SAS OMA Workunit Journaling & Other Metadata Performance Considerations

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Introduction

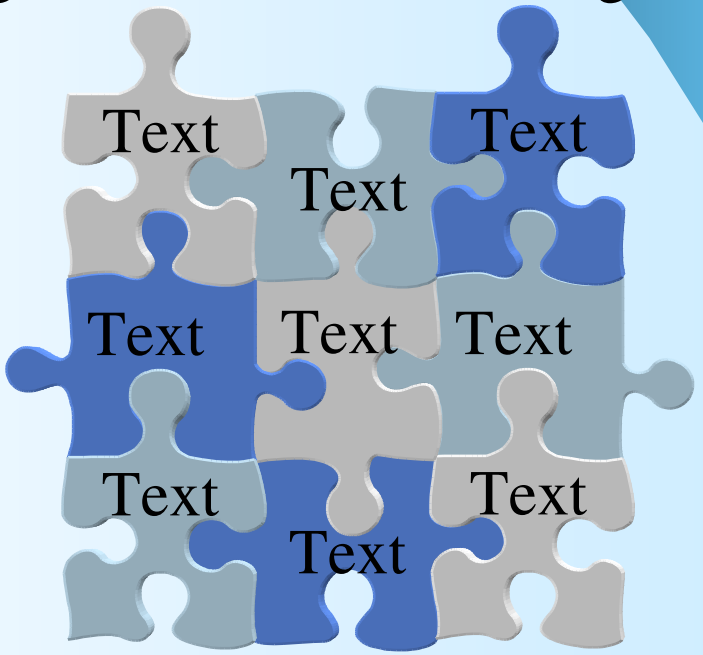
- Who we are?
  - SAS Alliance Partner
  - Futrix Reseller
  - Syncsort Partner
- What we do?
  - SAS Architecture
  - SAS EBI Architecture & Install
  - Performance
  - Data Modeling
  - SAS Consulting & Resource Provisioning

Introduction of Topic

- SAS Metadata Server
- Industry Install Patterns
- Performance Considerations
- Sizing
- Workunit Journaling

Overview

- Discuss different types of SAS Metadata installs in the industry as well as review what performance techniques could be employed for maintaining a robust OMA, including but not limiting to Workunit Journaling



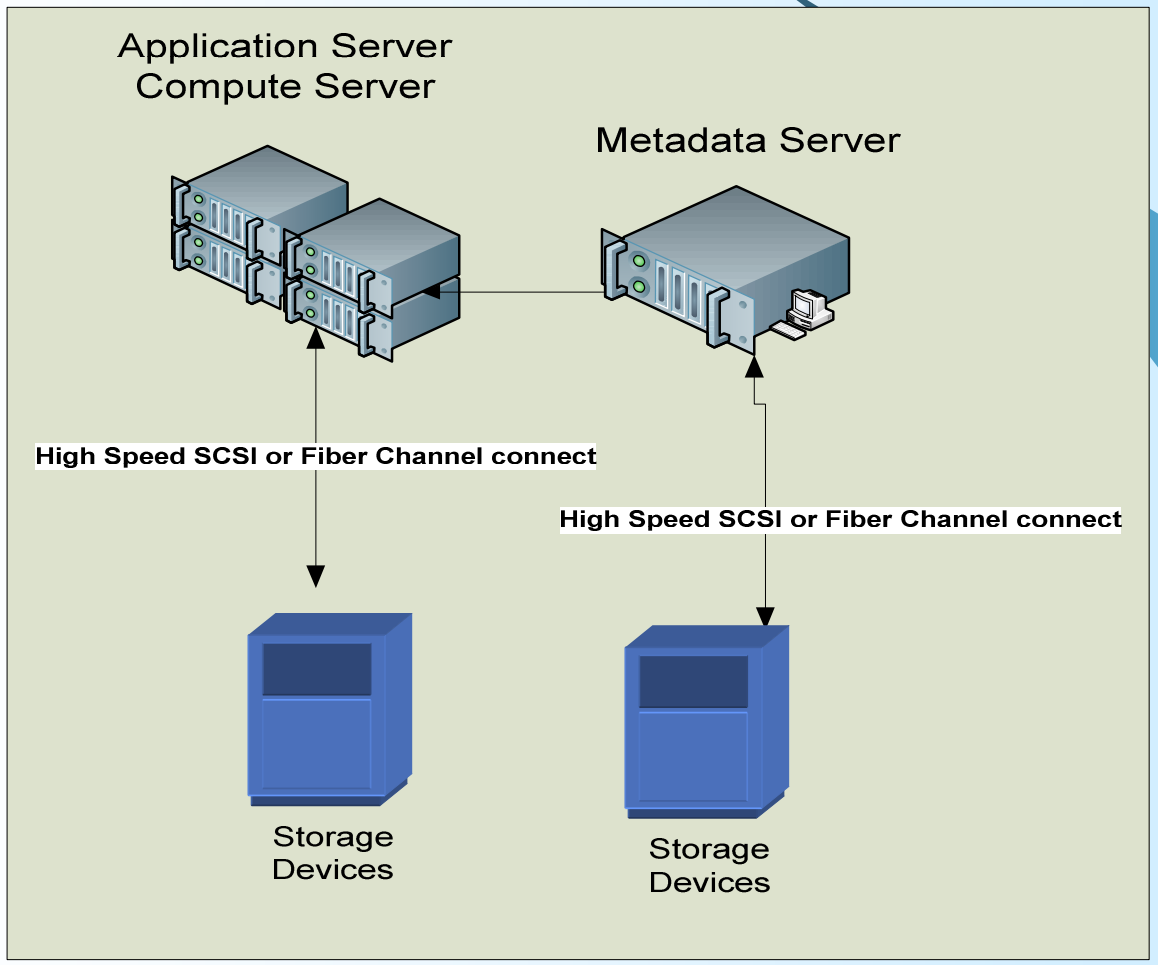
What is SAS Metadata Server?

