

# High Availability with the openais project

Prepared by:

Steven Dake

7/12/05

# Agenda

- Service Availability Forum
- Reliability and Availability
- Application Interface Specification

# Service Availability Forum – Mission

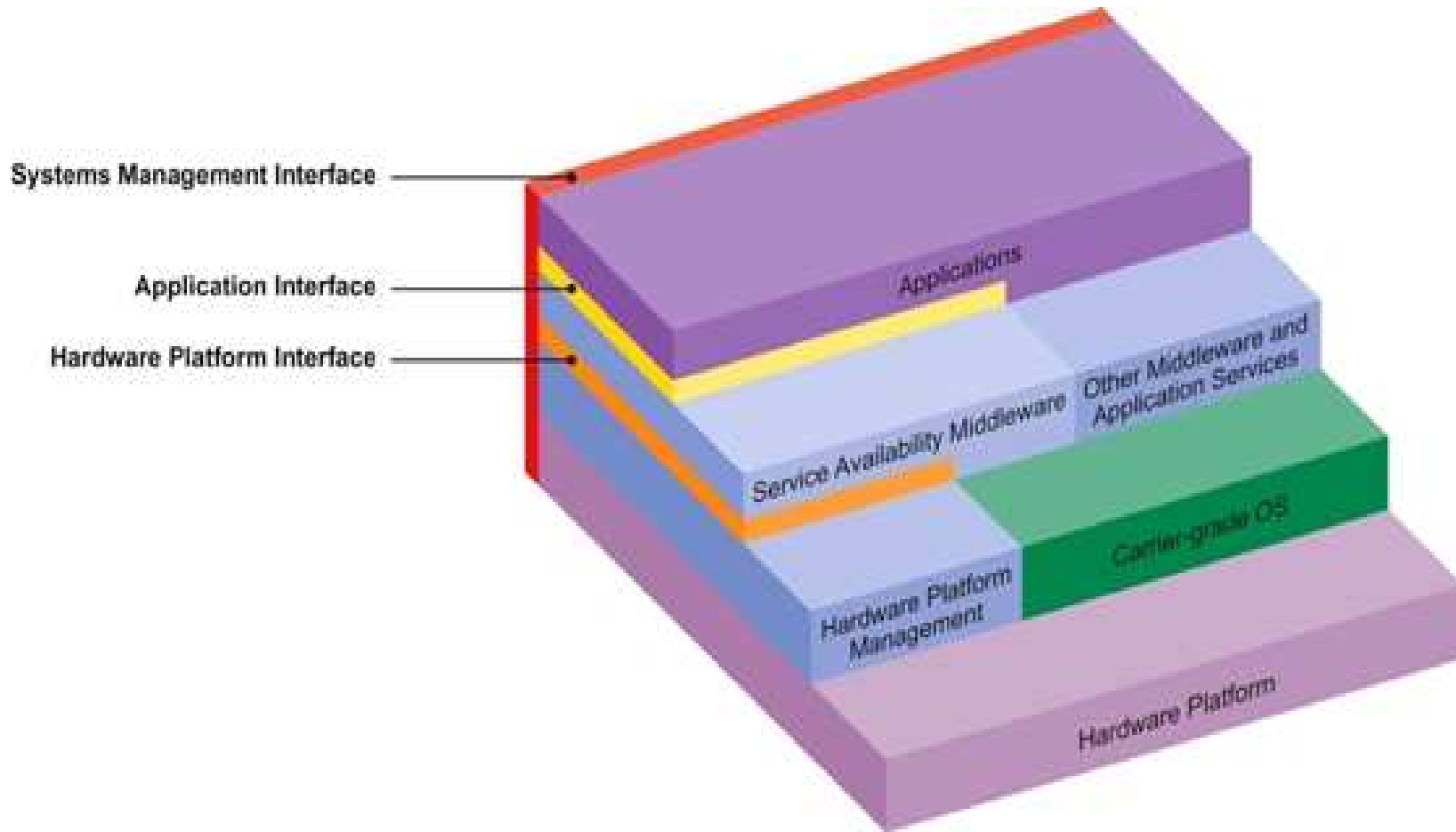
The Service Availability™ Solution helps meet end-user expectations for voice, data and multimedia services delivered with the dependability of traditional telecommunications.

The Service Availability™ Forum is addressing this by fostering an ecosystem to enable the use of commercial off-the-shelf building blocks in the creation of high availability network infrastructure products, systems and services. The Service Availability™ Forum will accomplish this through developing and publishing high availability and management software interface specifications as well promoting and facilitating their adoption by the industry.

