SGI Adaptive Data Warehouse Solution

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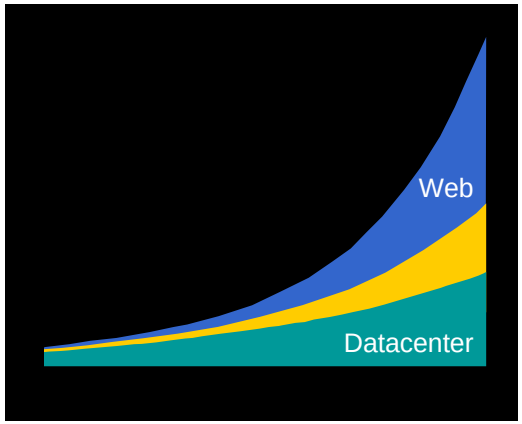
8-02-08

SGI® Adaptive Data Warehousing Solution

SGI and Oracle are collaborating to provide solutions for complex decision support

Complex Data Warehouse Customer Challenges

Perform complex analytics…



… on exponentially growing data sets

… from multiple data sources in real time

Complex Decision Support Market

Huge Data, Highly Complex Analysis, Concurrent Mixed Workloads

Web 2.0 Companies

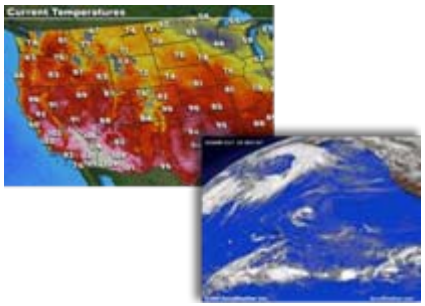
Customer Insight

Telecommunications Companies

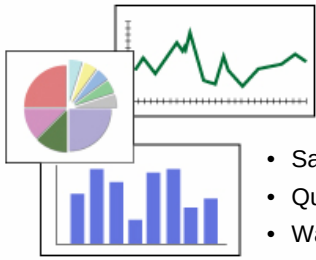
Airlines

Fraud Detection

Predictive Analytics



Manufacturing



- Sales analysis
- Quality control
- Warranty analysis
- Supply chain management

Government

Battlefield Intelligence

THE NATIONAL ARCHIVES
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Complex Decision Support Technology

SGI and Oracle Have the Technology Required by Complex Decision Support Customers

Business Imperatives

- Greater customer insight
- Faster decision-making
- Multiple high-volume data sources
- More complex data analysis

IT Challenges

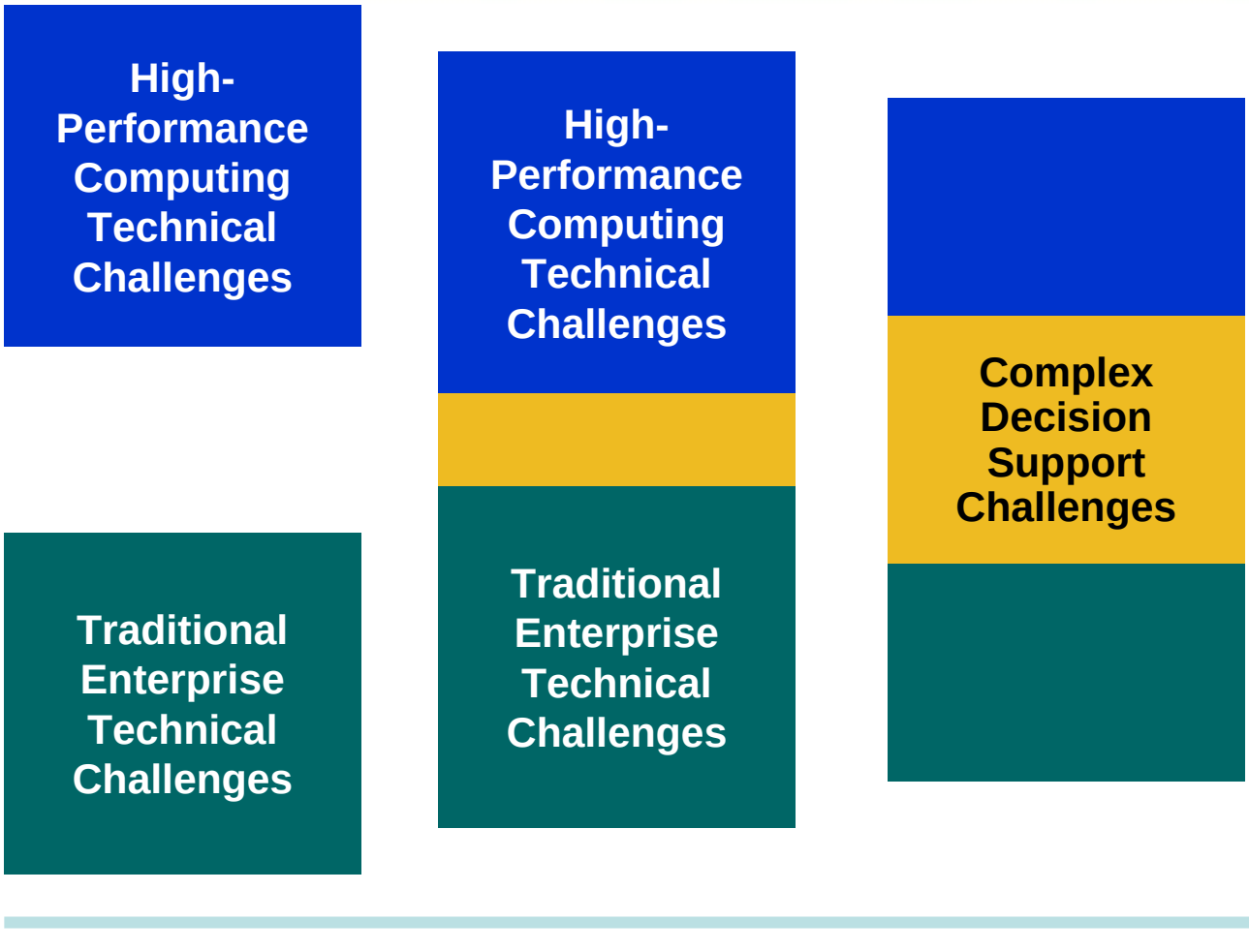
- Service Levels
- Mixed workloads
- Efficiency
- Standardization
- CapEx and OpEx

Technology Needs

- High I/O bandwidth
- Flexible growth
- Intensive analysis
- Large memory support
- Scaling for very large data sets
- Support for structured and unstructured data

SGI and Oracle excel in delivering the technology required by complex decision support customers with industry-standard technology

Complex Decision Support Challenges



Challenges

- Huge data growth
- Highly complex analyses
- Concurrent mixed workloads

Complex Decision Support Targets

SGI and Oracle Are Targeting the Complex Decision Support Market

sgi ... brings decades of experience in high-performance, large-scale systems architecture

sgi ... is 100% committed to industry standards such as Intel and Linux

ORACLE is the leading provider of data management solutions for data warehousing, with more than 40% market share

ORACLE is addressing the rapidly expanding (market) customer requirements for larger data warehouses

Jointly...

