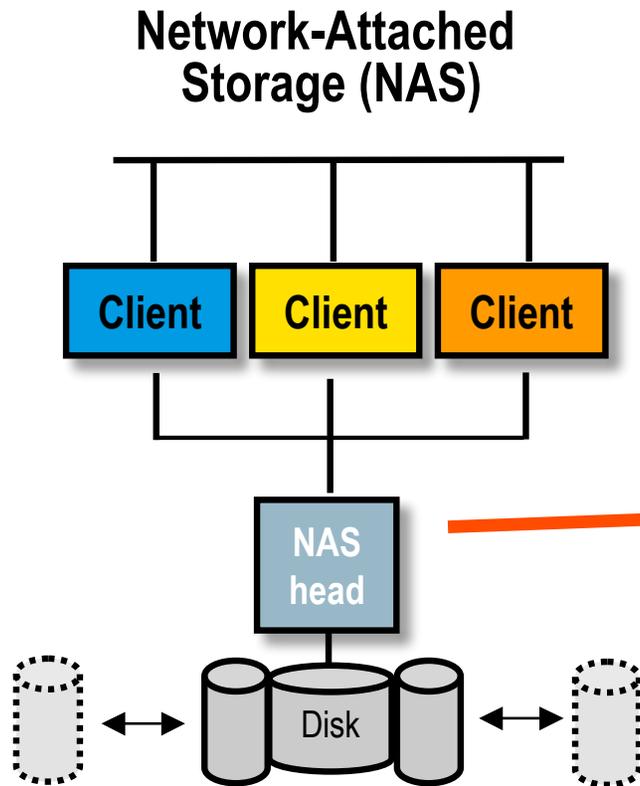
Either create islands of storage or start over...

