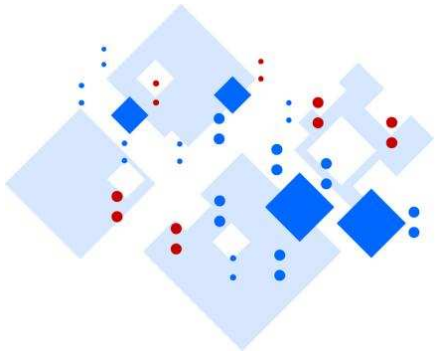


DevCon 2006
OPC Unified Architecture
A 3-day Conference for: **Decision Makers, Engineers & Visionaries**

Introduction to Unified Architecture

The Next Generation of System Interoperability

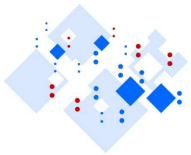
Thomas J. Burke

OPC Foundation President & Executive Director

October 2006

OPC Foundation's New Opportunity

Improve the Existing … and … Find Its Place in …



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- Next Gen Systems: Enterprise Interoperability
- Many complex information structures
  - Many groups working on semantics: schemas+
- Complex exchanges between platforms
  - Business & Integration processes (scenarios)
  - Consolidation of standards – less overlap
  - Reduce complexity, easier decisions, …
  - Faster progress
- New architecture with bigger scope:
  - Service-based (SOA, SBA, …)
  - Scope includes other platforms:
    - Microsoft, Oracle, SAP, IBM, …

The Enterprise IOp Challenge …

OPC Foundation Taking on a Larger Role

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Increasing Maturity

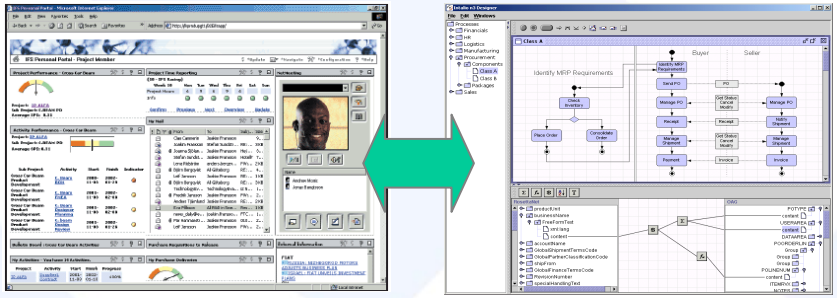
Maturity Level **Environment**			Interoperability Attributes			
			People	Process & Workflow	Information & Knowledge	Communications
Dynamic Level **(Flexible)**	5	C	User Tunable Role-Based Collaborative Environments	User Tunable Standard Processes	Flexible Analytics on Common Models	Transparent & Invisible
		B				
		A				
Unified Level **(Standardized)**	4	C	Collaborative Views & Concepts User Environment	Standardized & Extensible Processes and Scenarios	Common Sharing Models	Built Into Architecture & Service-based
		B				
		A				
Integrated Level **(Selective)**	3	C	Selective Visibility & Collaboration	Scenarios	Synchronized	Messaging, File Transfers, Remote Procedure Calls
		B		Standard Msgs		
		A		User Defined		
Connected Level **(Open)**	2	C	Basic Sharing Possible	Manual Coordination	Exchanged Occasionally	Proprietary or simplistic
		B				
		A				
Isolated Level **(Manual)**	1		Vendor Application Experts	Custom & Vendor Specific	Local & Hidden	Removable Media