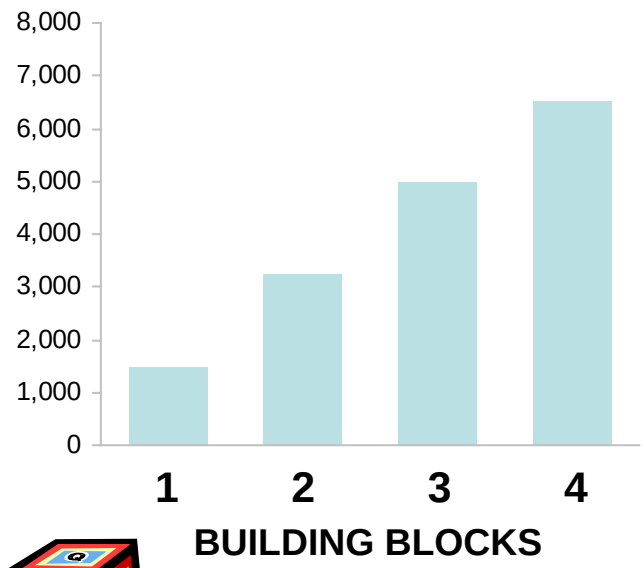
SGI and Oracle are targeting complex decision support customers, whose requirements extend beyond the needs of the traditional enterprise customer

Oracle® Optimized Warehouse Initiative

Simplifies Deployment of Complex Data Warehouses

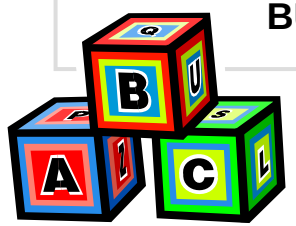
- Scalable systems, pre-integrated and pre-configured
- Ready to run out-of-the-box

Scalable Performance



Benefits

- **High performance**
- **Building-block approach**
- **Simple to buy**
- **Fast to implement**
- **Easy to maintain**



Full Range of DW Solution Options

Custom

- Flexibility for the most demanding data warehouse
- Benefits:
  - High performance
  - Unlimited scalability
  - Completely customizable
  - Industry-leading database and hardware

ORACLE DATABASE ENTERPRISE EDITION

- Partitioning
- RAC

sgi

Reference Configurations

- Documented best-practice configurations for data warehousing
- Benefits:
  - High performance
  - Simple to scale; modular building blocks
  - Industry-leading database and hardware
  - Available today with SGI

ORACLE DATABASE ENTERPRISE EDITION

- Partitioning
- RAC

sgi

Oracle Optimized Warehouse

- Scalable systems pre-installed and pre-configured: ready to run out-of-the-box
- Benefits:
  - High performance
  - Simple to buy
  - Fast to implement
  - To be launched at Oracle Open World

ORACLE DATABASE ENTERPRISE EDITION

- Partitioning
- RAC

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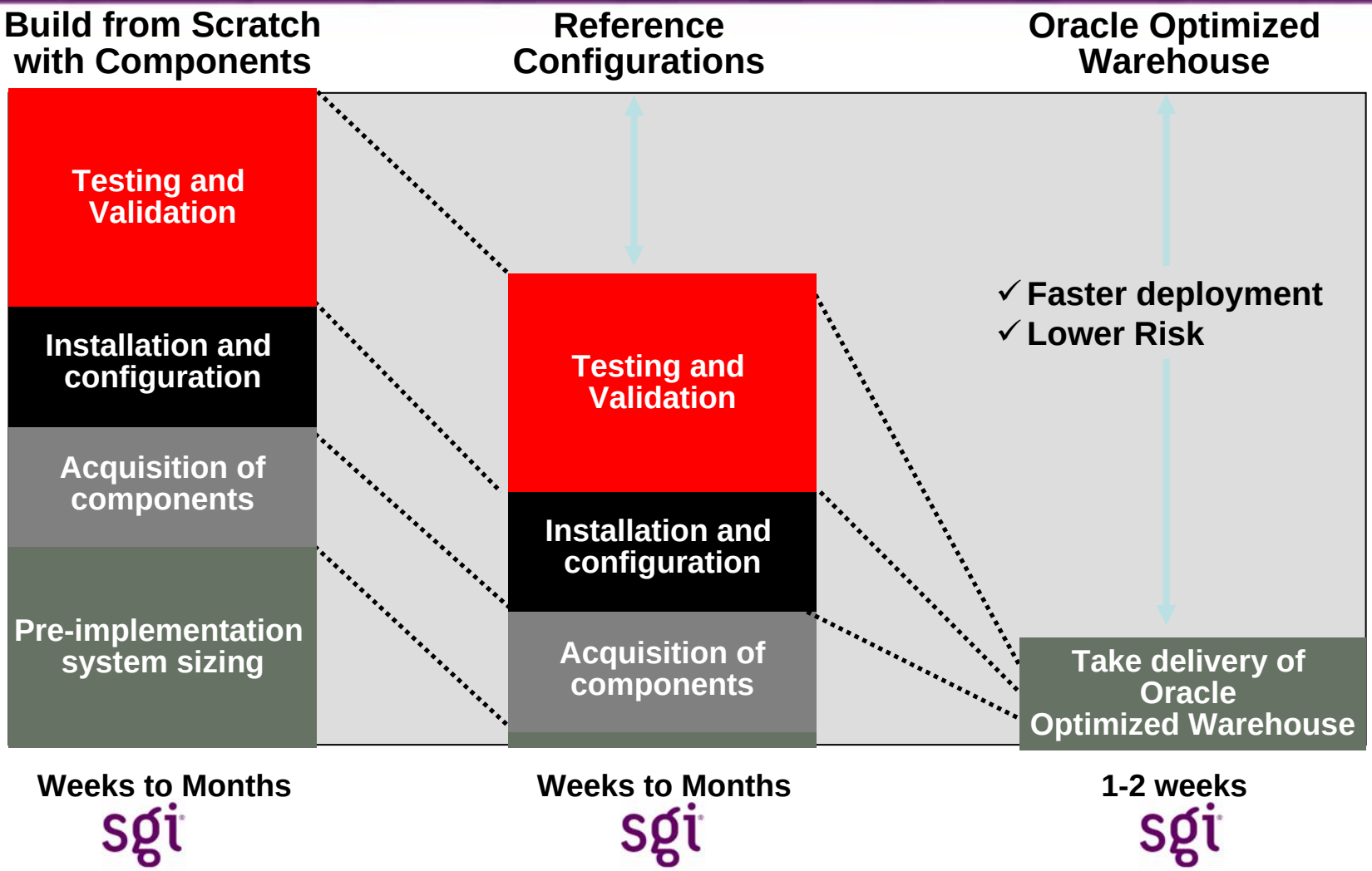
Pre-configured, Pre-installed, Validated

Flexibility

sgi INNOVATION FOR RESULTS

Accelerate Implementations and Lower Risk
SGI - Agile business partner



SGI® Adaptive Data Warehouse Solution

- **Outstanding price/performance:** Based on industry-standard technology
- **Multiple solution families:** 1TB to 300+TB configurations
- **Flexible architecture:** Scale-up and scale-out
- **Adaptable to changing business requirements:** No forklift upgrades
- **Easy to configure:** Predefined building blocks
- **Supports industry-leading database:** Oracle
- **Includes:** Server, storage, network switches, database, and services

