State-of-the-art Technology
Fault Resilient Distributed Solutions

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AMT5

Distributed Control and Management for

Rail Infrastructure

January 2017

AMT5 Philosophy

OBJECTIVES

- Distributed monitoring and control
- Mitigating the consequences of control system and operator induced failures
- Mitigating the consequences of component failures
- Using technological advances to reduce complexity
- Cost effective robust systems
- Scalability
- Easy, safe, loosely coupled 3rd party tool integration

AMT5 Philosophy

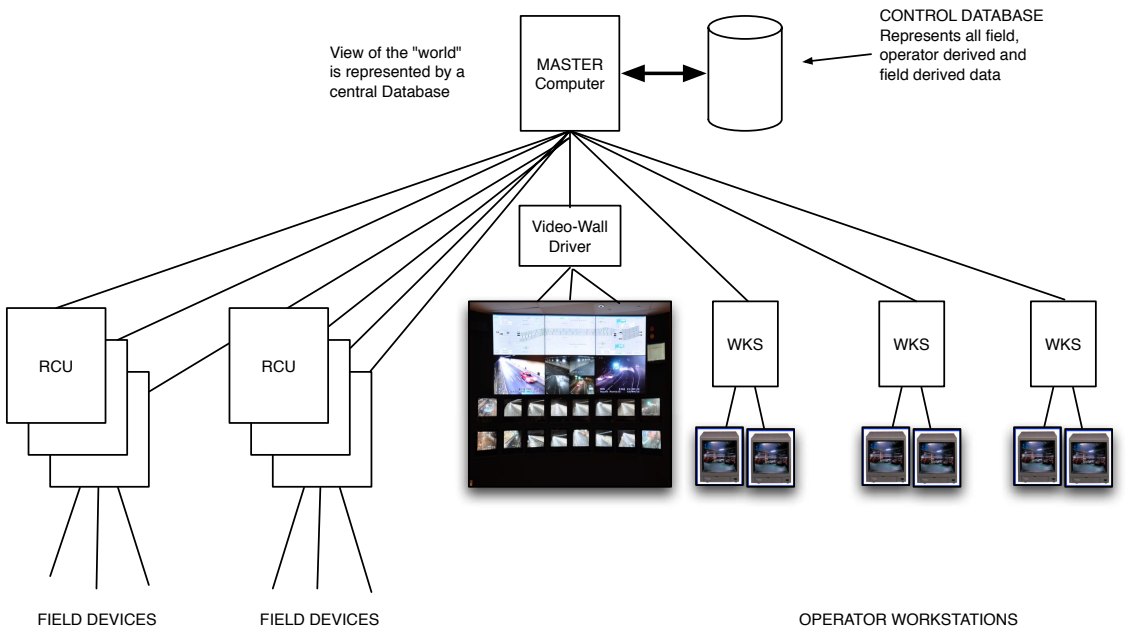
Typical Sources of Failure

- Hardware
  - Accounts for a diminishing percentage of systemic failures
- Communications
  - Redundant Path technologies are making the failures rare
- Software
  - Least reliable components of a control system
- Human Errors
  - Users, operators and maintenance account for most system failures

AMT5 Philosophy

Legacy Control Systems

- Point to Point or Master/Slave Networks and Protocols
- Network Structure implies system organisation
- Low bandwidth
- Small memory
- Small persistent storage
- Slow processing power



AMT5 Philosophy

AMT5 Architecture – A new approach to integrated control

- Peer to Peer communications – there is no designated master
- Hardware is cheaper than software. AMT5 uses multiple hardware platforms performing the same functions in parallel for fault resiliency with less complexity
- Can duplicate functions simultaneously from different geographic locations
- Manages multiple simple network paths to achieve communications redundancy
- Gateways provide support for 3rd party systems and protocols
- Triple modular redundancy provides fault tolerance for 3rd party devices that communicate only in master/slave fashion using master/slave protocols such as Modbus and IEC-60870-5-104