# High Bandwidth : NAS (Scalability & NFS-RDMA)

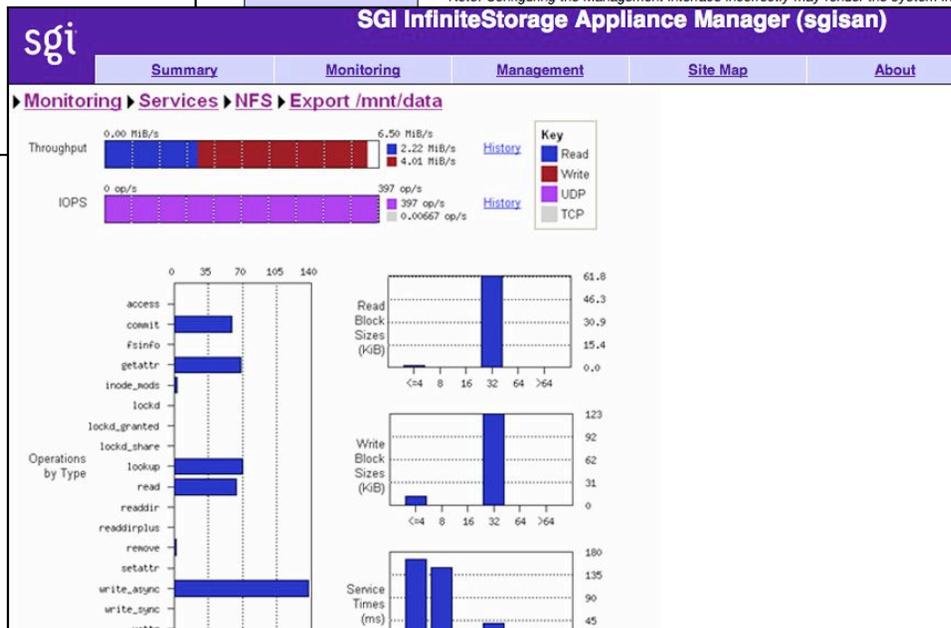
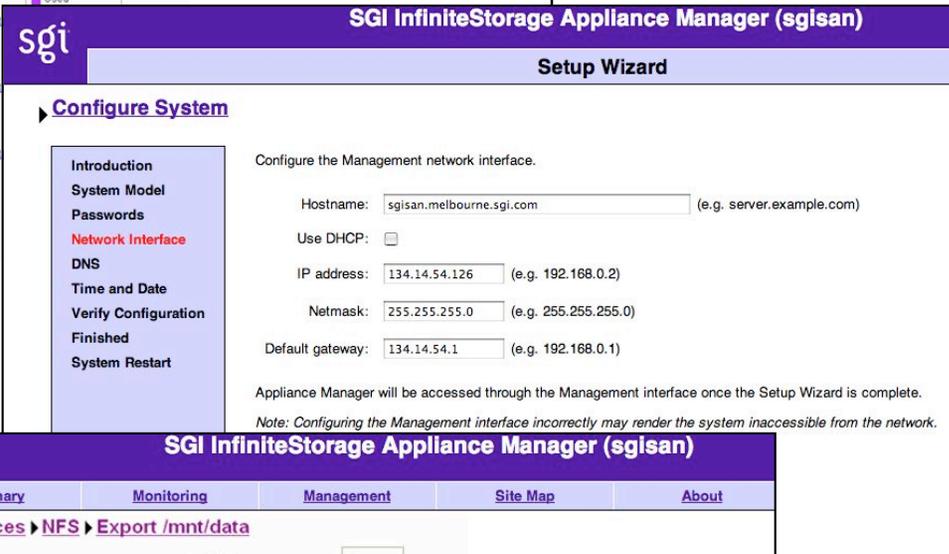
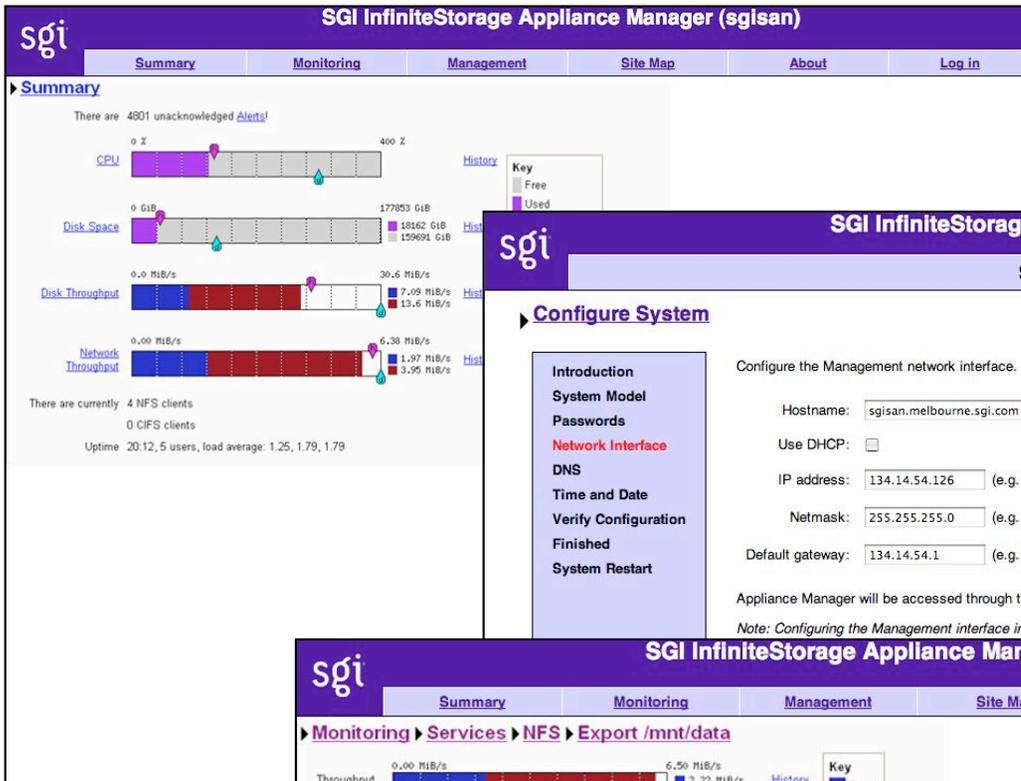
1 HCA

Read : 0.8 GB/s

Write : 0.5 GB/s



# InfiniteStorage Appliance Manager



- Easy to read all-in-one graphical GUI
- Real time status on performance, resource utilization and system alert
- Standard features include trending analysis for proactive management