SGI® Adaptive Data Warehouse Solution

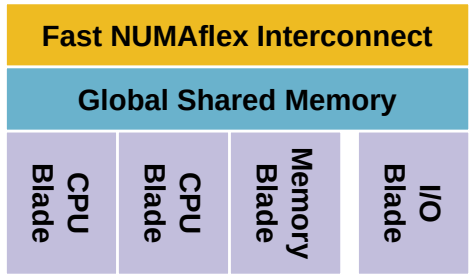
Outstanding Price/Performance

Leveraging the economics of industry-standard technology …

Processors

Linux Operating System

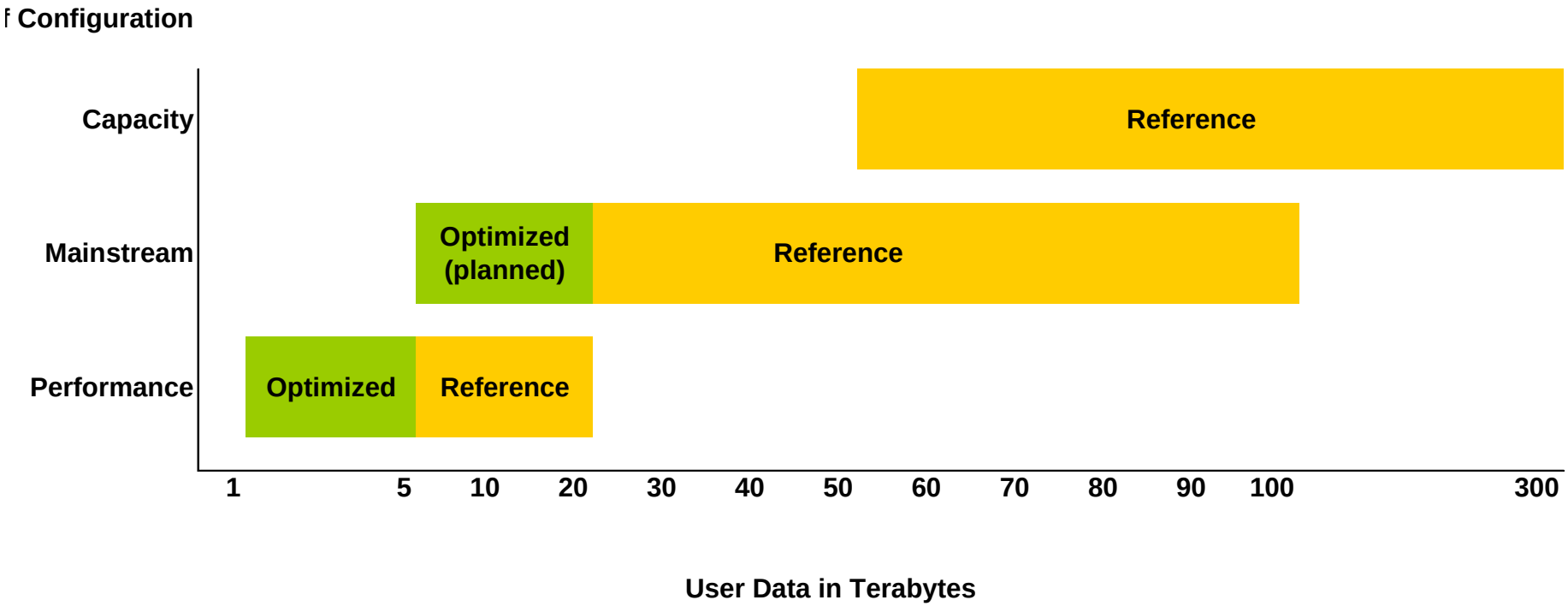
… combined with innovative technology …



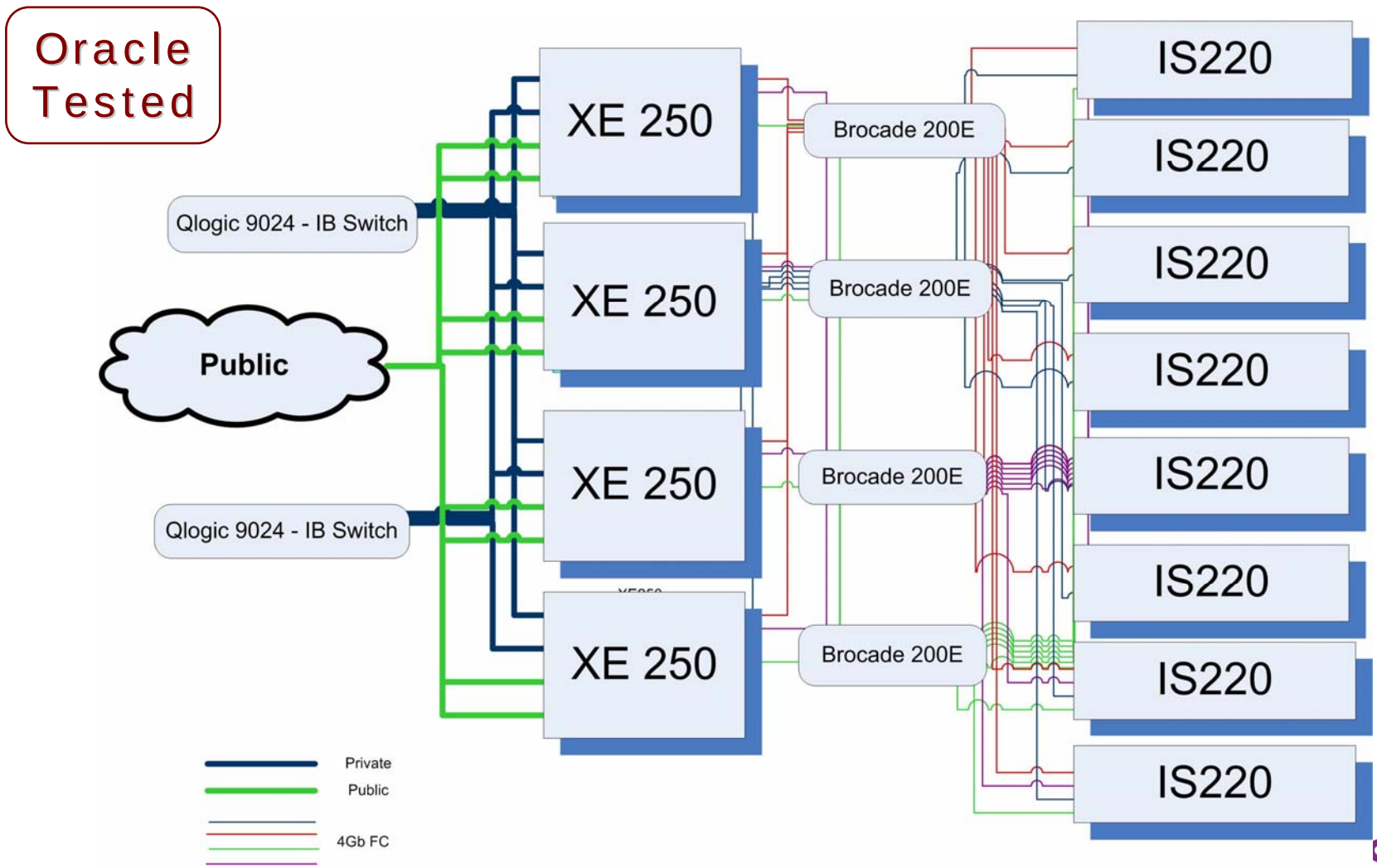
… and our 25 years of system design expertise