- What is SAS Metadata?
  - SAS Metadata (also referred to as OMA) is the heart and soul of the SAS EBI environment
  - It is a multi user server which is central to all the SAS EBI components bringing the intelligence platform client together
  - It is in memory server
  - Based on a open metadata architecture

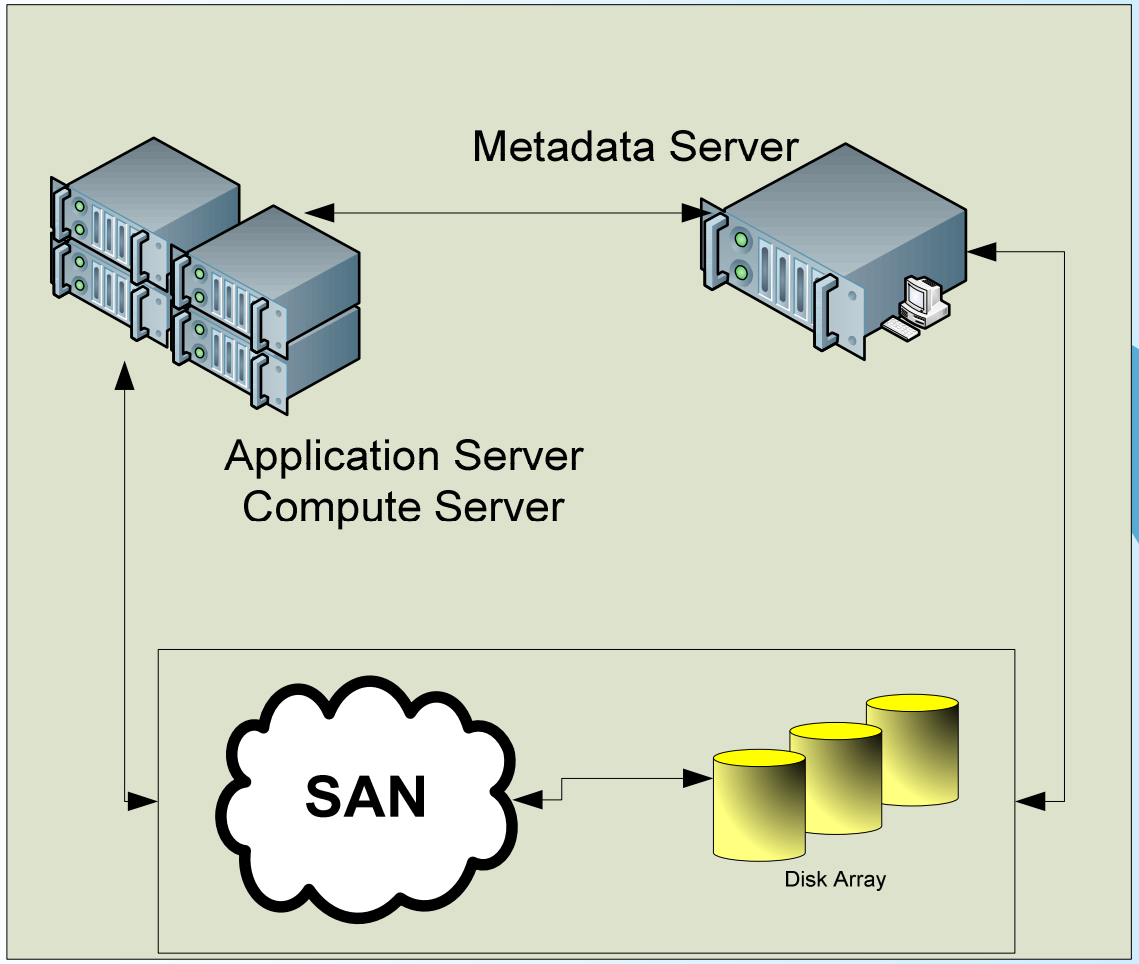
Install Characteristics of the SAS Metadata Server