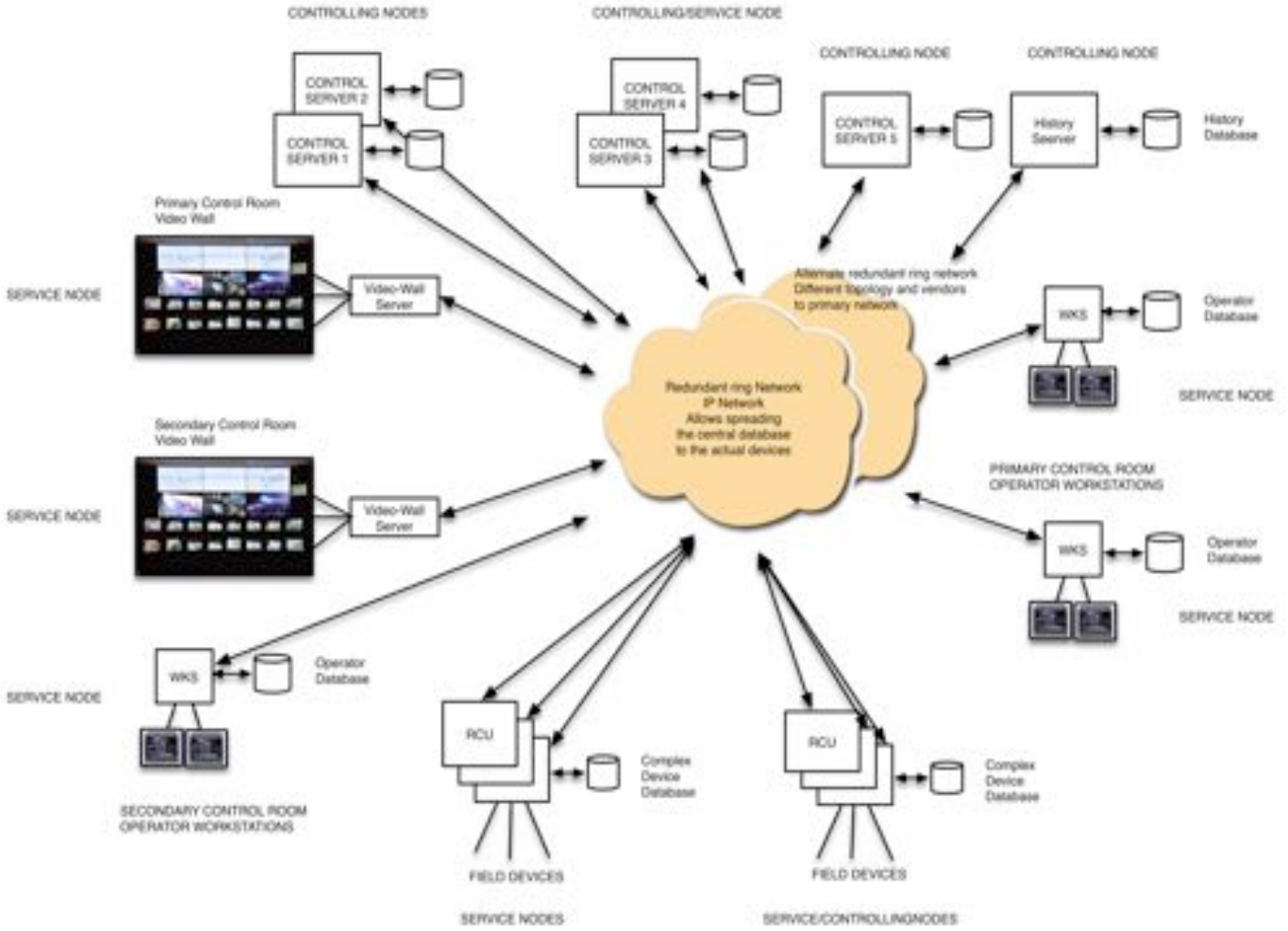
AMT5 Philosophy

Architecture – A new approach to integrated control

- Introduces the concept of “resources” as the basic element
  - A resource can be an input, an output, a microphone, a speaker or camera
- Complex resources are constructed from simpler resources
- Resources can have complex behaviour
- Introduces the concept of a Controlling node as a consumer of resources
- A control node performs actions by locking resources
- Introduces the concept of a service node that controls access to resources
- A hardware element can have both a controlling node and service node functions
- Access is prioritised, supporting up to 64 priority levels

AMT5 Philosophy

Example Architecture



AMT5 Philosophy

AMT5 Features

- Distributed Monitoring and Control – avoids single points of failure
- Fault resilient without complexity
- Easy Integration
- Structured configuration language allows for simple design of complex systems
- Supports redundant communications interfaces
- Supports 3rd party integration
- Triple modular redundancy for 3rd party master/slave systems

AMT5 Products

Operations Control and Monitoring

- Integration Platform for Central Control Facilities
- Operations Management Control facilities
- Train Monitoring
- Electrical Distribution and Transmission (SCADA)
- Plant Management
- Public Address using VoIP and native AMT5 with dynamic audio zone control
- Emergency Intercom using VoIP and AMT5 with call queue management
- Passenger Information System Management
- CCTV Video Management System
- Gateways for 3rd party systems integration with OPC, Modbus
- Custom protocol development

AMT5 Products

On Board Passenger Information System

- On board networked public address – every speaker is a network node
- 10 Watts RMS class D amplifier per speaker
- Per speaker background noise compensation
- Feedback on message delivery success/failure
- On board networked driver intercom and management panel
- Integrated Passenger Emergency Intercom system
- LED Next Station Displays
- LCD graphics displays, including dynamic route map displays
- VoIP gateway
- EN50155

AMT5 Products

Station Passenger Information System

- Networked public address – every speaker is a network node
- 15W RMS class D amplifier per speaker
- Per speaker background noise compensation
- Feedback on message delivery success/failure
- Software Configurable and Dynamic Audio Zone Configuration
- Integrated Emergency and Help Point Intercom system
- LED Station Displays
- LCD graphics displays
- VoIP gateway

AMT5 Products

Remote Control Units

- Programmable to conduct complex functions using AMT5 configuration language
- Small and scalable
- Sized for the application, from single resource (I/O) to many I/O and many types

AMT5 Products

Remote 3rd Party Equipment Gateways

- Choice of interface options
- Custom design and protocol development available
- Small device can be built into 3rd party equipment

Thank you very much for your attention!
Obrigado pela sua atenção
Gracias por su atención!
Merci beaucoup pour votre attention!
Vielen Dank für Ihre Aufmerksamkeit!
Bedankt voor uw aandacht!