Oracle Optimized Warehouse Initiative Configurations

Fully tested OWI optimized and reference configurations in a broad range of performance and capacity categories

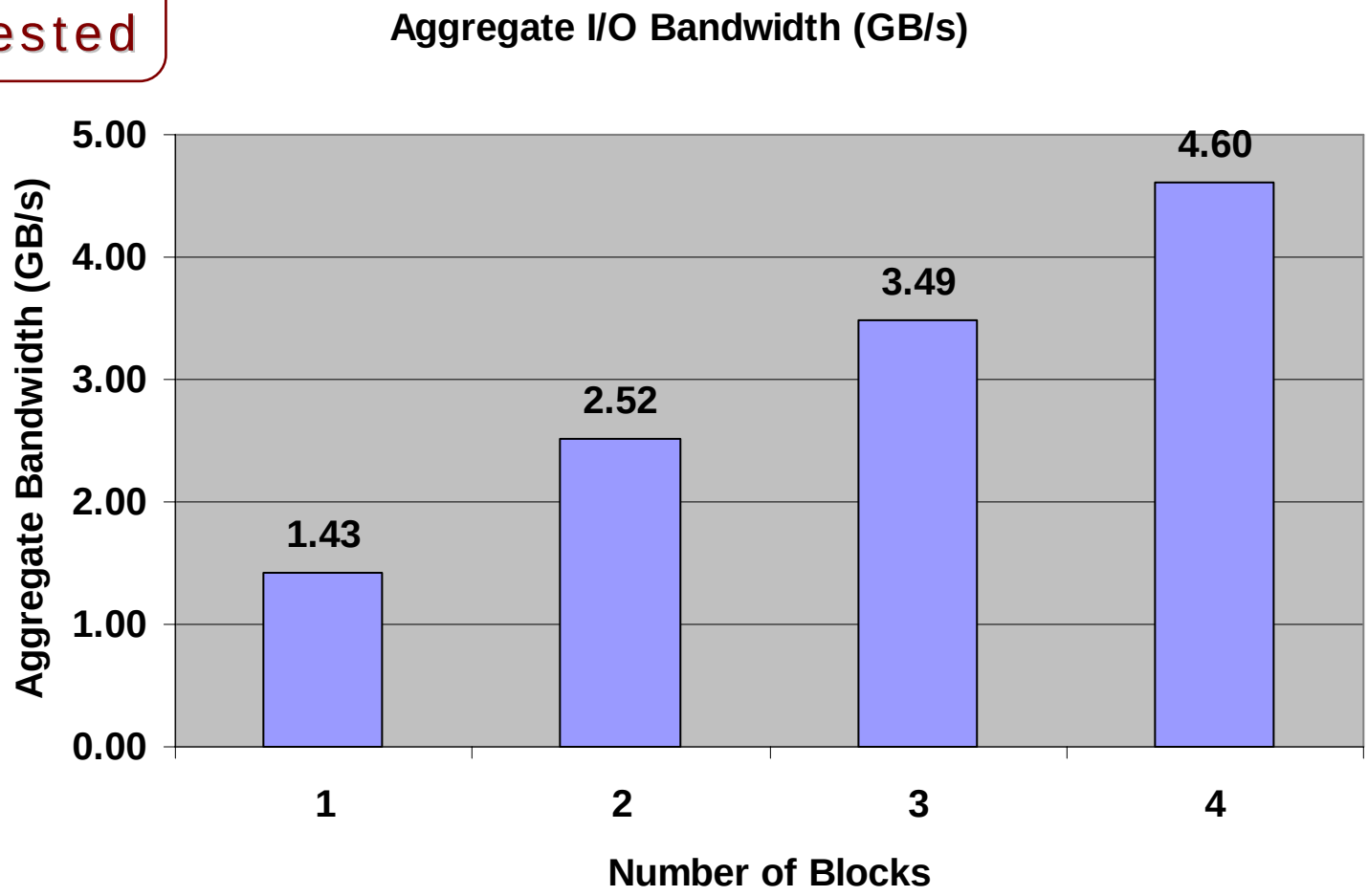


SGI 5 TB Optimized Performance OWI Configuration



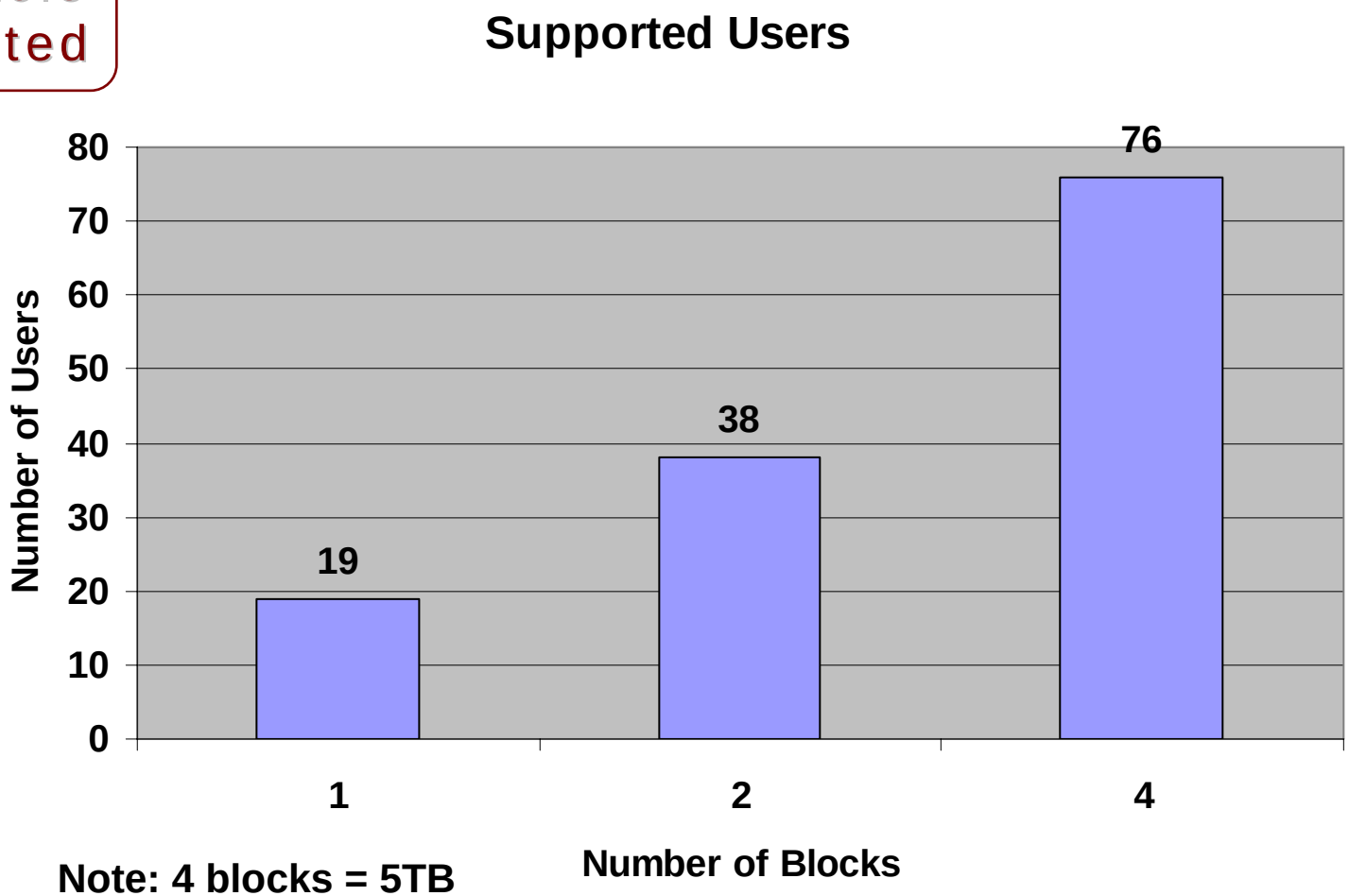
SGI OWI 5TB Performance Configuration Bandwidth Scaling