- Industry wide different practices of SAS EBI Architecture
  - Usage
  - Need
  - Tools Used
- Metadata Server are installed on single machine sharing the SAS server (Compute) servers on the same machine

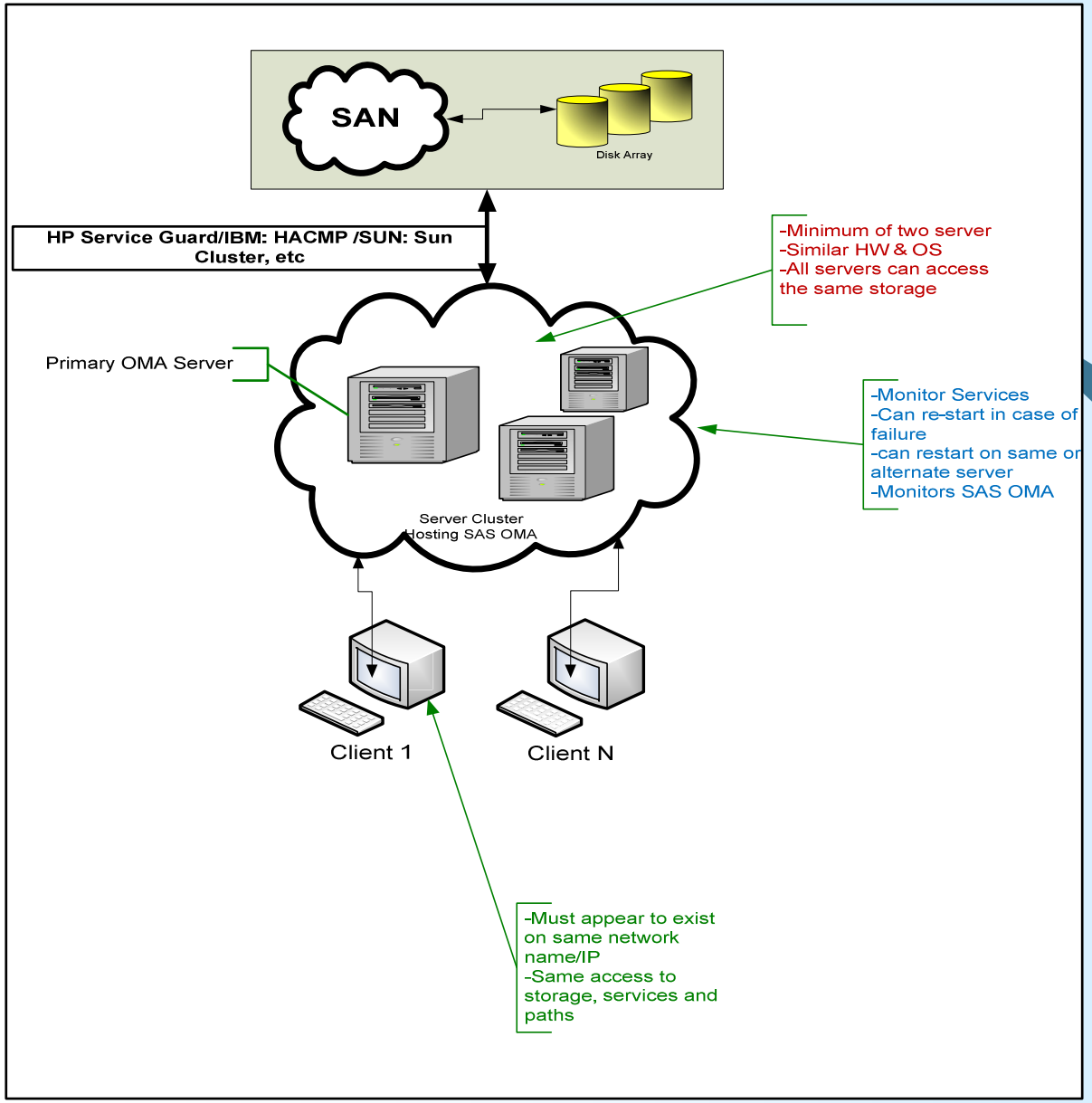
Metadata Servers are also installed separately from the compute servers