# Service Availability Forum Member Companies

- Artesyn Technologies
- MySQL AB
- Augmentix Corporation
- NEC
- Clovis Solutions
- Nokia
- Continuous Computing
- Nortel Networks
- Ericsson
- NTT
- Force Computers
- Oracle Corporation
- Fujitsu Siemens Computers
- OSA Technologies
- GNP
- Phoenix Technologies
- GoAhead Software
- Radisys
- Hewlett-Packard
- Siemens
- IBM
- Solid Information Technology
- Intel
- Sun Microsystems
- Kontron
- TietoEnator
- MontaVista Software
- UXComm
- Motorola
- Veritas Software
- Wind River Systems

# Service Availability Forum – The Software Stack

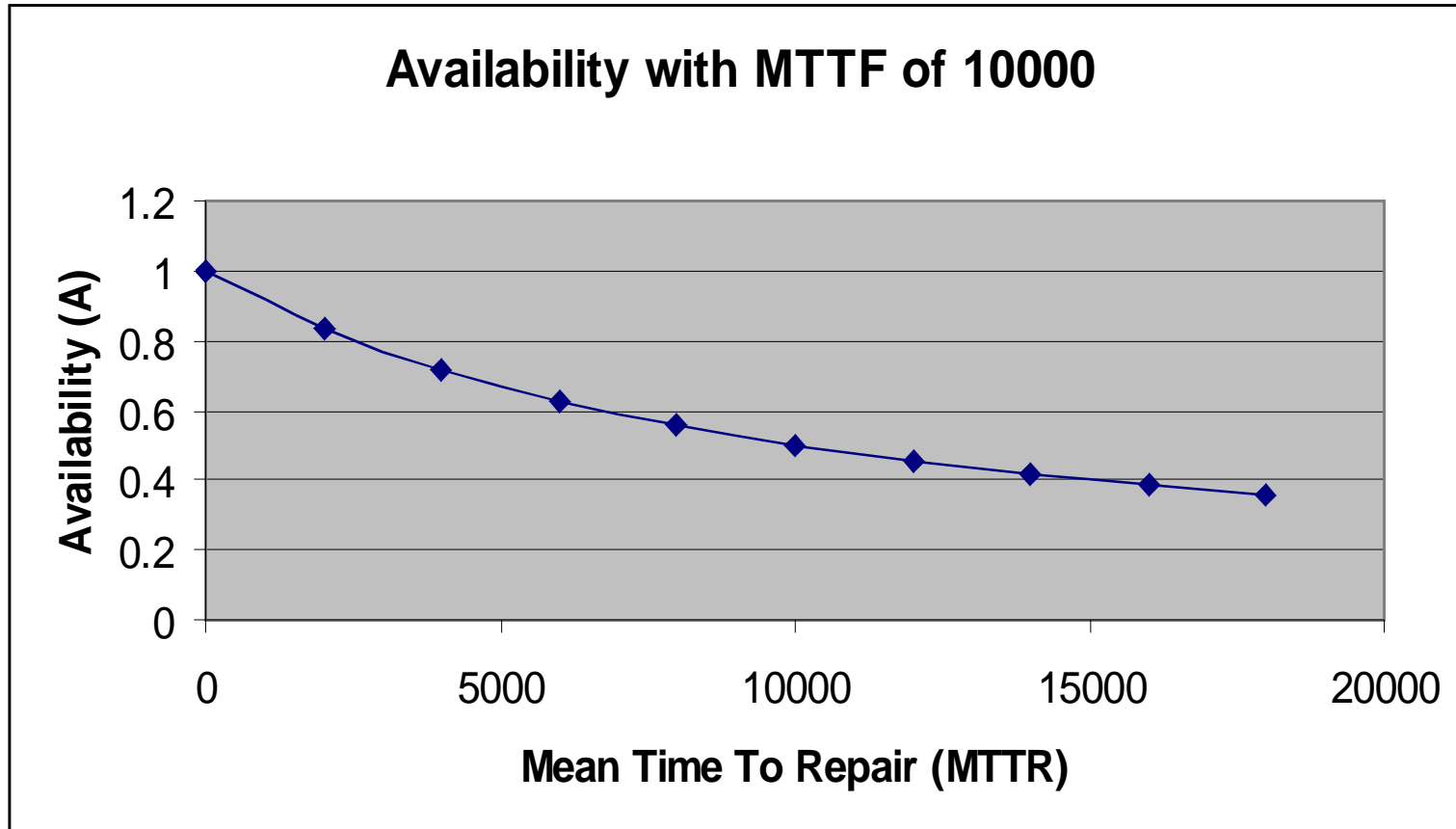


# Reliability and Availability – Availability Equation

$$A = \frac{MTTF}{MTTF + MTTR}$$

Where MTTF is the mean time to failure and MTTR is the mean time to repair.