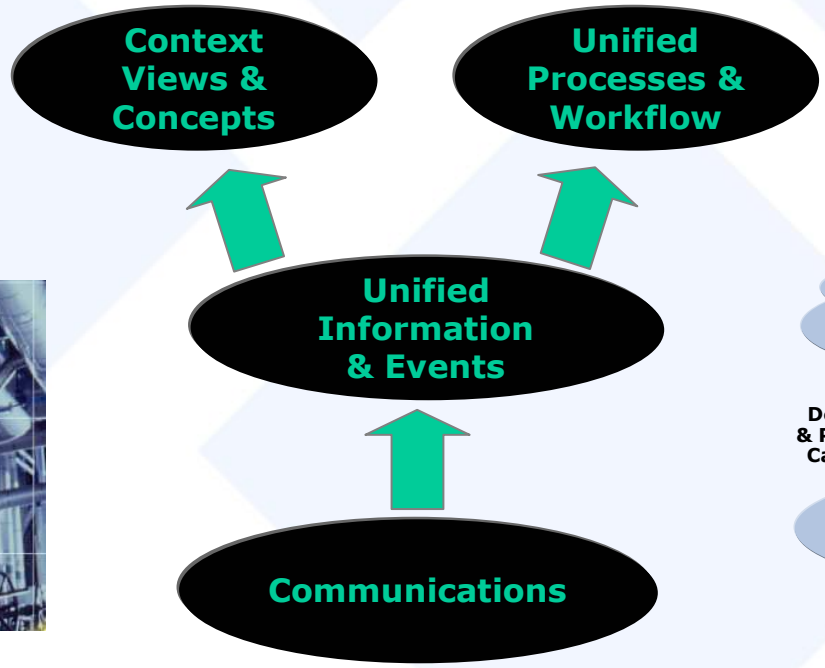
Next

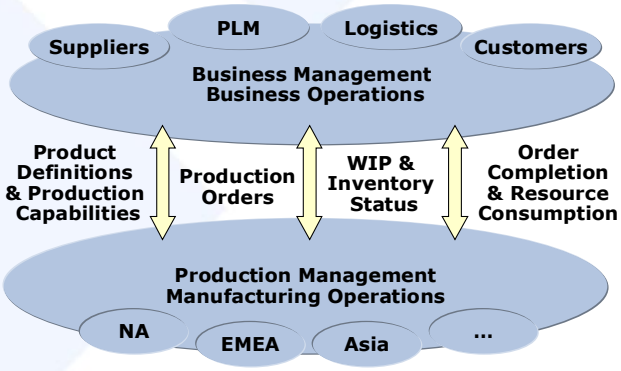
2006

Suppliers Platforms Are Required for Unification

Not Enough Industry Standards – Will Be Evolutionary

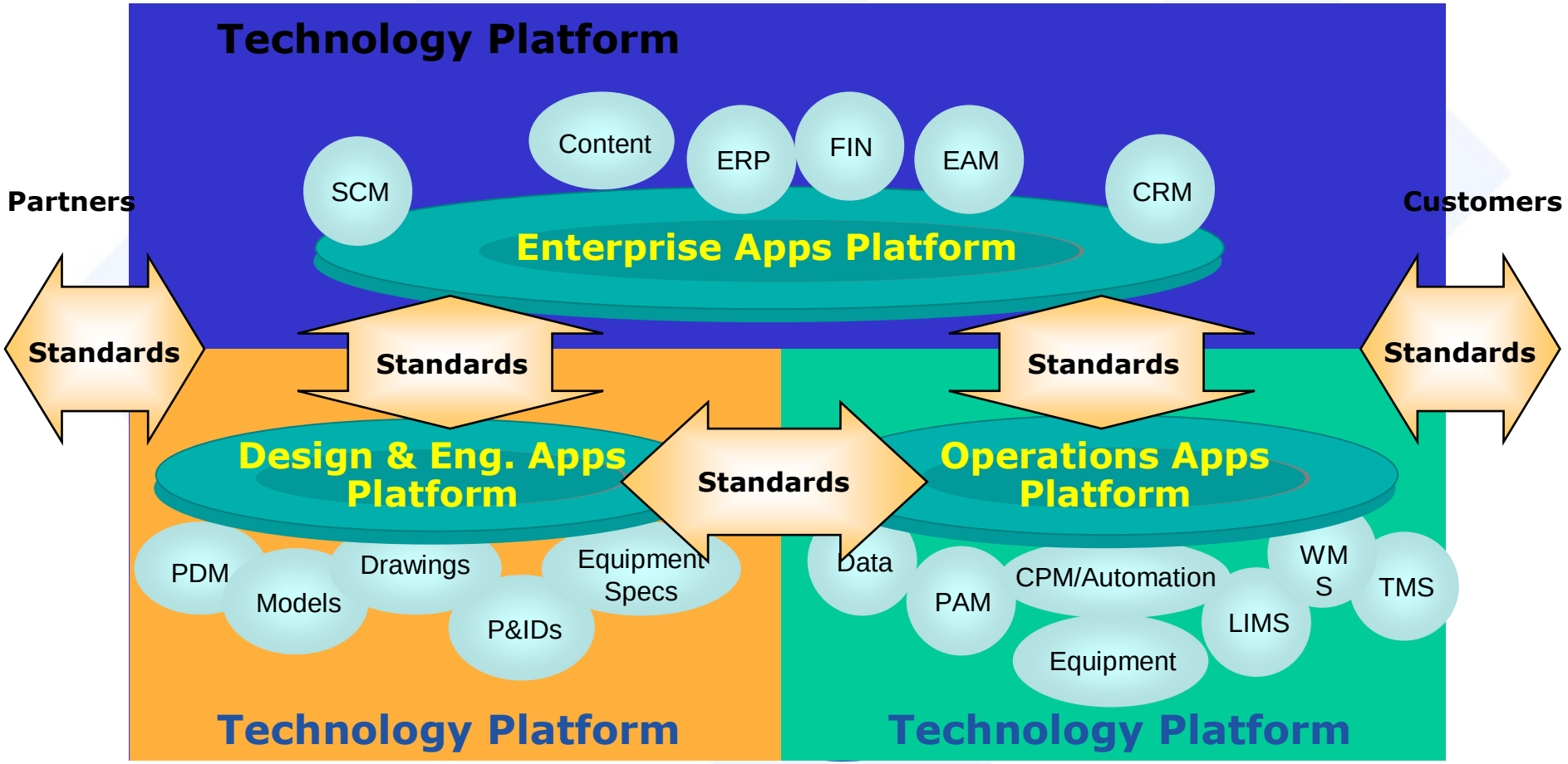






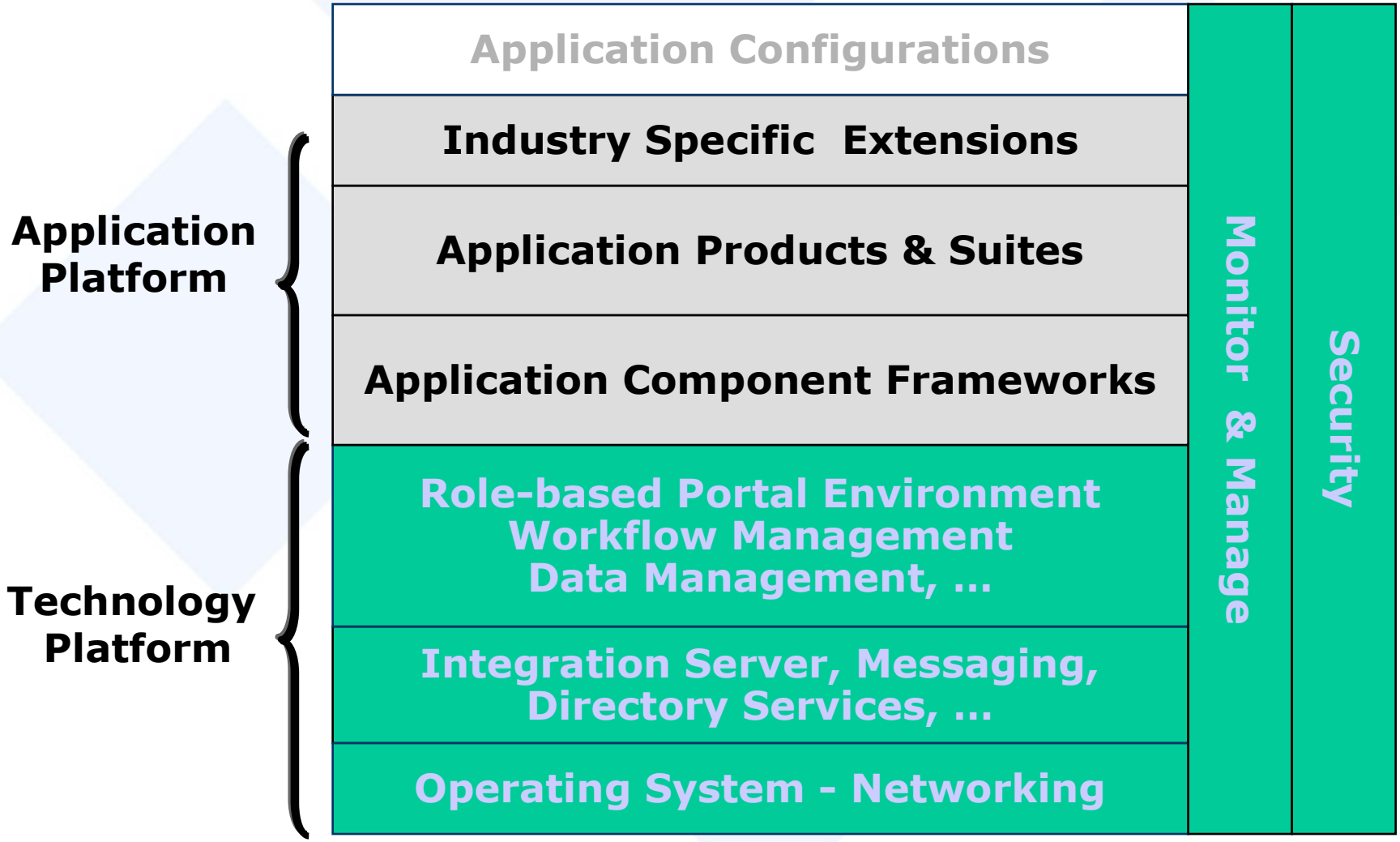
OPC Unified Architecture

A Basis for Unifying “Aspects of” Supplier Platforms?



Platform Concepts Defined

OPC UA: Unify Component Frameworks?

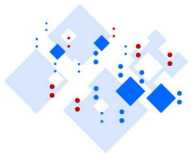


Enterprise Interoperability Fundamentals

- Existing OPC Interfaces within new capabilities …
- Component-based information modeling
  - Operations Application must have Flexible Asset and Resource Modeling
- Accommodate many semantic standards
  - ISA/B2MML, OAGi, RosettaNet, CIDX, …
- Support standard messaging (above)
- Support reliable enterprise-wide orchestration
  - Within Enterprise and Operations Platform Tools
- Strong security integrated with infrastructure
  - Better management of security information

Where Does OPC UA Help?

(Definitely a work in progress)



