

# ATCA, HPI, AIS - open specifications for HA applications

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TIPP09

# Outline

- New CS and ATCA as platform of choice
- Service Availability Forum (SAF)
- Hardware Platform Interface (HPI)
- Application Interface Specification (AIS)

# ILC Control System requirements

- Overall Control system availability goals of 99% -99.9%
  - For a system of a ~1200 “shelves” it translates to 99.999% availability for each “shelf”
- Serviceability and manageability
  - 30 km long underground tunnel
- Standardization
  - For simplified development and Quality Assurance
- Modularity - Both Hardware and Software
- And many other including redundancy, high speed serial links...

# ATCA as a platform for ILC control system

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- Advanced Telecom Computing Architecture (ATCA) embodies most of the required features
- Designed to provide 99.999% availability
- Modularity
  - separate back-pane and front
  - HOT SWAP
- Redundancy - Power supply, cooling, serial back-pane
- Extensive manageability
- And more

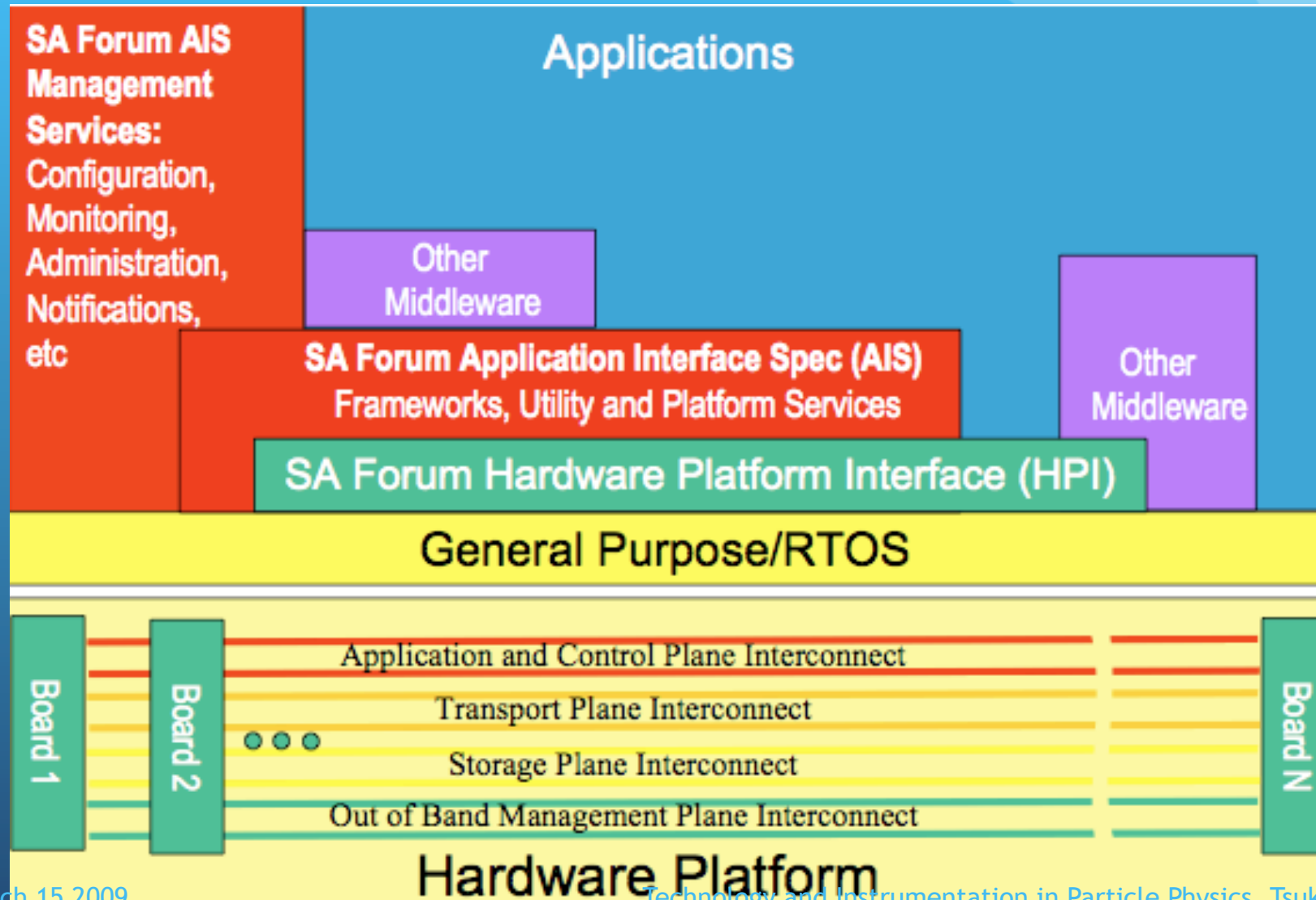
# Service Availability Forum

- Objectives:
  - Develop and publish high service availability and management software interface specifications
  - Promote and facilitate their adoption by the industry
- Members - Leading telecom industry companies
- Primary specifications:
  - HPI - Hardware Platform Interface - for hardware resource monitoring and management, similar to IPMI
  - AIS - Application Interface Specification - for software monitoring and management

# SAF Specifications

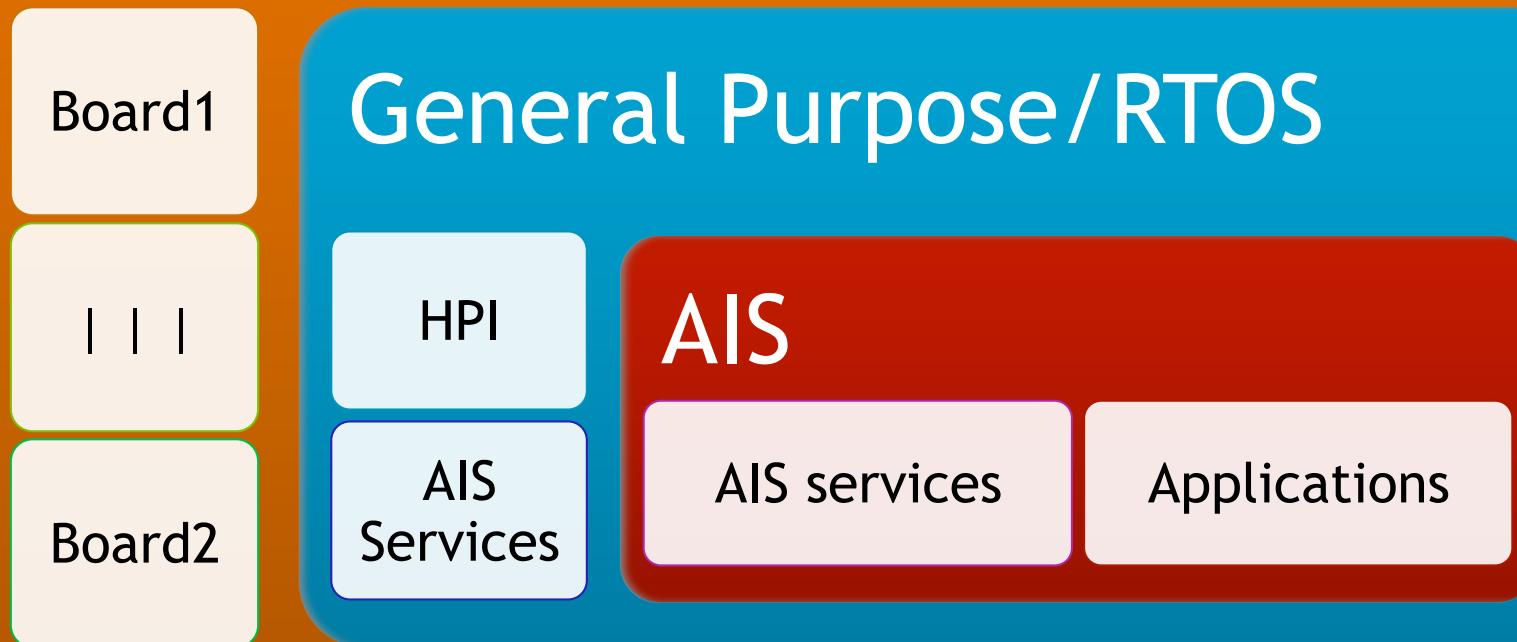
- Represent current “best-practices” of Telecom Industry in building HA applications
  - And this may be applicable for accelerator control systems as well
- C and Java API
- Provide a framework and guidelines for development of HA applications