# Reliability and Availability – Availability with fixed MTTF and variable MTTR



# The EVS service

- Extended Virtual Synchrony Model
- Allows registration of callbacks for delivery of messages and delivery of configuration changes
- Allows sending a multicast message
- Separate instances for applications



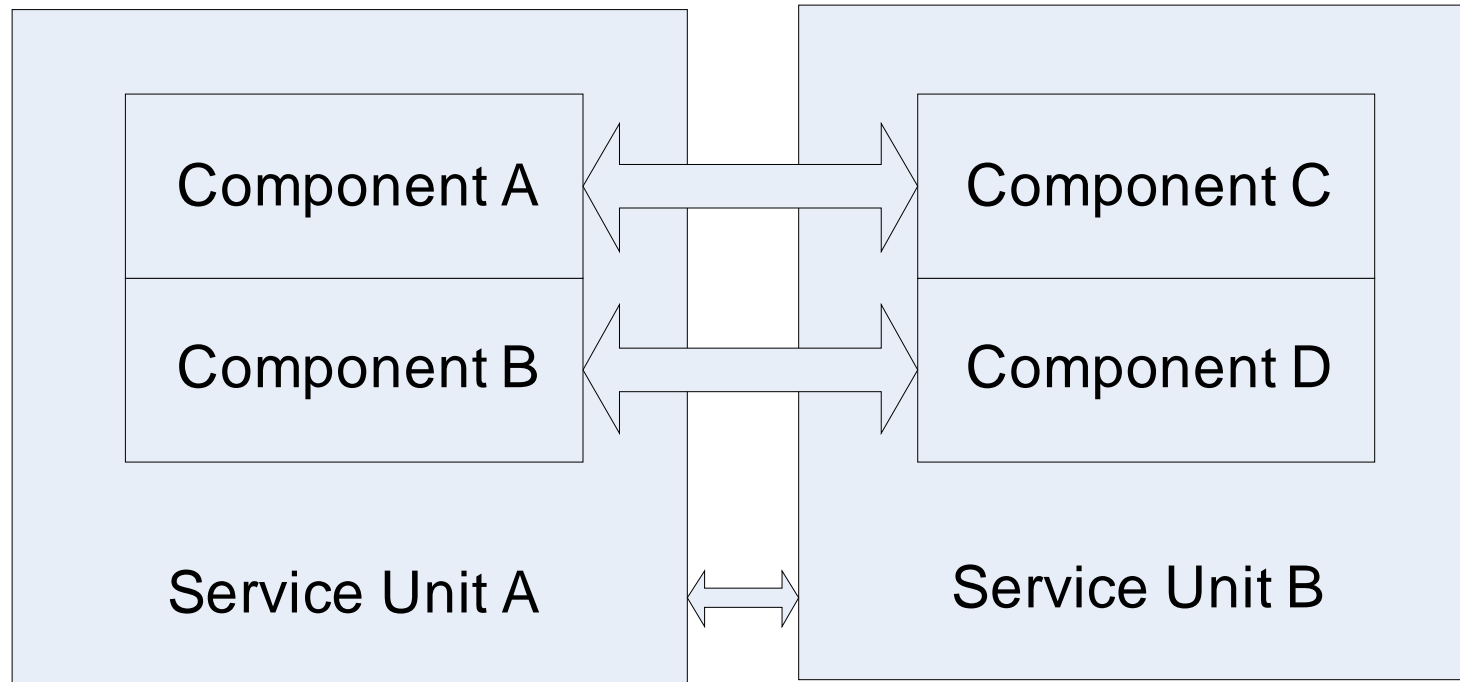
# Application Interface Specification - Overview

- High Availability Specification
- Application Failover
  - Checkpoint Service
  - Availability Management Framework
- Communication
  - Cluster Membership Service
  - Event Service
  - Message Service
- Mutual Exclusion
  - Distributed Lock Service

# Availability Management Framework - Overview

- Allows service to be registered or unregistered
- Instantiates services as active or standby
- Detects service faults
- Provides mechanisms to gather instantiation state
- Mechanism to enable and disable services
- Allows reporting of errors and canceling errors
- Instantiates services

# Availability Management Framework – Service Group



# Checkpoint Service - Overview

- Checkpoints are named
- Checkpoints have sections which store data
- Checkpoint sections can be read and written
- When an standby component is directed active by AMF, standby reads checkpoint sections and recovers state