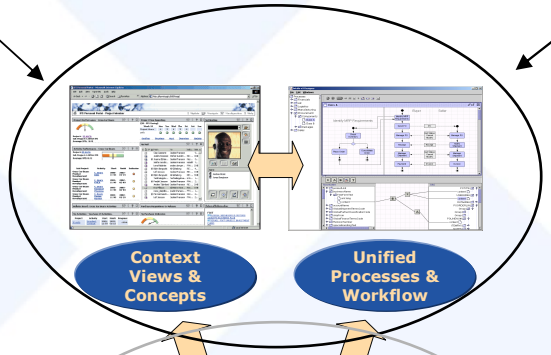
E-IOp	OPC UA
Support Legacy Systems	Existing OPC I/F's … Subscription Model
Unified Data Models	(Does not define data models) Provides Common Object Management Methods Supports more complex and flexible models
Unified Semantics	(Does define semantics or address mapping to Apps) Complements Industry Standards Create and Expose Object Structures
Unified Messaging	(Does define or address messaging) Complements Industry Standards Create and expose Object Commands (Methods and Programs)
Unified Orchestration	(Does not address orchestration) … Exposes common services (for Orchestration) … Exposes Standardized Programming I/F's … Provides common state model for managing services
Security	(Does not specify user data management, …) Encryption, Digital Signatures, PKI Web Service Security Standards Traceability & Audit Records required

How is OPC UA Going to Work?

Use UA-Based Software Supplier Platforms and Tools

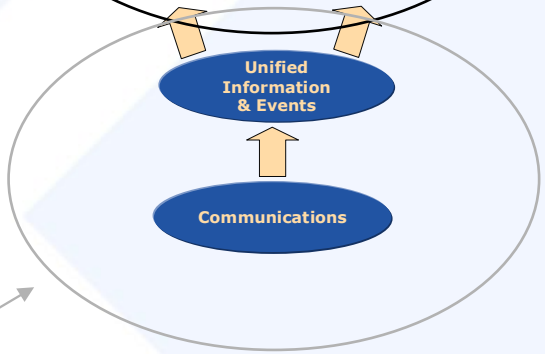
Use Platform Tools (Portal, UI, …) to Create Role-Based Common Views by Browsing and Accessing Shared UA Objects and Commands

Use Platform Tools (BPM, EAI, …) to Create Processes and Mappings by Browsing and Accessing Shared UA Objects and Commands



OPC UA Client Suppliers

"Conform to UA Security Guidelines**"**



OPC UA Server Suppliers

Provide Tools to "Import" Industry Standards into UA and Create Shared UA Objects and Commands

Provide Tools to Create and Expose Application Object Info and Commands **as UA Services and Programming I/Fs**

Questions:

Once we Understand …

- Explore the Implementation of UA
  - How will Commands get created?
  - How will industry standards (semantics, messages, …) be used on OPC UA?
  - How do we expect Enterprise Apps to use OPC UA?
  - What do we expect suppliers to implement?
  - Will OPC Foundation manage any shared code?
  - Who is working on UA and what are their deliverables?
    - How can we become more aware of its status and monitor its progress?
- (If we run out of important things to talk about)
  - OPC UA talks about Objects - How does OPC UA compare to CORBA?