# Basic architecture



# Basic Architecture

## Hardware



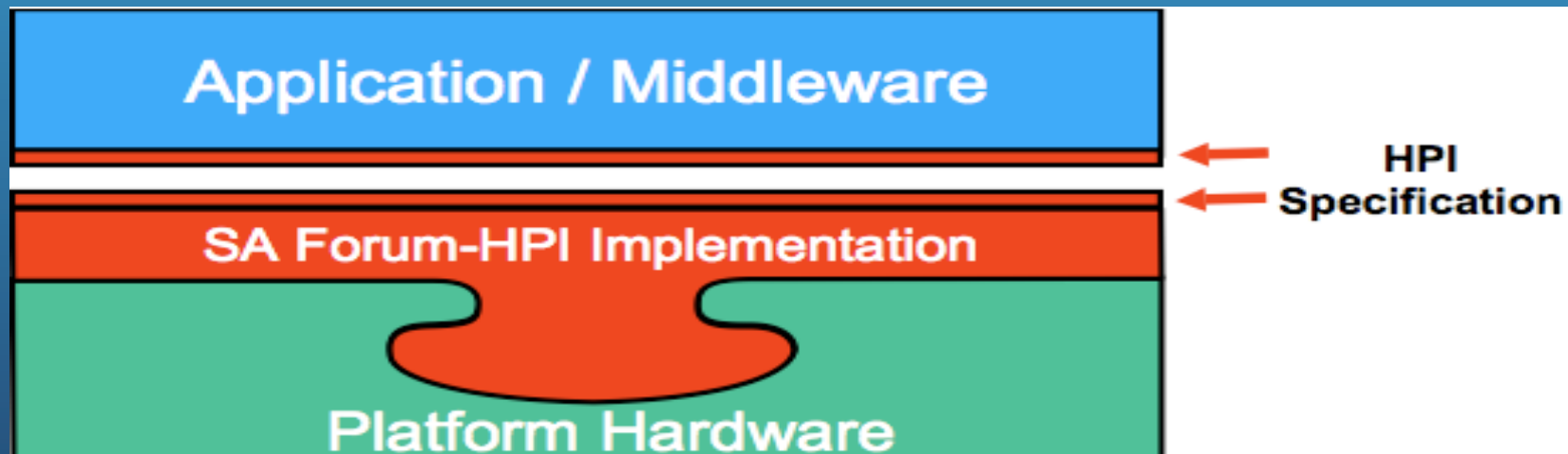


# HPI - Hardware Platform Interface

- Inventory & configuration - what components are in the system HW, serial numbers, location
- Control - Hot Swap, Power up/down, reset, firmware upgrade, watchdogs...
- Monitoring - temperature, voltage, fan speed, LED...
- Portable - Abstract, support various factors/architectures

# HPI - Reasons to use

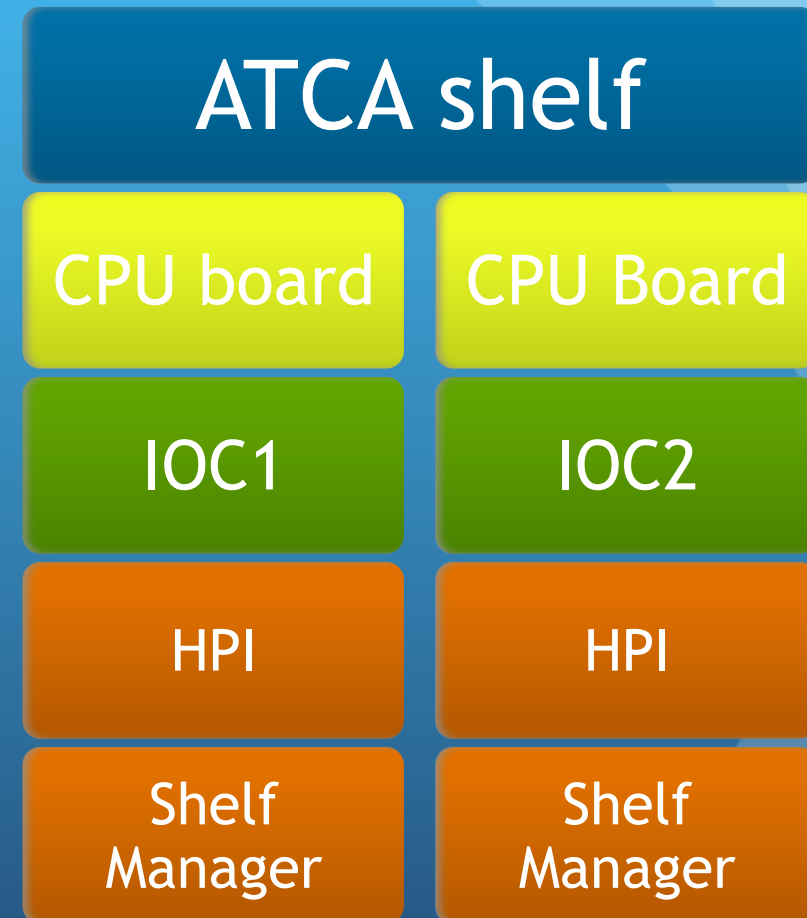
- Hides platform specific or proprietary features from application
- Eliminates proprietary application interface - allows fast porting to other platforms
- Remote control via HPI-SNMP