# Cluster Membership Service - Overview

- Maintains view of current configuration
- Allows for asynchronous notification of configuration changes via tracking API
- Provides mechanism to read current configuration

# Eventing Service - Overview

- Provides named event channels for publish and subscribe
- Publish events to an event channel
- Callback executed when filtered event is delivered
- Events can be filtered by api

# Messaging Service - Overview

- Named queue identifiers for sending and receiving messages
- Mechanism to send a request and wait for the response
- Load balancing messages

# Locking Service - Overview

- Resources can be locked and unlocked
- Asynchronous notification of unlock operation
- Locks can be reclaimed in case of failure of locker



# The openais project - Agenda

- Setup and Configuration
- Project History
- Architecture
- Performance
- Project Statistics

# openais – setup and configuration

- Create shared key:

```
Linux# ./keygen
OpenAIS Authentication key generator.
Gathering 1024 bits for key from /dev/random.
Writing openais key to /etc/ais/authkey.
```

- Save /etc/ais/network.conf:

```
Bindnetaddr: 192.168.1.0
Mcastaddr: 226.94.1.1
Mcastport: 6000
```

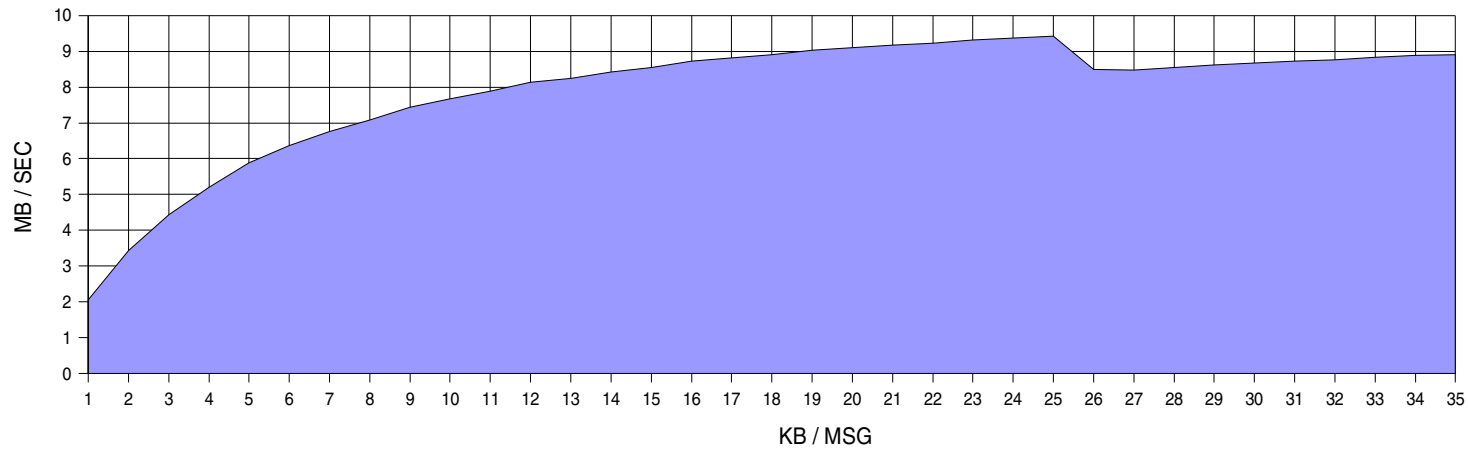
Read QUICKSTART file in source package for more details.

# openais – project history

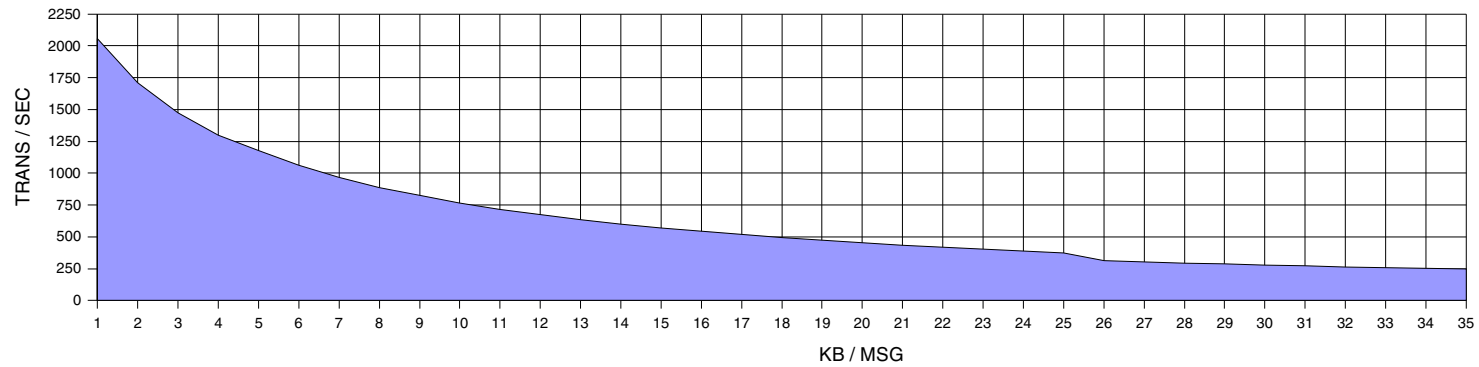
- Project started in January 2002 to support hotswap on ATCA chassis
- Morphed into SA Forum in April 2003
- Virtual Synchrony merged January 2004
- Released to open source under Revised BSD license by MontaVista Software in June 2004 as the openais project hosted at Open Source Development Labs.
- Event service merged September 2004
- Open Source Development Labs and SA Forum officially announce via press release their support for the openais project in November 2004.
- 3<sup>rd</sup> generation implementation Virtual Synchrony protocol merged January 2005