Oracle Tested



SGI OWI 5TB Configuration Scales Linearly with Additional Nodes

Oracle Tested



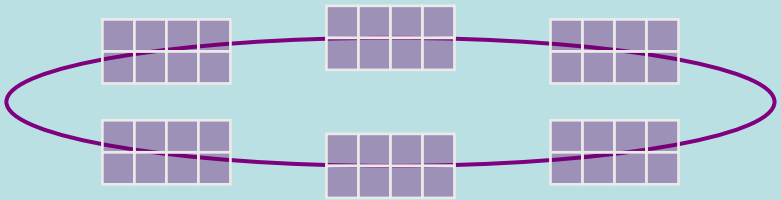
Note: 4 blocks = 5TB

SGI® Adaptive Data Warehouse Solution

Systems Architecture Technology

Loosely Coupled to Tightly Coupled Architecture

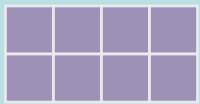
ULTRA-LARGE



100TB to 300TB

- Scale-up and scale-out
- NUMAlink systems architecture
- 24TB memory

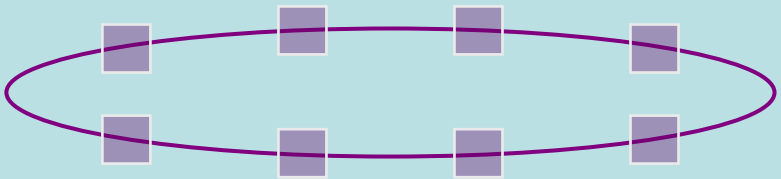
LARGE



5TB to 100TB

- Large-scale SMP
- NUMAlink systems architecture
- 864GB memory

MID-RANGE



<25TB

- Loosely coupled, scale-out
- IB interconnect

SGI® Adaptive Data Warehouse Solution

Adaptability

Simplified Expansion Without Sacrificing Flexibility

Simplified Growth

- Capacity growth by the addition of balanced building blocks
- Predefined reference configurations that scale into the hundreds of terabytes

Incremental Expansion

- Upgrades are additive to existing infrastructure
- No forklift replacement

Huge expandability with NUMAlink

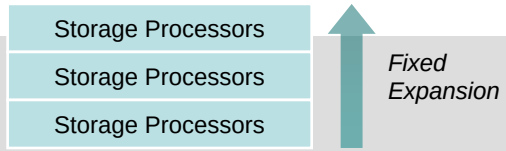
- Within a single processor and interconnect architecture
- CPU, memory, and I/O blades are all independently scalable
  - Thousands of processors
  - Terabytes of memory
- Independent scaling provides lower TCO and software licensing costs

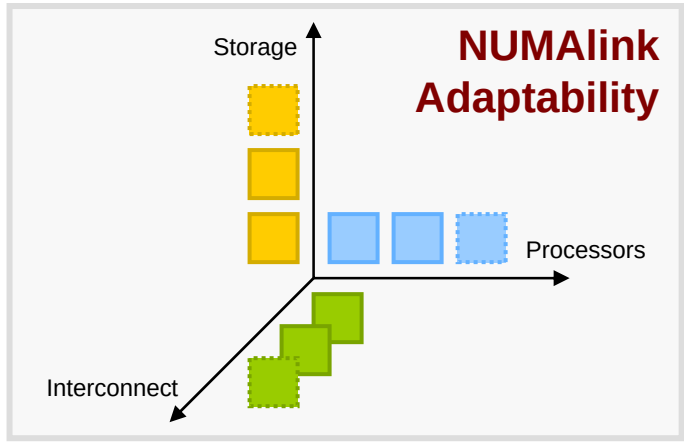
Adaptability and Choice

- Meet new workload processing, memory, and bandwidth requirements by adding blades

Data Warehouse Appliances

- Rigid, inflexible expansion
- Forklift upgrades
- Acceptable if all of your future needs look just like today's