# SGI Servers: Sized to fit the task

Large  
SMP Workflow



SGI® Altix® 4700

Midrange SMP/  
Cluster Workflow



Altix 350 & 450

Small-node  
Cluster Workflow



SGI® Altix® XE  
Clusters & Servers

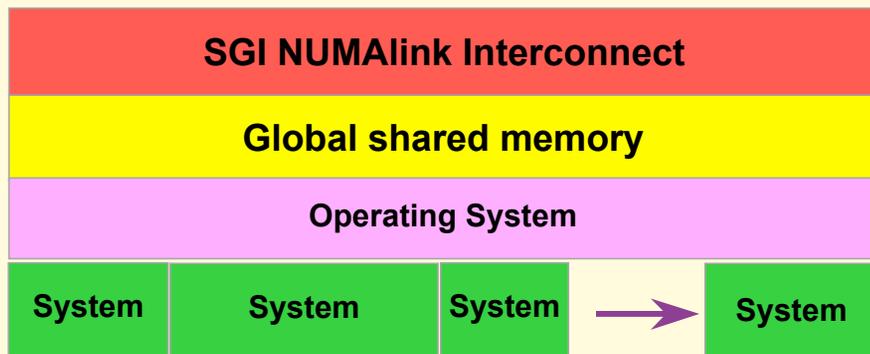
Intel Itanium based

Intel Xeon based

# Choice of server to fit your data strategy

## Altix – Shared System Image

Perfect for Big Node Problems

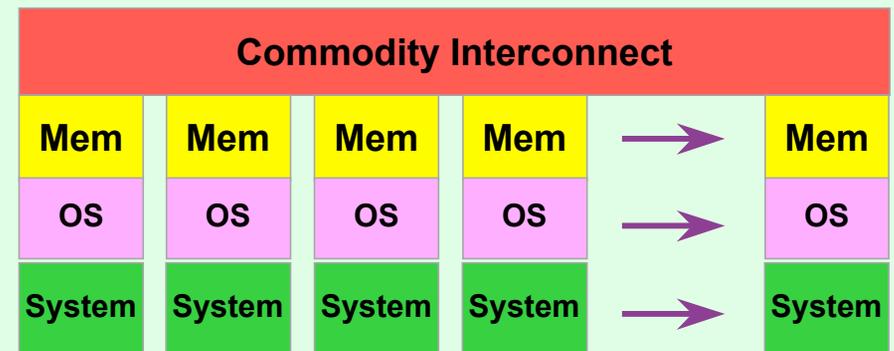


- All nodes operate on one large shared memory space
- Eliminates data passing between nodes
- Big data sets fit in memory
- Less memory per node required
- High Performance for Large Node