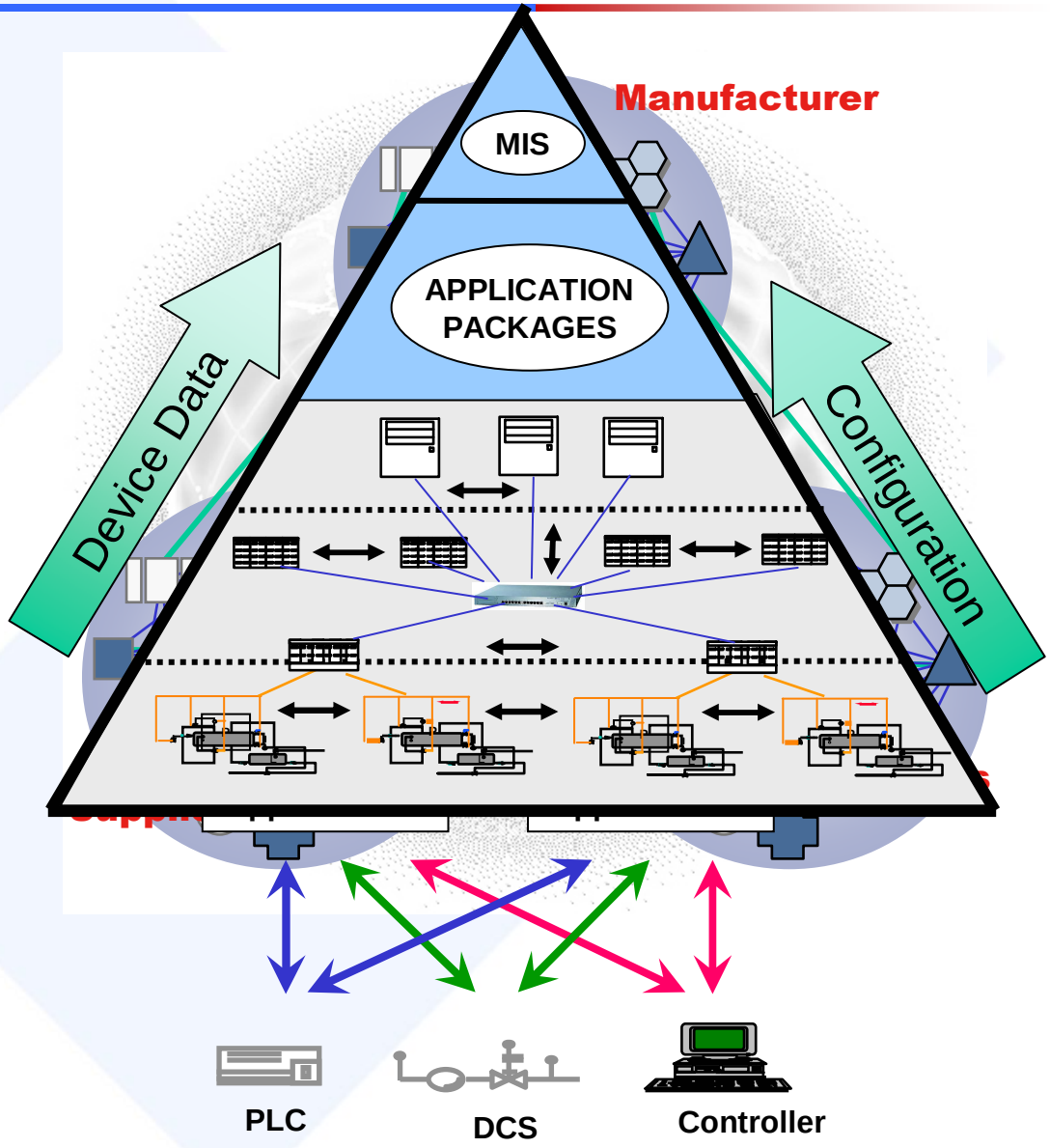
Today's Integration Challenges

- Numerous incompatible protocols
- Complex configuration and maintenance
- Islands of automation
- Rigid infrastructure
- Vulnerability to system and network failures
- Security or lack there of…