For large scale installations, Metadata Servers are installed separately as well as have provisions for Failover (High Availability)



SAS Metadata High Availability



High Availability Requirements for Cluster/Service

- Similar OS and HW minimum of two (2) servers
- Same access to storage, services, and paths
- Monitors SAS OMA processes
- Can re-start or fail over in case of SAS OMA failure.
- One machine is primary host for SAS OMA

High Availability Requirements for Cluster/Service

- Known failover services deployed via:
  - HP Service Guard
  - Sun's Sun Cluster
  - IBM: High Availability Cluster Multi-Processing
- Normally work with monitoring TCP/IP connections, Querying against the metadata, or monitoring for PID and or ID which runs the OMA. (SAS PING JAVA Utility)

Workunit Journaling

- Workunit Journaling is NOT enabled by default in SAS 9.1.3. However it is enabled by default in SAS 9.2
- Before WUJ is discussed lets discuss techniques that help tune for better SAS Metadata performance
- The next slides will discuss methodologies and configurations that tool a robust SAS Metadatserver Server.

Metadata Performance Tuning/Configuration

- MAXACTIVETHREADS
- The MAXACTIVETHREADS server configuration option specifies the maximum number of metadata server threads that are allowed to run concurrently on the metadata server
  - Listed in the omaconfig.xml
  - In a one processor machine value defaulted to 2, otherwise is equal to the number of processors on the server

Metadata Performance Tuning/Configuration

- THREADSMIN
  - Controls the minimum number of threads available at any given time in the threads pool available for the metadata
  - Value is in **sasv9_MetadataServer.cfg**
  - MAX(5,((*number-of-processors* * 2) + 1))
  - If =< 2 processor value = 5
  - THREADSMIN value should be kept = THREADSMAX

Metadata Performance Tuning/Configuration

- THREADSMAX
  - Controls the maximum number of threads available at any given time in the threads pool available for the metadata
  - Value is in **sasv9_MetadataServer.cfg**
  - Same value as THREADSMIN to reduce threads resource thrashing
  - (MAXACTIVETHREADS*2)+1

Metadata Performance Tuning/Configuration
Memory Considerations

- Recover Memory
  - Purge Memory
  - Physically Re-claim Memory
  - Optimize Memory Usage (RUNANALYSIS)

Metadata Performance Tuning/Configuration
Memory Considerations

- Recover Memory
  - Purge Memory
    - SAS Management Console
    - Metadata Manager > [right click] Select Purge
  - Reclaim Memory
    - REORG with %OMABKUP
    - Reclaim Physical SAS datasets that make up RPO