Intel Itanium based

## Altix XE – Scalable Clusters

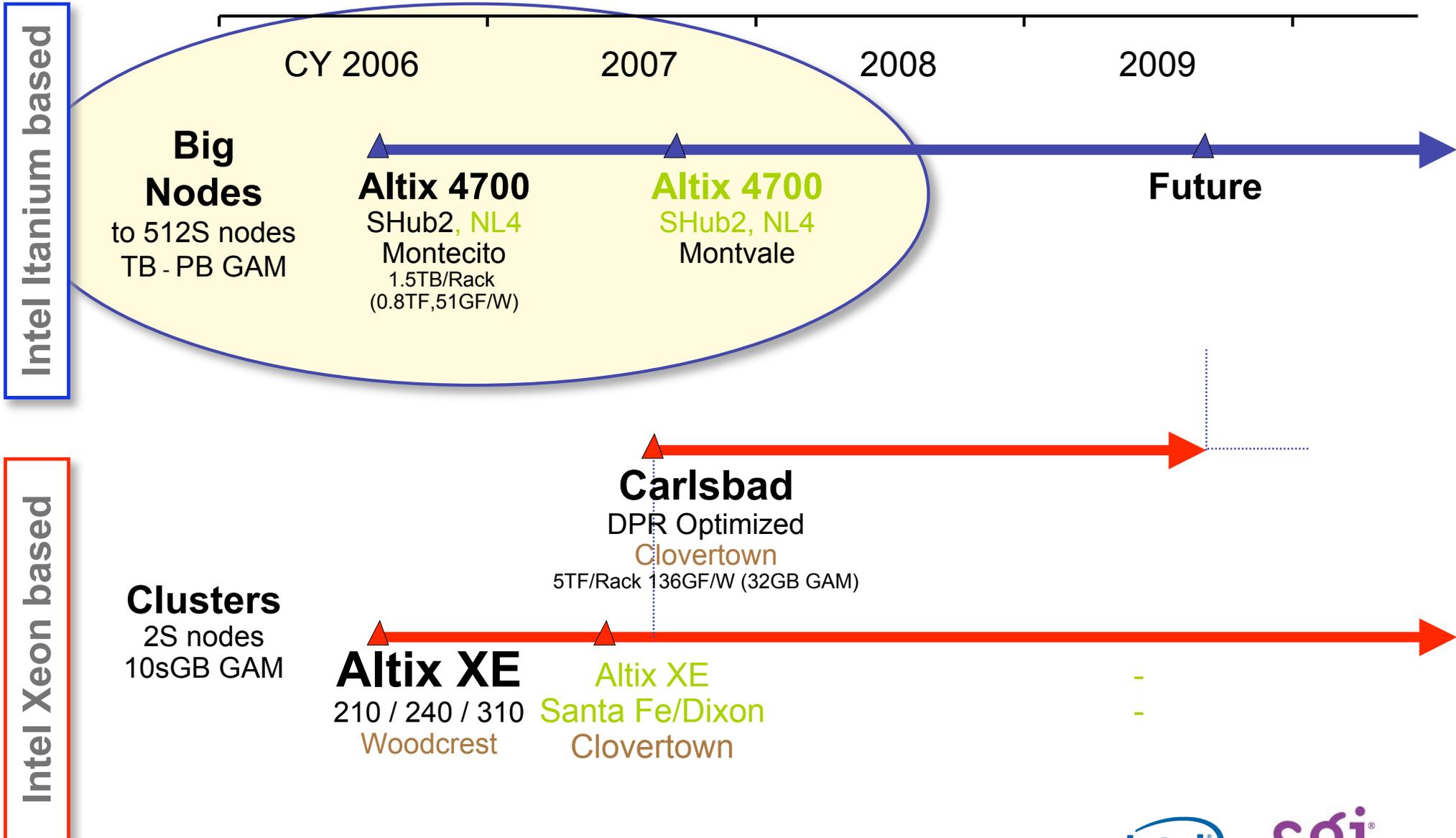
The Solution for Small Node Problems



- Each system has own memory and OS
- Nodes communicate over commodity interconnect
- Price performance
- Initial lower cost
- Heterogeneity
- Node autonomy

Intel Xeon based

# Server Roadmap



# SGI Altix 4700 and 450

## *Next-wave Supercomputing, Today.*

- **Tera-scale made easy**
  - Scales to 1024 cores, memory address to over 100TB
- **Versatility to handle any demanding workload**
  - Scale compute, memory-only, I/O as needed
  - Unmatched MPI efficiency
- **Excellent power and space efficiency**
- **Bring on the next wave of supercomputing**
  - Next-generation component blade architecture
  - Proven solution for heterogeneous computing



*“.....Nowhere is the trend of standardization more evident than Altix 4000...” ServerWatch, 2005*