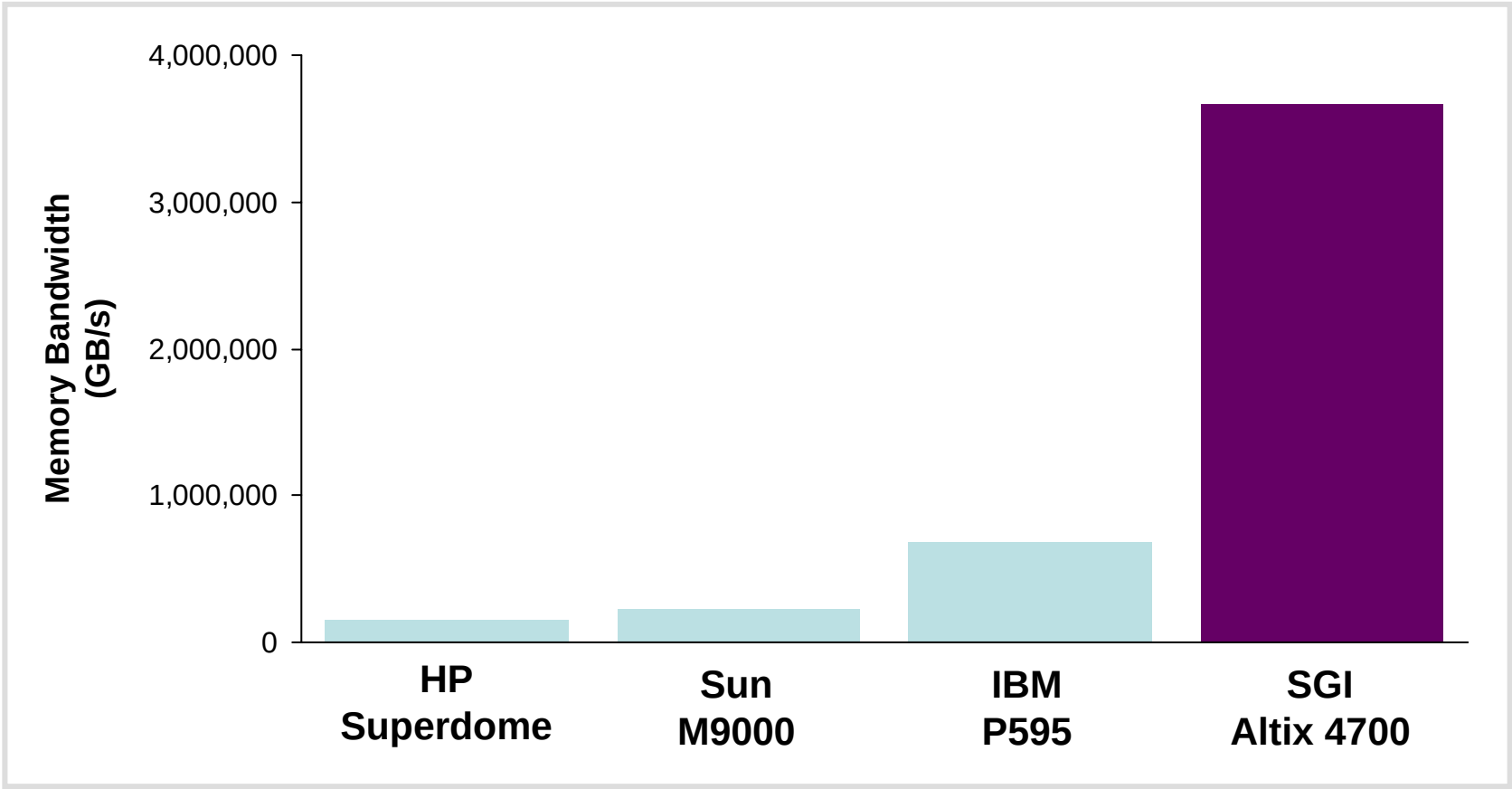




SGI® Adaptive Data Warehouse Solution

Shared Memory Bandwidth

*SGI Delivers 5x Greater Memory Bandwidth**



*Based on Stream benchmark, 06/01/2008

Konami Casino Management System – Data Warehousing for Real-Time Analytics

Real-time Tracking and Data Mining with Oracle and SGI

- Real-time play tracking combined with incentives and promotions
- Performance to uniquely provide personalized responses and responses to free play incentives in real-time
- A single system tracks all customer game play across, tables, slots, and other venues, across multiple properties

Transaction Rates that Rival Banks

- Casinos have as many as 3000 slot machines
- Transaction volumes as high as 34 million per day
- 24 X 7
- Oracle and SGI provide the ability to manage huge transaction vo availability features within a single server
- Memory and I/O bandwidth enable tracking to the individual game level.

Full Detail Data for Data Mining and Marketing Analysis

- Konami provides full player history across millions of players for data mining
- Konami captures 10X the detail data of competitors who can only provide detail data for 90 days
- Mixed OLAP and OLTP with Oracle database

No Forced Architectural Transitions or Scaling Limits

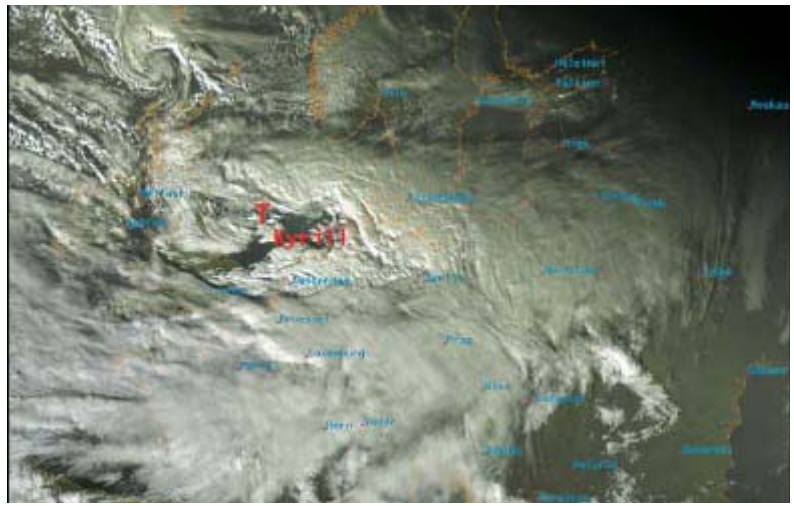
- 500-3000 slots with same systems architecture vs. competitors need for different CPUs and server product lines

DWD – SGI Adaptive Data Warehouse Solution Improves Advanced Weather Forecasting

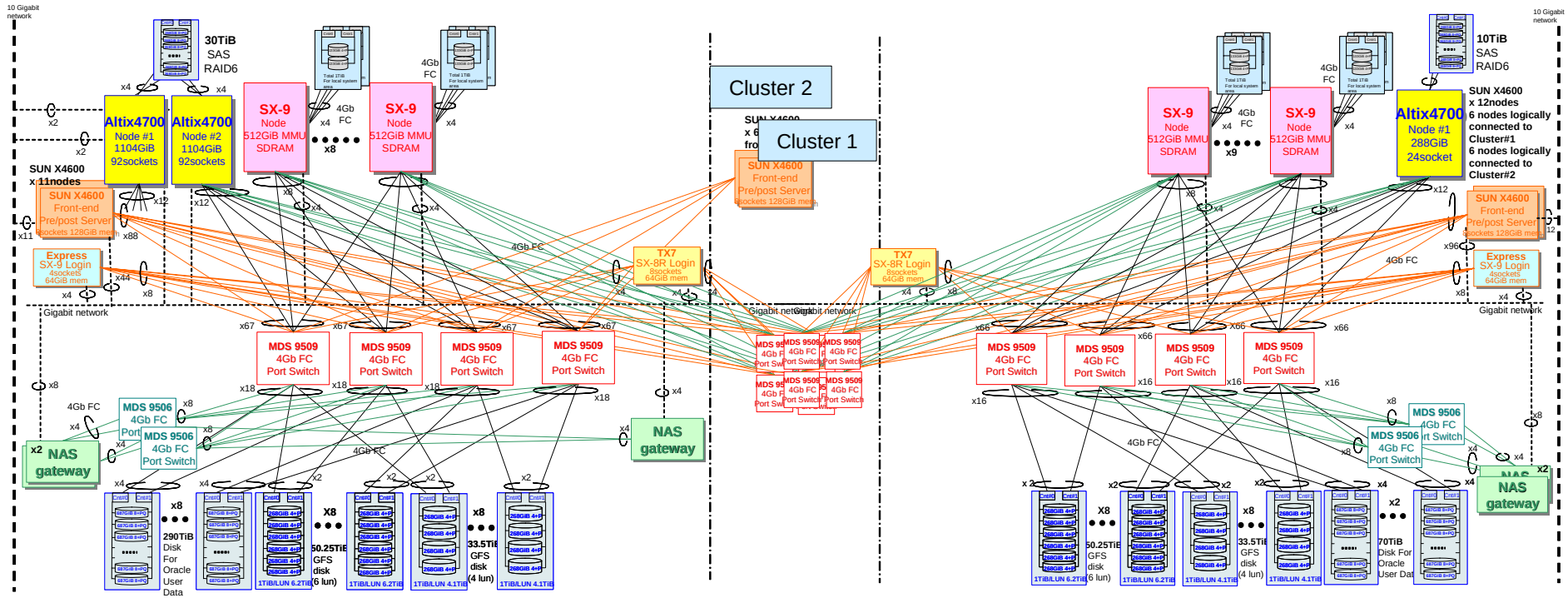
- Total of 2.8TB of shared memory on five SGI Altix 4700 data base servers
- Total of 472 Intel Itanium cores
- Two SGI Altix 450 test servers