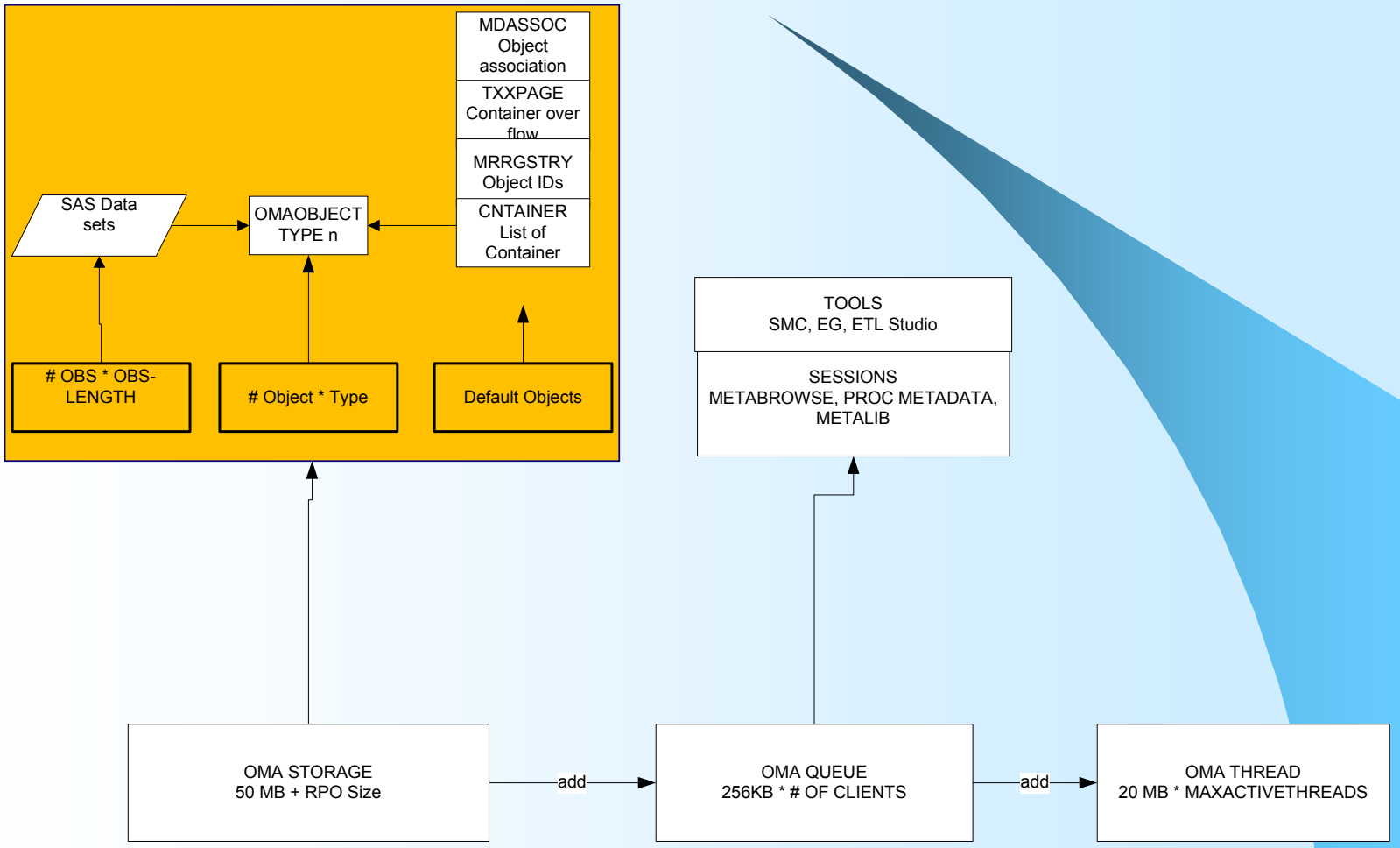
Metadata Performance Tuning/Configuration Memory Considerations

- Optimize Memory Usage
  - RUNANALYSIS as %OMARUNAN
  - Run with %OMABKUP with “YES”
  - Run as a separate Process
  - Analyzes handling of
    - character variables
    - Checks unnecessary indexes, long character variables that can be stored as variable-length strings, and duplicate strings.