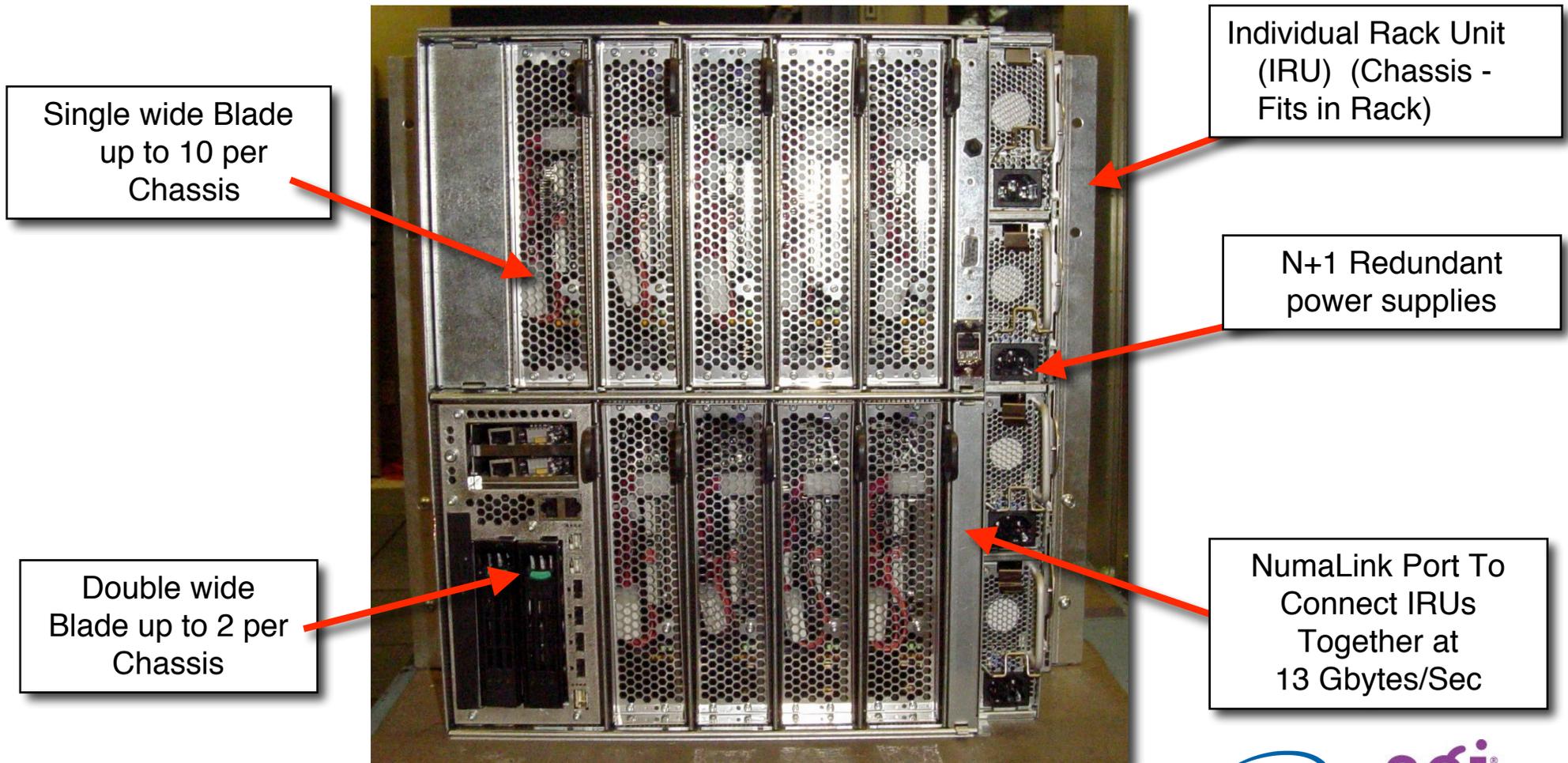
*“....the Altix 4000 is capable of tailoring hardware to application needs rather than being a static powerhouse....” IDM, 2006*

*“....SGI’s blade-based design foreshadows the future of HPC...” LinuxHPC.org, 2005*