# openais – checkpoint performance

## Throughput

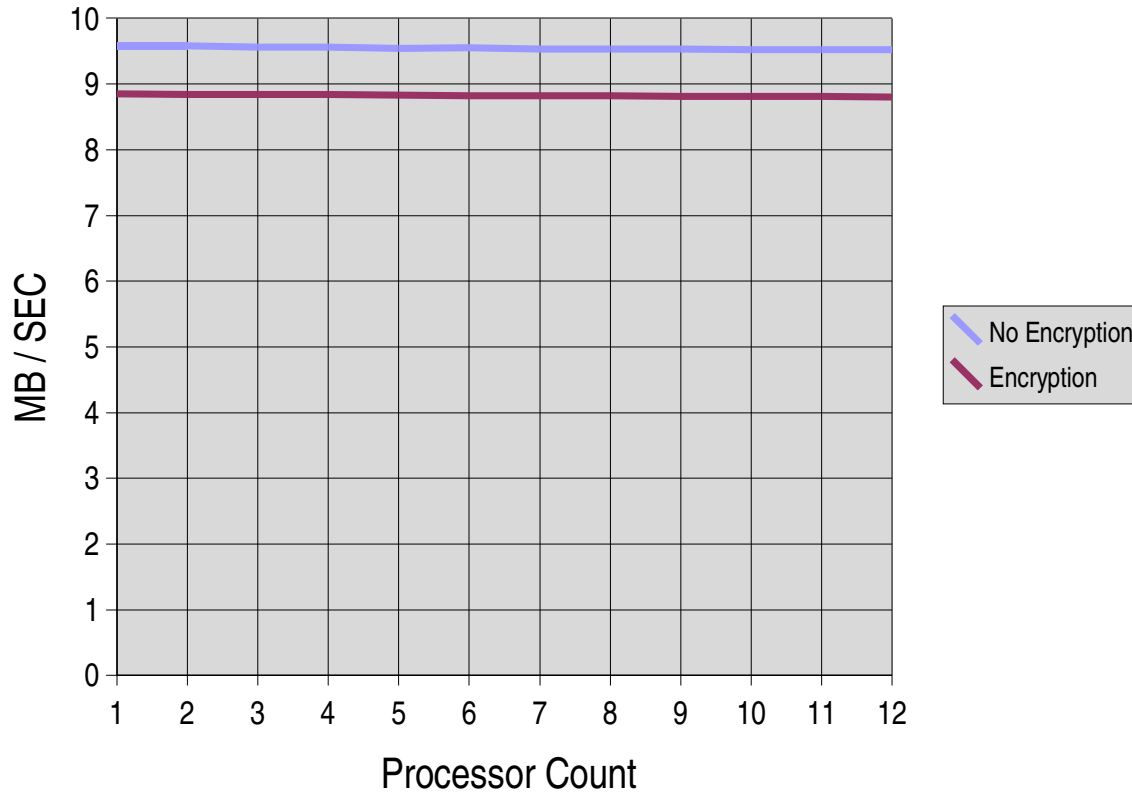


## Transactions Per Second



# Openais – performance with many processors

## Group Messaging Throughput



# openais – project statistics

- Executive LOC: 29141
- Library LOC: 6018
- Include LOC: 3027
- Total LOC: 38000
- Changesets since openais inception: 770

# Conclusion

- Reduce MTTR to improve availability
- SA Forum AIS provides APIs to reduce MTTR
- open source solution available of AIS  
(<http://developer.osdl.org/dev/openais>)

Questions?