Metadata Performance Tuning/Configuration
Other Considerations

- MEMSIZE
- I/O Balance
  - Single Thread
  - No I/O balancing needed
  - I/O occurs at request
- Concurrent Queries/Client
  - Based on Usage, MAXACTIVETHREADS, TMIN, TMAX

Estimating Metadata Memory Size

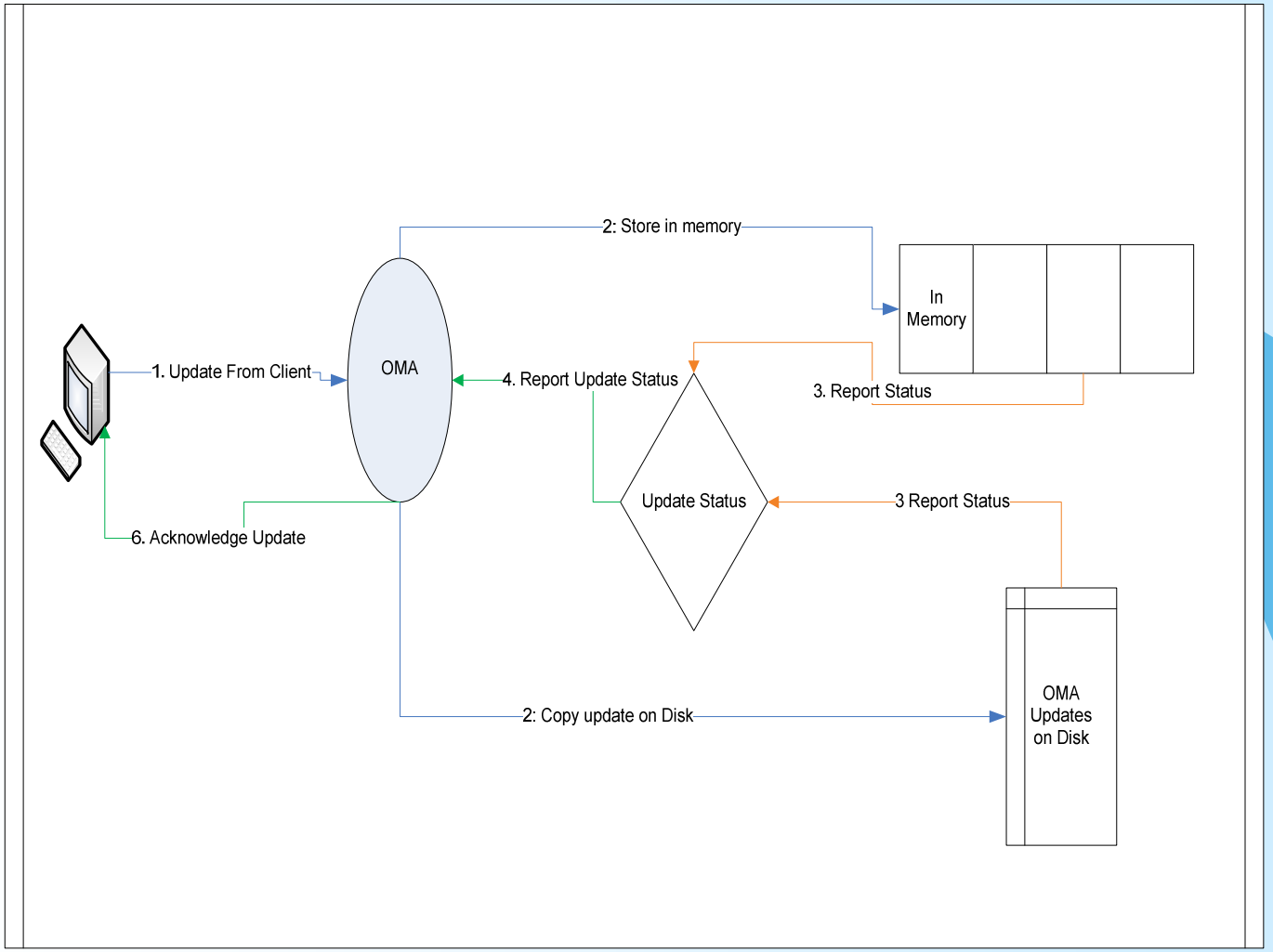


Implementing & Enabling Workunit Journaling

Workunit Journaling

- Default Metadata Server Behavior
  - In Memory Server
  - Two copies of OMA are maintained
    - In-memory and Permanent Copy on Disk
  - Updates need to occur on both
- Workunit Journaling is NOT turned on by Default in SAS9.1