- 30TB Metadata in Oracle 10g Data Warehouse
- 300TB Disk-based unstructured data
- 1.5PB Tape-based unstructured data

- Advanced Ensemble Prediction System
  - Averages forecast outputs of several models from different centers
  - Enables forecast reliability estimates
- SQL queries to Metadata warehouse which retrieves additional unstructured data
- Planned 20X increase in extremely short-range forecasts
  - From 1 every 3 hours to 20 in every 3 hours
  - Data sets are less than 10 minutes old
  - 4GB of data in each forecast
  - Each forecast updates 800MB of metadata
- Metadata from eight databases
  - Measured values
  - Satellite images
  - Weather models
  - Numerical experiment data
  - Operational data



DWD System Architecture



Real Time Data Access

MTU Aeroengines AG

The Challenge

- Increase ROI, decrease TCO
- Consolidation of technical and enterprise computing resources
- Adoption of new open-standards-based platform

The Solution

- 3+2 Altix® 350s (16p, 62GB)
- HDS 2x20TB

"SGI Altix gives us the fast performing consolidated platform for technical and transaction computing."

Norbert Diehl, CIO of MTU Aeroengines

The Benefits

- Fastest Oracle 10g performance
- Solid base for SAP
- Improved ROI 15-30%

SGI® Adaptive Data Warehouse Solution

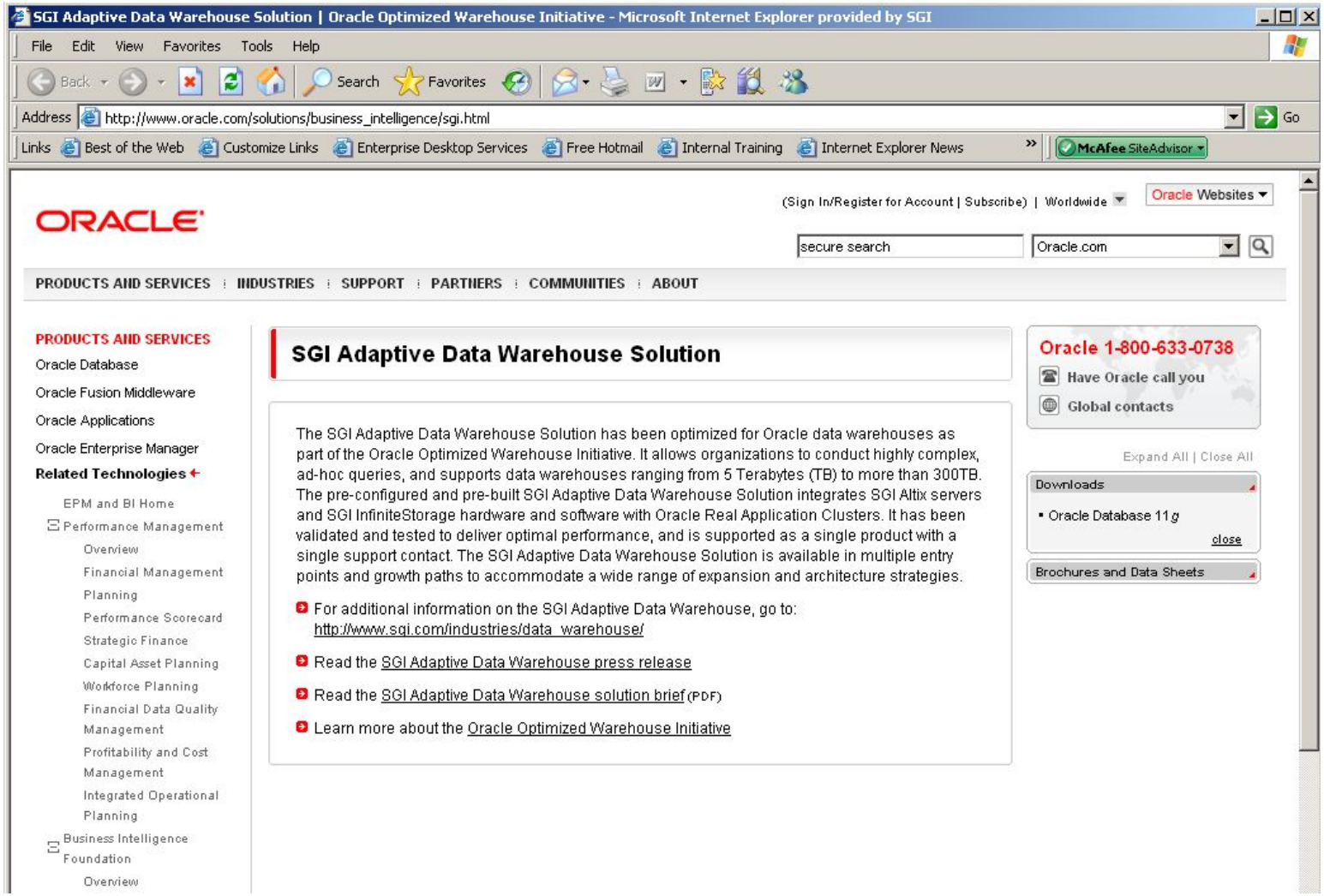
Competitive Differentiation

- **The SGI Adaptive Data Warehouse solution is ideal for complex data warehousing**
  - SGI knows how to build high-performance, large-scale systems
  - Oracle is the leading provider of database technology for data warehouses
- **SGI has 25 years of expertise in designing large systems**
  - SGI builds thousands of core systems and multi-petabyte storage systems on a regular basis
- **SGI delivers faster query performance on industry-standard technology**
  - SGI Adaptive Data Warehouse solution delivers up to 5x higher memory bandwidth
  - SGI and Oracle both strongly support industry-standard technologies (Linux®, Intel® processors)
- **SGI offers a flexible architecture with lower TCO for growing data warehouses**
  - Supports wide range of needs, 1TB to 320+TB
  - No forklift upgrade eliminates costly, disruptive future upgrades
  - Independent expansion of CPU, memory, and I/O capacity minimizes cost

Summary

- The SGI® Adaptive Data Warehouse solution helps Oracle customers that need a more capable data warehouse solution
- SGI is bringing its 25 years of expertise in large-scale systems design to data warehouse customers
- The SGI Adaptive Data Warehouse solution offers higher performance, lower TCO, and greater flexibility than other data warehouse offerings
- SGI is joining the Oracle OWI program, expanding the target market for the Oracle Optimized Warehouse Initiative to complex data warehouse customers

