Empowering SAS® Grid Computing and SAS Marketing Automation on Oracle SPARC SuperCluster
Agenda

- About Marketing Automation
- Oracle SPARC SuperCluster (SSC) and SAS Application Solutions
- Oracle SSC and Private SAS Application Cloud Computing
- SAS Application Solution Performance on Oracle SSC
- Summary
Today's Marketing Campaign Challenges
Finding the Customer Opportunity

Inbound Marketing Channels Challenges

- Explosive growth in Internet Store Front customers
  - Managing "Big Data" – Intelligent Aggregation
- Opportunity Discovery – Targeting Campaigns
  - Intelligent Knowledge Discovery
- Campaign Formulation – Campaign Analytics
  - Testing Potential Campaign Outcomes
  - Determining Outbound Channel Effectiveness
- Campaign Monitoring
  - Iterative Analysis – Adapting campaigns in real time
Marketing Automation
Process Driven Opportunity Discovery

• Inbound Marketing Data
  • Processing "Big Data"
  • Extraction, Transformation and Loading
  • CPU and Storage Intensive

• Analytics/Insight
  • Knowledge Discovery
  • Testing Opportunities
  • Compute Intensive

• Campaigns
  • Iterative Computing and Storage workloads
  • Determine Best Marketing Channels
  • Test for Market Effectiveness

• Revenue
  • Campaign Costs
  • Revenue / Margin
Why deploy SAS Marketing Automation

- **Reduce Cost**
  - Automation & Analytics improves time to market

- **Improve Productivity**
  - Deploy more effective campaigns faster

- **Reduce Risk**
  - Quickly understand inbound channel messaging
  - Proactively deploy targeted campaigns
  - Test/Verify campaigns prior to deployment
  - Determine best outbound channels in advance

- **Improve market agility**
  - Monitor Campaigns in Real Time
  - Fine tune and adapt through iterative marketing analytics
Oracle SPARC SuperCluster for SAS Application Solutions
Oracle Engineered Systems
Accelerate Your SAS Marketing Automation to Campaign Success

Save Money
Reduce capital and operational costs to maximize IT investments and realize demonstrable campaign ROI

Reduce Risk
Ensure successful deployment and continued access to critical data and functions

Increase User Productivity
Improve service levels resulting in higher employee productivity and deploy more effective targeted campaigns faster
Re-defines SAS Application Solution IT Deployment Strategies

**Traditional Approach**
- Collection of vendors
- Complex matrix of products
- First integration is in your data center
- Staff focused on making it work

**Engineered Systems Approach**
- One point of accountability
- Engineered to work together
- Tested & proven architecture
- Staff focused on strategic projects
Why deploy Oracle SPARC SuperCluster

Engineered for the Enterprise

- No-Overhead Virtualization – OVM for SPARC
- Management – Enterprise Manager Ops Center 12C
- Application Throughput – SAS Application Solutions

Engineered to reduce Risk and Cost

- 5X faster Deployment
- 3X Less Operations and Maintenance Cost
- 1.5X higher consolidation ratios

Engineered for Performance

- Up to four (4) SPARC T4-4 Compute Nodes
- Large Memory Compute Node(s): 1 TB per/Node
- Sun ZFS Storage Appliance (ZFSSA) on Infiniband Network Fabric

* All SAS Software is separately available and licensed through SAS Institute.
Oracle SPARC SuperCluster Deployment

Improve Time to Market – Realize Benefits Faster

Accelerated IT SPARC SuperCluster Deployment

• 5X Faster Time to Value

Time to Value means:

• SAS Applications up and running faster
• SAS Grid Computing
  - Manage and process "Big Data" Faster
  - Naturally exploits SSC Compute Nodes
  - Intrinsic SAS Workload Distribution
• SAS Application Solutions
  • Rapidly create Campaign Data Marts
  • Exploit Oracle Database Query Performance

Benefits

• Improve Productivity through improved SAS turnaround
• Adapt business mission through faster analytics
• Potential for improved business revenue
SPARC SuperCluster Operational Cost Reduction
Reduce Infrastructure Operations and Maintenance

3X Less Administrative and Maintenance

- Manage
  - Plan, Deploy & Optimize IT Assets
- Optimize
  - Utilization Policies that drive elasticity
  - Track and Monitor Capacity Utilization
  - Collaborative with SAS Grid Computing
- Sustain
  - Patch Automation reduces upgrade risks
- Diagnostics
  - Performance Diagnostics & Analytics
  - Collaborative with DTrace Storage Analytics

Benefits

- Proactively manage IT Infrastructure
- Reduce risk during upgrades and patching
- Improve SAS Application Solutions Availability
- Reduce Operational Costs
SPARC SuperCluster reduces Overhead Costs
High Value Application Consolidation

Up to 1.5X Better Consolidation Ratios
- Empowered by Oracle VM for SPARC
  - Zero Overhead Virtualization
- SAS Grid Computing engages virtualized SSC
  - Policy Driven SAS Workload Distribution
  - Improves SAS Job throughput

SPARC SuperCluster empowers by
- Faster Compute/Storage
  - SPARC T4-4 Architecture
  - Infiniband Network Fabric Interconnectivity
- Higher bandwidth for Storage
  - Exadata Storage Servers
  - Sun ZFS Storage Appliance (ZFSSA)

Benefits
- Dramatically improve SAS Performance
- Rapidly deliver Marketing Analytics and Campaigns
- Faster time to potential Revenue
Oracle SPARC SuperCluster Platform for Private SAS Cloud Computing
Why deploy SAS on Oracle SPARC SuperCluster
SAS Grid Computing Delivers on SSC