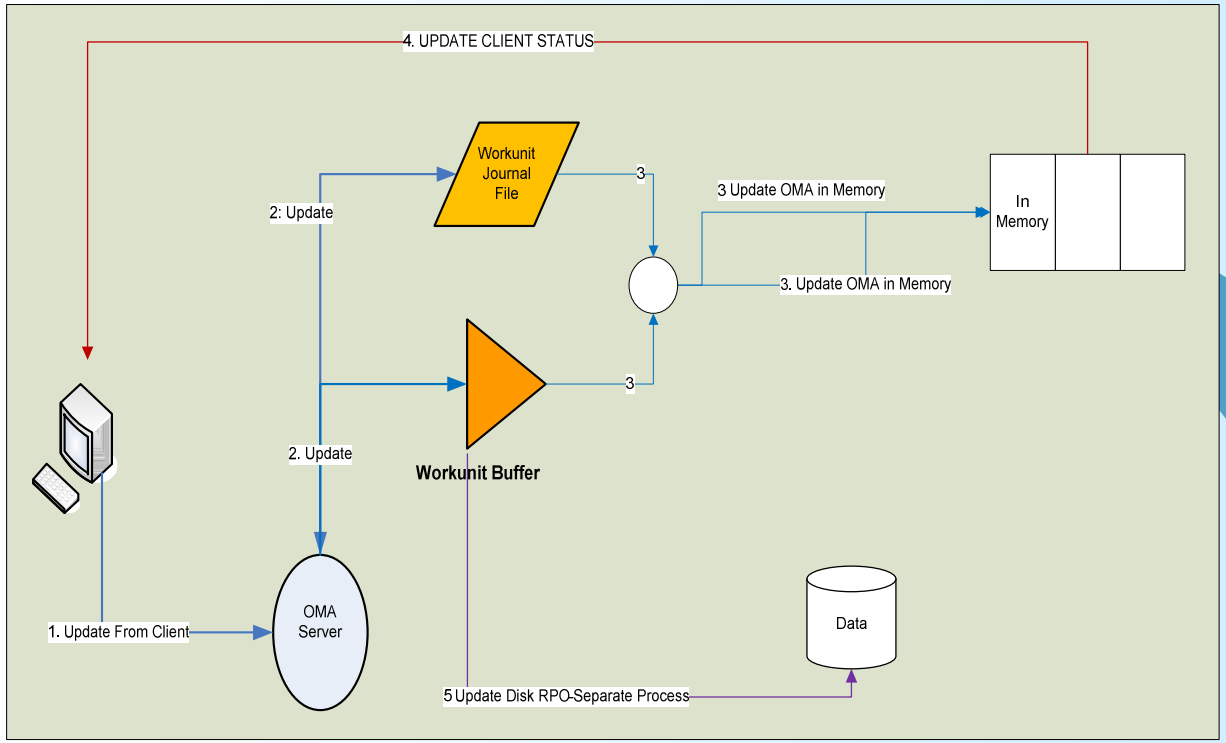
Workunit Journaling



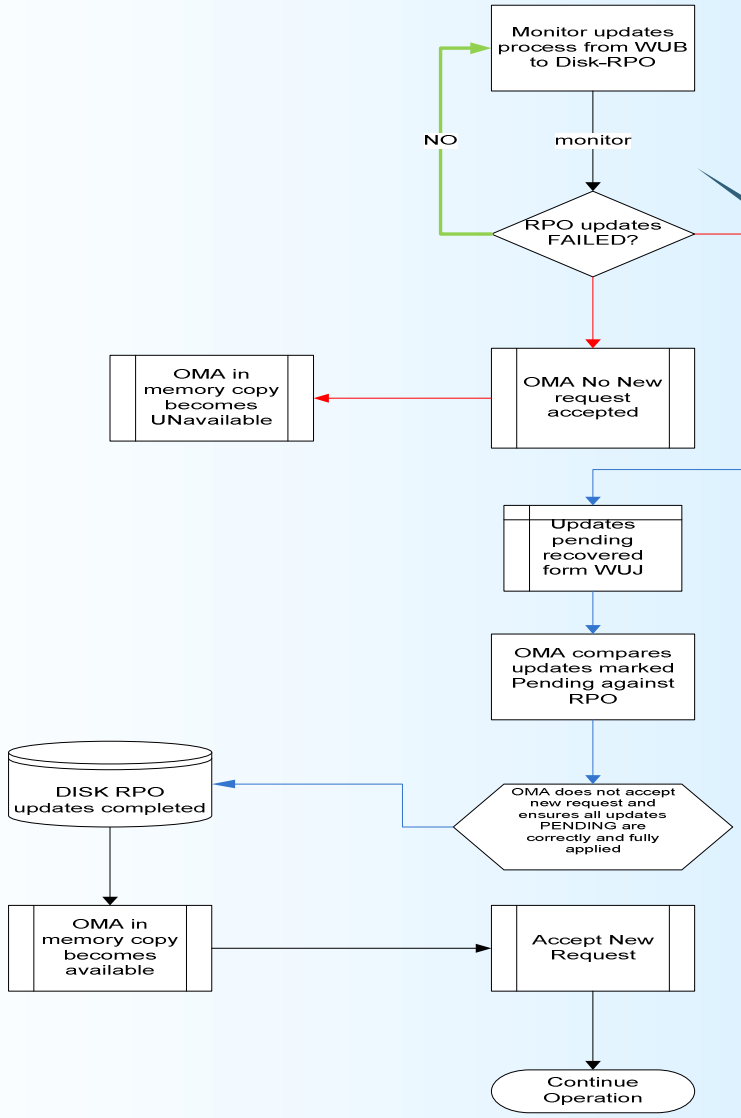
Workunit Journaling

- Requirement-SMP Server
- Takes Advantage of
  - Workunit Journal (WUJ)
  - Workunit Buffer (WUB)
  - Metadata in memory gets updated after updating WUJ & WUB
  - Updates to Disk RPO is done separately when CPU is available

Workunit Journaling



Workunit Journaling Recovery Process



Workunit Journaling

- Enable WUJ
  - Configure omaconfig.xml
  - At /sas/Lev1/SASMain/omaconfig.xml
  - Add values
    - WORKUNITJOURNALPATH
    - WORKUNITJOURNALSIZE
    - ALERTEMAIL
    - ALERTEMAILATTACHMENT
    - JOURNALYIELDCOUNT

Workunit Journaling

<OMA ADMINUSERS="MetadataServer/adminUsers.txt"
TRUSTEDUSERS="MetadataServer/trustedUsers.txt"
GROUPSFORMEMBERASSOCDELETE="DESKTOP_PORTALPAGES_G
ROUP,
Portlet Template Group,
OrderingGroup,
DESKTOP_PAGEHISTORY_GROUP,
Portal Collection"
WORKUNITJOURNALPATH="WorkunitJournal.dat"
WORKUNITJOURNALSIZE="20000000"
ALERTEMAIL="monitor@aii-3.com"
ALERTEMAILATTACHMENT="omaconfig.xml"/>

Workunit Journaling

- Modify metadataserver_sasv9.cfg, add:
  - emailsys smtp
  - emailhost
  - Emailid
- Re-start Metadata Server

Known Issues with WUJ Enabling

- Workunit Journaling enabled Metadata Server may fail to initialize due to on some Non-Byte-Swapped systems. Hotfix http://www.sas.com/techsup/download/hotfix/e9_sbcs_prod_list.html#015923
- When issuing a WHERE clause with Workunit journaling, the following error may appear: WHERE clause is not allowed with preset index. Solution calls for turning WUJ off. Hotfix :

  http://www.sas.com/techsup/download/hotfix/e9_sbcs_prod_list.html#017800

References

- SAS EBI Administration Guide(s)
- SAS R&D Forum (www.sas.com)
- Analytiks Lab findings
- www.sun.com
- www.HP.com

Something Extra

- New SAS EBI Architecture Course
- New SAS EBI Install Hands On Course
- Aii-lab utilities (widgets)
- White Papers
- How To webdemo-tips

  – info@aii-3.com

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