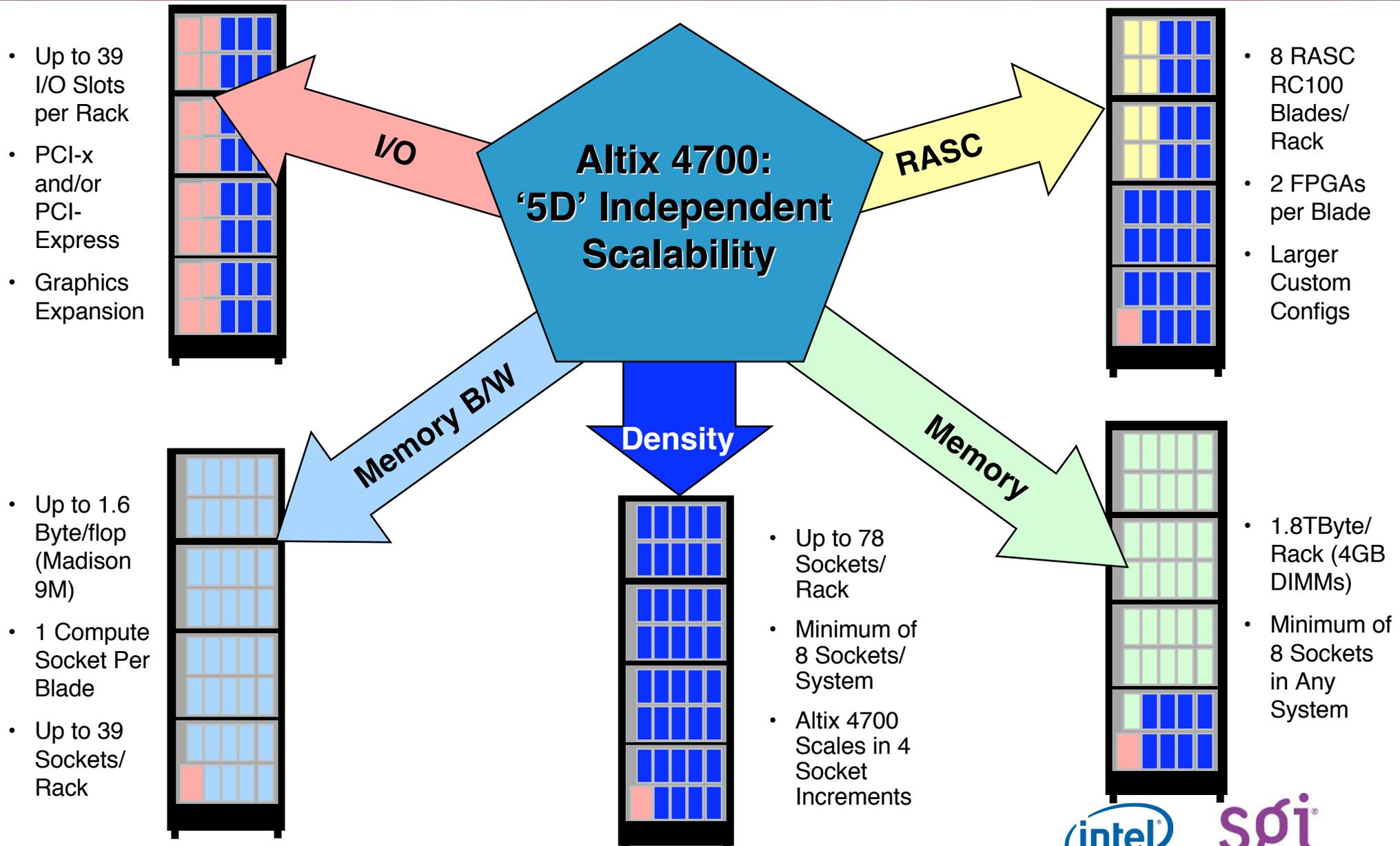
# Plug & Solve Versatility

## Innovative Backplane That Enables True Expansion Without Limitations:

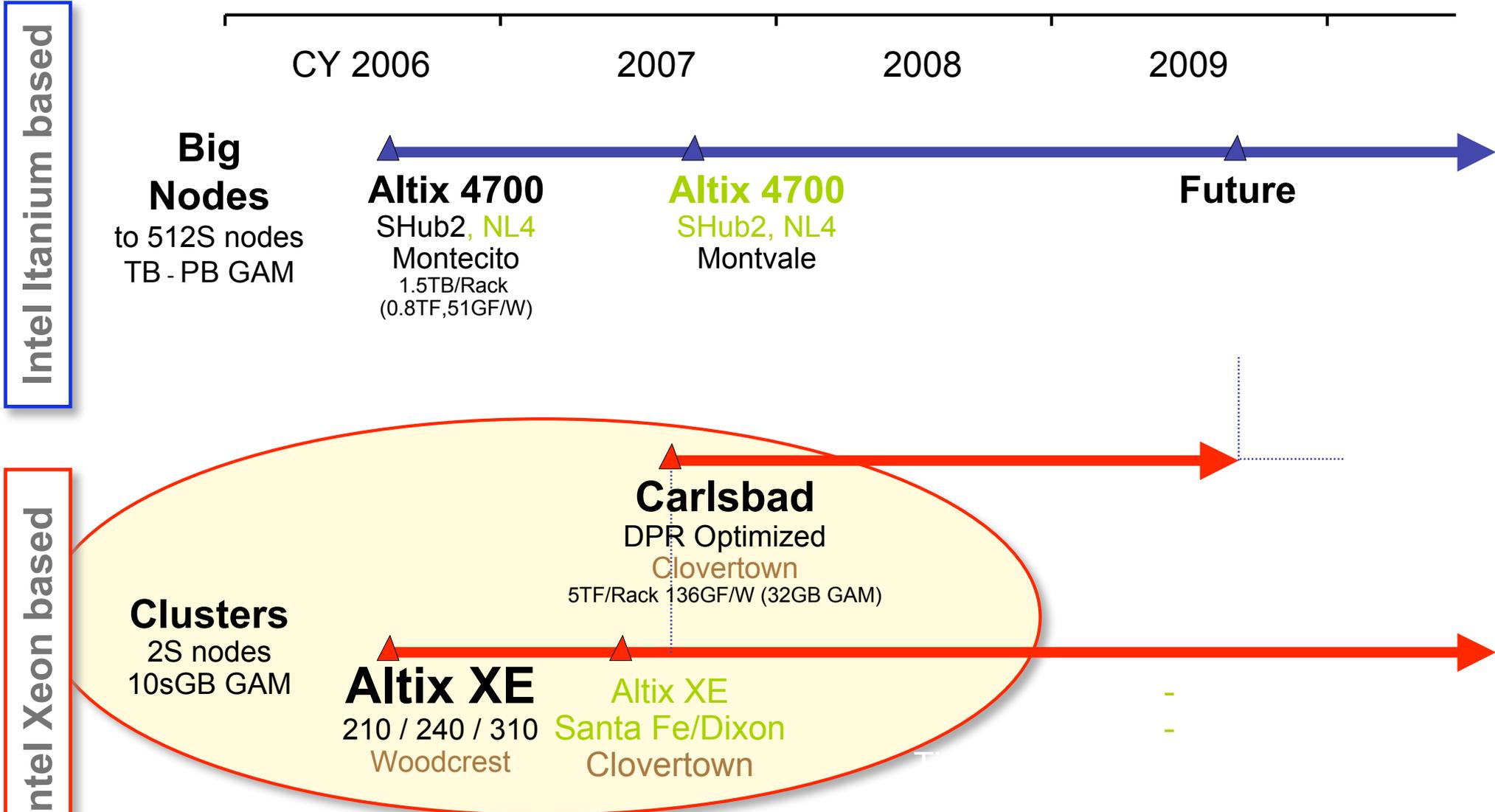
*Each Empty Blade Slot is 'Ready' to Accept Blades, Just Plug Blades in to Activate*



# Independent Scaling for Unlimited Possibilities



# Server Roadmap



# Trend: Advanced Density, Reduced Power

## SGI Altix XE *The x86-64 Line*



**Greater Density**  
**Power Efficiency**  
**High-speed Interconnect**

**Altix XE210**

1U = 2-8 cores

**Altix XE310**

1U = 4-16 cores

# SGI Altix XE 210 & 240

## - Specs:

- Woodcrest
- 4 Flops/core (2add + 2mult)
- 1333 MHz FSB
- 10.6 GB/s memory b/w per socket (2 cores)

## - Fully integrated & tested clusters

## - Modular Systems Management (RAS)

## - Industry standard Linux:

- SUSE® Linux® Enterprise Server
- Red Hat Enterprise Linux®

## - Available with Windows



# The Next Wave: SGI Altix XE310

- **High density cluster compute node**
  - Extremely power efficient
  - Reduce floor space
  - Fewer components, increased reliability
- **Innovative new design packs 16 cores in 1U (2 x 2-socket motherboard)**
- **Integrated Infiniband and GigE interconnect for increased flexibility**