Summary


SGI Adaptive Data Warehouse Solution | Oracle Optimized Warehouse Initiative - Microsoft Internet Explorer provided by SGI
File Edit View Favorites Tools Help
Back Search Favorites
Address http://www.oracle.com/solutions/business_intelligence/sgi.html
Go
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Performance Management
Overview
Financial Management
Planning
Performance Scorecard
Strategic Finance
Capital Asset Planning
Workforce Planning
Financial Data Quality Management
Profitability and Cost Management
Integrated Operational Planning
Business Intelligence Foundation
Overview
SGI Adaptive Data Warehouse Solution
The SGI Adaptive Data Warehouse Solution has been optimized for Oracle data warehouses as part of the Oracle Optimized Warehouse Initiative. It allows organizations to conduct highly complex, ad-hoc queries, and supports data warehouses ranging from 5 Terabytes (TB) to more than 300TB. The pre-configured and pre-built SGI Adaptive Data Warehouse Solution integrates SGI Altix servers and SGI InfiniteStorage hardware and software with Oracle Real Application Clusters. It has been validated and tested to deliver optimal performance, and is supported as a single product with a single support contact. The SGI Adaptive Data Warehouse Solution is available in multiple entry points and growth paths to accommodate a wide range of expansion and architecture strategies.
For additional information on the SGI Adaptive Data Warehouse, go to: http://www.sgi.com/industries/data_warehouse/
Read the SGI Adaptive Data Warehouse press release
Read the SGI Adaptive Data Warehouse solution brief (PDF)
Learn more about the Oracle Optimized Warehouse Initiative
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SGI® Adaptive Data Warehouse Solution

Scale-Out and Scale-Up

Scale-Out

- Exploits commodity servers
- Low incremental expansion cost
- Multiple system images
- **High latency communication over cluster interconnect**
  - Interconnect protocol latency
  - Latency between OS instances
- **Low practical node limits based on scaling overhead**

SGI addresses these issues with InfiniBand

Scale-Up

- Proprietary interconnect architecture
- **Proprietary processor architecture**
- **Proprietary operating system**
- **Some architectures have lumpy acquisition costs**
  - (i.e., the 33rd processor requires a whole new chassis and backplane)

SGI addresses these issues with industry-standard Intel processors, Linux, and the scalable NUMAlink interconnect

- Single-system image
- Low-latency shared memory communications between processors
- **Many architects have scaling limits based on high interconnect cost**
- **Large scale-up architectures may have relatively higher system costs due to limited market volume**

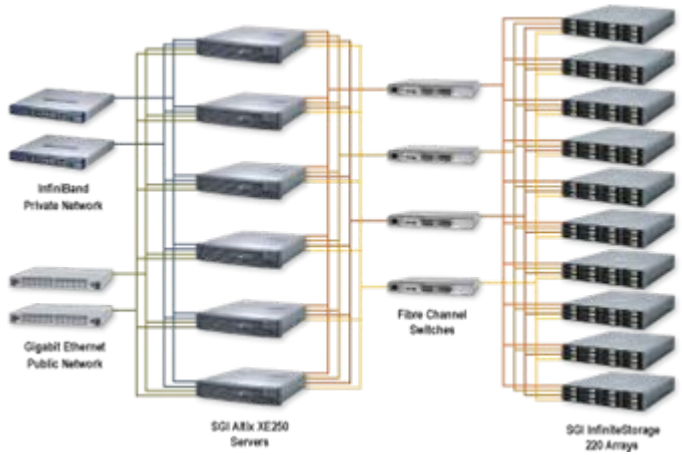
SGI addresses these issues with NUMAlink scalability from one to thousands of nodes within a single systems architecture

SGI® Adaptive Data Warehouse Solution

Mid-Range Solution Family

- Scalable reference configuration using building blocks
- Scale-out cluster architecture
- Low-cost x86 industry-standard processors
- InfiniBand interconnect
  - Up to 50% performance improvement for RAC*
- Multiple storage controllers for high aggregate bandwidth
- Large number of high-speed SAS drives for high storage array throughput

	Mid-Range
Nominal Scalability	1TB to 25TB
Architecture	Scale-out Cluster
RAC Node	SGI Altix XE 250
Processor Interconnect	InfiniBand
Storage	SGI InfiniteStorage 220
Storage Interconnect	Fibre Channel
Disk Family	146GB 15K SAS



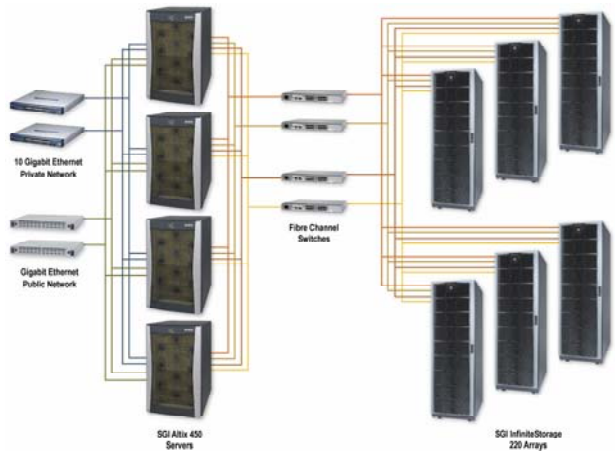
*Source: http://www.pr-inside.com/voltaire-infiniband-accelerates-oracle-r-r296154.htm

SGI® Adaptive Data Warehouse Solution

Large Solution Family

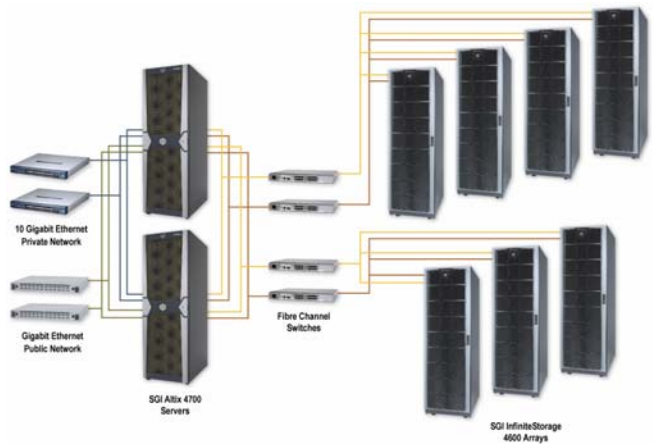
- Scalable reference configuration using building blocks
- Scale-up architecture
  - Leverages NUMAflex global shared memory architecture
  - Independent scaling of CPU, memory, and I/O
  - Dual servers for Oracle RAC high availability
- Based on industry-standard processors
- Fully redundant
- Multiple storage controllers for high aggregate bandwidth
- Large number of high-speed SAS drives for high storage array throughput

	Large
Nominal Scalability	5TB to 100TB
Architecture	Scale-Up
RAC Node	SGI® Altix 450
Processor Interconnect	Shared Memory/10GB Ethernet
Storage	SGI® InfiniteStorage 220
Storage Interconnect	Fibre Channel
Disk Family	146GB 15K SAS



SGI® Adaptive Data Warehouse Solution

Ultra-Large Solution Family

- Scalable reference configuration using building blocks
- Scale-up and scale-out cluster architecture
  - Leverages NUMAflex global shared memory architecture
  - Independent scaling of CPU, memory, and I/O
  - Dual servers for Oracle RAC high availability
- Based on industry-standard processors
- Fully redundant
- Very high-performance storage controllers with 16 4Gb FC host channels for high aggregate bandwidth
- Large number of high-speed FC drives for high storage array throughput

	Ultra-Large
Nominal Scalability	100TB to 320+TB
Architecture	Scale-Up and Scale-Out
RAC Node	SGI Altix 4700
Processor Interconnect	Shared Memory/10GB Ethernet
Storage	SGI InfiniteStorage 4600
Storage Interconnect	Fibre Channel
Disk Family	300GB 15K FC