# HPI usage example - Redundant EPICS IOC

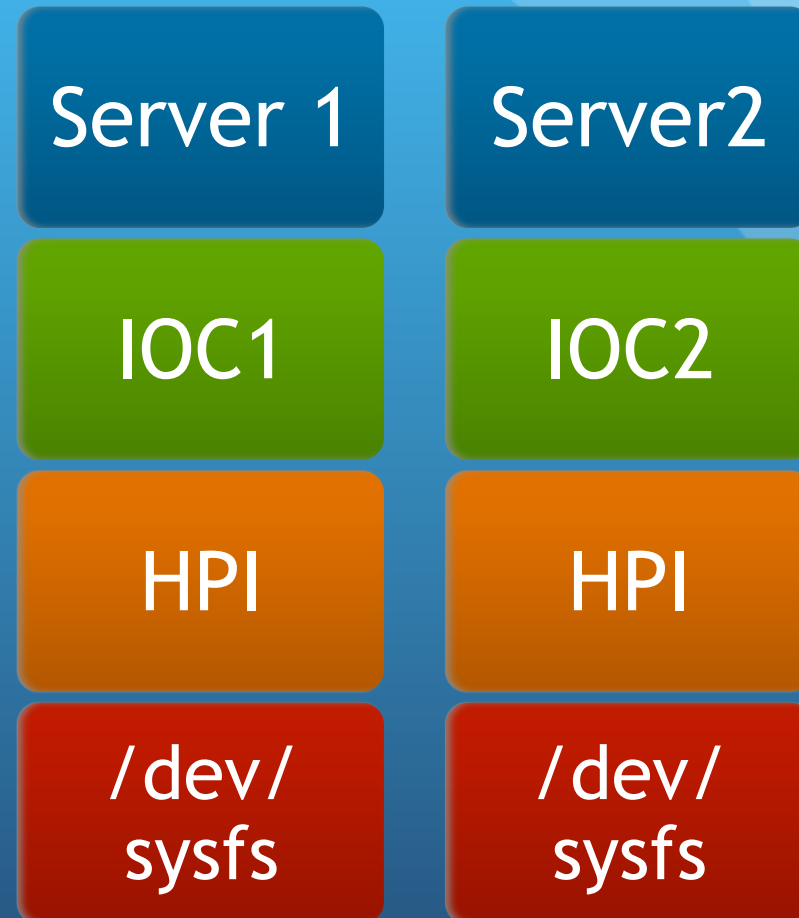
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- ATCA shelf with two CPU blades
- Running two Redundant EPICS IOC
- HPI is used to monitor the health of each blade
- This information is used to make decision on failover



# HPI usage example - Redundant EPICS IOC

- HPI is Platform independent
- Instead of ATCA we can use “conventional” server PC
- OpenHPI has /dev/sysfs mappings on Linux



# AIS - Application Interface Specification

- AIS is a set of open standard interface specifications
- AIS defines an API for middleware between the applications and the operating system
- It is divided into the areas:
  - Availability Management Framework
  - Cluster Membership Service
  - Log Service
  - Event Service
  - Lock Service
  - Checkpoint Service
  - Message Service
  - Information management Model

AMF

CLM

LOG

EVT

LCK

CPT

MSG

IMM

# Further topics

- AIS benefits and reasons to use
- AIS implementations ?
  - OpenSAF, OpenAIS, OpenClovis
- Examples of AIS usage
  - “cold” standby redundant IOC - Claude Sanders APS
  - EPICS caGW - proposal - Claude Sanders APS
  - My experience ?

# Conclusion

- ATCA is being actively adopted by accelerator people, new boards being developed, Physics ATCA initiative
- As for the software HPI & AIS offer extensive base for hardware and software management. And a framework and guidelines for development of HA applications
- HPI & AIS Possible areas of usage in accelerator controls
  - IOCs
  - Nameservers
  - Gateways
  - Embedded CPUs (FPGA)

# Open questions