Ideal for SAS workloads

• SPARC SSC T4-4 Servers accelerate SAS processes
  − Virtualization empowers SAS Grid Computing
• High Performance Storage
  − Exadata Storage Servers improve query performance
  − Hi-Performance shared Filesystem with ZFSSA
  − Infiniband network fabric interconnectivity

SAS Grid Computing Orchestrates SAS Workloads

• SAS Data Integration with Inbound Marketing Channel Data
  − Improves data aggregation and reduction times
  − Accelerates time to campaign formulation
• Dramatically faster turnaround times
  − Fast compute and storage enables iterative analysis
  − Enables higher fidelity analytics
• Deliver business critical results faster on Oracle SPARC SSC
SAS® Grid Computing
Deploy SAS Application Solutions in a Private SSC Cloud

• Private SAS Application Solutions Cloud
  - Oracle VM for SPARC - No Overhead
    - SPARC firmware level Virtualization
    - Dynamic Logical Domain (Ldom, VM) provisioning enables SAS Grid Computing
  - SAS Grid Computing
    - SAS Cloud Job Orchestration
    - Automated Workload balancing
  - Oracle Enterprise Manager Ops Center 12C
    - Hardware, Software and Applications Mgmt
    - Provisions for Oracle VM for SPARC
  - Oracle Solaris Cluster
    - Solaris HA for SAS Application Solutions Cloud Infrastructure
SAS® Grid Computing On SPARC SuperCluster
Accelerating SAS Computing Throughput

Workload Balancing
- Business Goal Policy driven SAS Job Orchestration
- Automated Workload balancing that gets results faster

High Availability SAS Environment
- Complements Oracle Solaris Cluster
- Manages compute server availability for SAS workloads

Exploit SSC Compute Resources
- Distributes SAS Jobs throughout compute infrastructure
- Effective for Big Data Processing
- Faster campaign time to market benefits

Scale available SAS computing resources
- Scale computing resources as requirements change
- Scale SAS processing with Oracle SSC Incrementally
  - Oracle VM for SPARC – Add or Reduce number of LDOMs
  - Grow from Oracle SSC Half Rack to Full Rack

* External ZFS Storage Appliance with IB Connectivity
SAS® Data Integration on SPARC SuperCluster Accelerated Data Transformation

SAS Data Integration on SPARC SSC

• Distributed Data Transformation with Grid Computing
• Empowered by SPARC SuperCluster
  - SPARC T4-4 Server Architecture
  - Oracle VM for SPARC
  - SAS Grid Computing
  - Infiniband Network Fabric
  - Exadata Storage Servers
  - High Performance Shared Filesystem
• Exadata Storage Servers & Oracle Database
  - Accelerates Database query processing
• High Performance ZFSSA Shared Filesystem
  - Utilized during Data Transformation
  - Accelerates NFS Filesystem Traffic

* External ZFS Storage Appliance with IB Connectivity
SAS Application Solutions Performance on Oracle SPARC SuperCluster
Oracle SPARC SSC and SAS Grid Computing
SAS Application Solution Storage Performance Results

Performance Highlights:

• Over 130+ Concurrent CPU and I/O Intensive SAS Jobs
• ZFSSA Shared Filesystem Throughput
  • Aggregated Throughput ~ 6 GB/s

Computing/Storage Infrastructure

• Oracle SPARC SSC – Full Rack
• Solaris 11 and Solaris 10
• Oracle Database 11g
• ZFS Storage Appliance - 7420 Dual Controller*
• Oracle Database 11g Instance
• SAS Application Solution Infrastructure
  - SAS Grid Computing
  - SAS Customer Intelligence

Peak RW Filesystem Throughput (GB/s)

Combined Throughput

SAS Work Files "/saswork"

SAS Data Files "/sasdata"

* External ZFS Storage Appliance with IB Connectivity
Oracle SPARC SSC and SAS Marketing Automation
Targeted Campaign Formulation Performance Results

Performance Highlights:
- Execution (Turnaround) Time
- Serial Execution of 22 Campaigns
- Concurrent Campaign Execution
  - Multiple simultaneous campaign execution
- Serial Execution – 4X Faster on Oracle SSC
- Concurrent Execution – 8X Faster on Oracle SSC

Computing/Storage Infrastructure
- Oracle SPARC SSC – Half Rack Configuration
- Two(2) T4 Nodes with Four(4) Logical Domains
  - Solaris 11 and Solaris 10
- Oracle Database 11g Instance
- SAS Application Solution Infrastructure
  - SAS Customer Intelligence 5.41
Oracle SPARC SuperCluster and SAS Application Solutions

- Deliver Faster Time to Value
- Reduce Risk - During and after Deployment
- Deliver Faster Results – Powerful SPARC Computing Technology
  - Enabled by Oracle VM for SPARC and SAS Grid Computing
  - High Performance Storage Solutions with Infiniband Interconnectivity

Rapid Private SAS Application Cloud Deployment

- Consolidate SAS Applications – T4-4 SPARC Server Architecture
- Distribute Compute Power - Oracle VM for SPARC
- Distribute SAS Workloads - SAS Grid Computing
- Manage and Maintain - Oracle Enterprise Manager Ops Center 12c

Delivers Results Faster that can improve the bottom line
Resources

Optimized Solutions
http://www.oracle.com/goto/optimizedsolutions

Oracle SPARC SuperCluster
http://www.oracle.com/supercluster

SAS and Oracle
http://my.oracle.com/sas

Sun ZFS Storage Appliance

SAS Institute
Hardware and Software

Engineered to Work Together