**4 x 1U Opteron System = 16 cores**



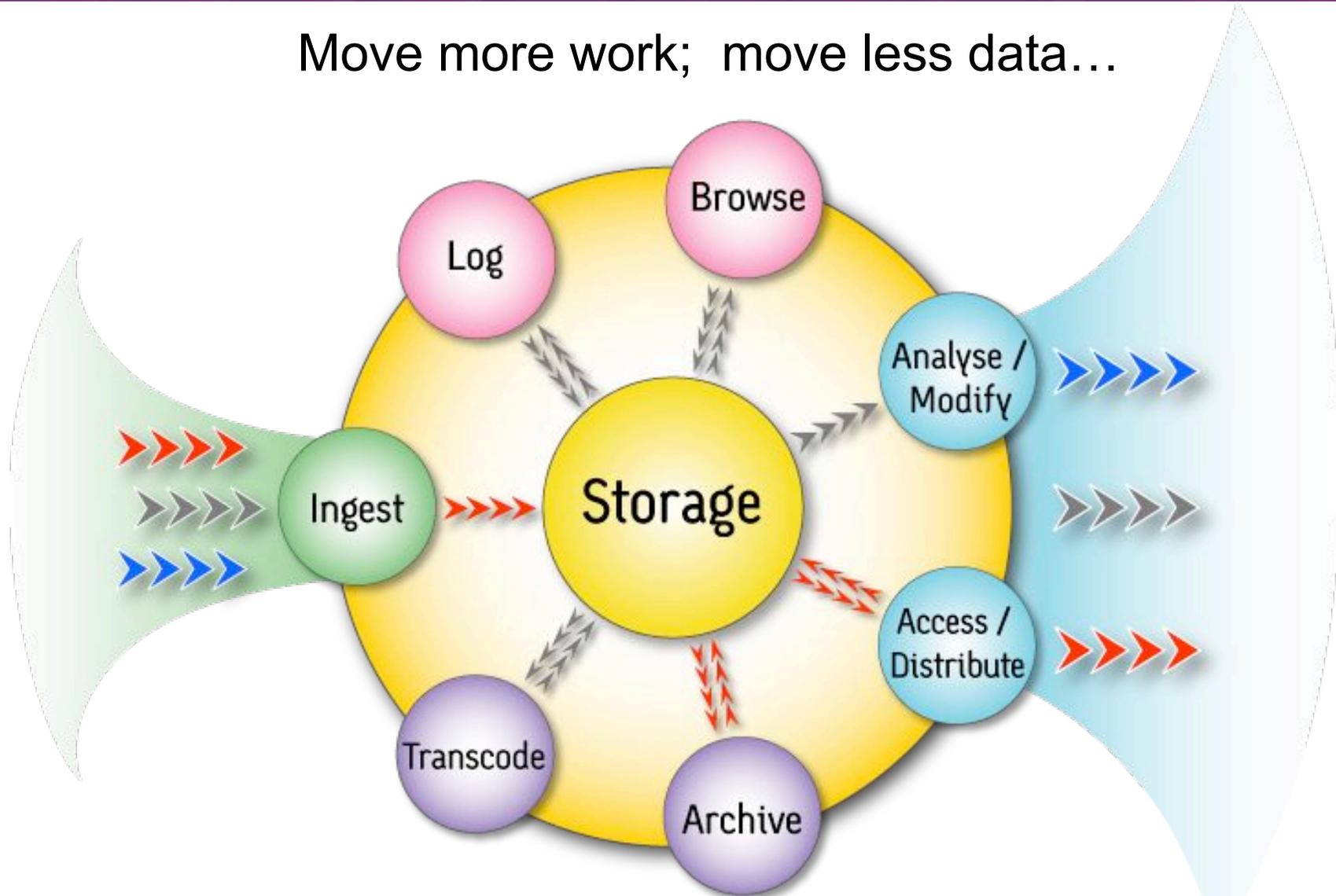
**1 x 1U Altix XE 310 = 16 cores**



**4X Density**

# Shared Dataflow Solves the Problem

Move more work; move less data...



Content I/O

5/30/07

Dataflow

Slide 52

Digital Formats



Thank You!

sgi<sup>®</sup>



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