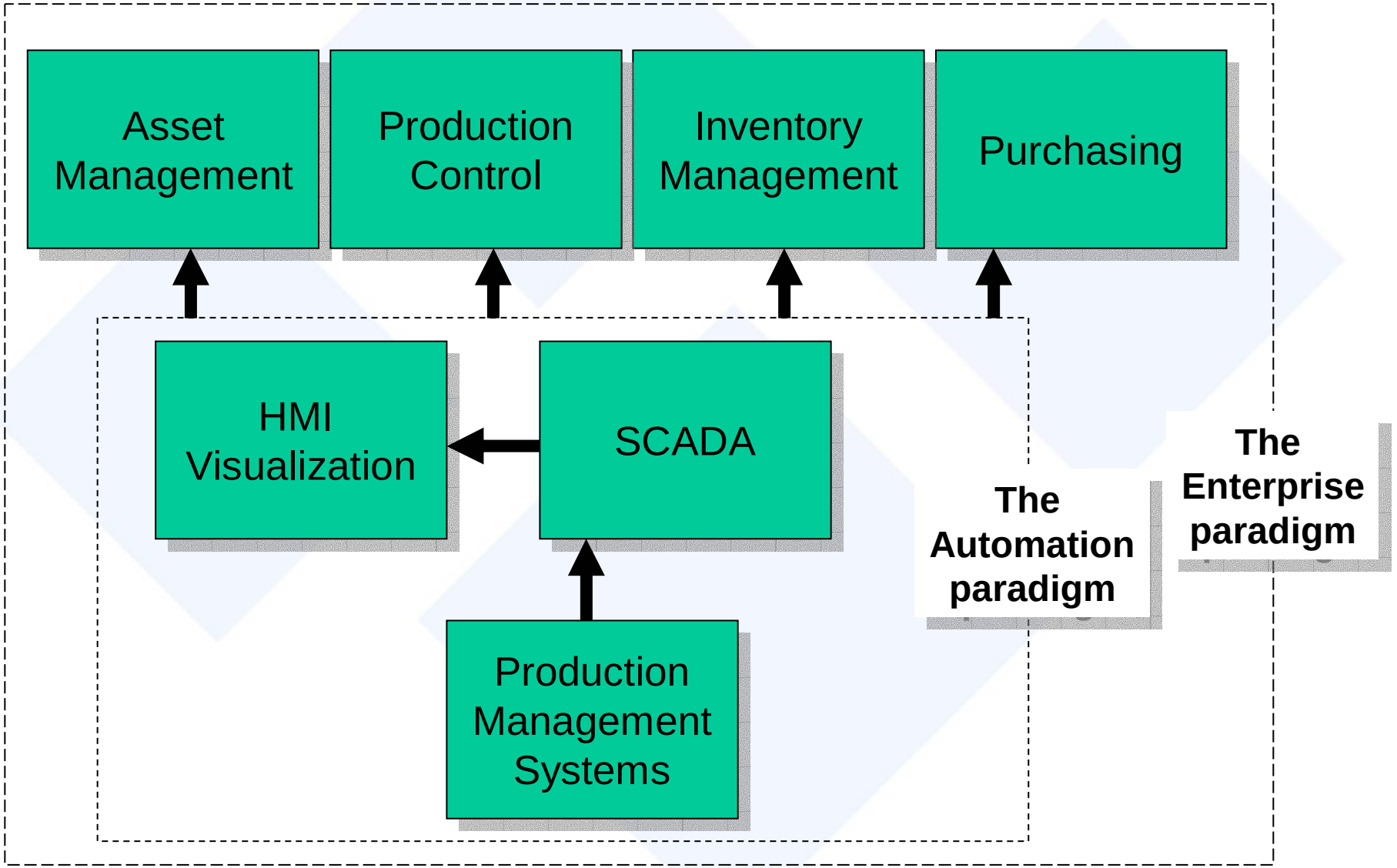
Numerous Incompatible Protocols

The Inter-Enterprise Nightmare

- The Problem
  - Many different vendors
  - Custom made solutions
  - Proprietary technologies
  - Point-to-point Integration
  - Limited “real-time” information
  - Maintenance nightmare
  - Multiple dependencies
- Solution
  - **OPC Unified Architecture**

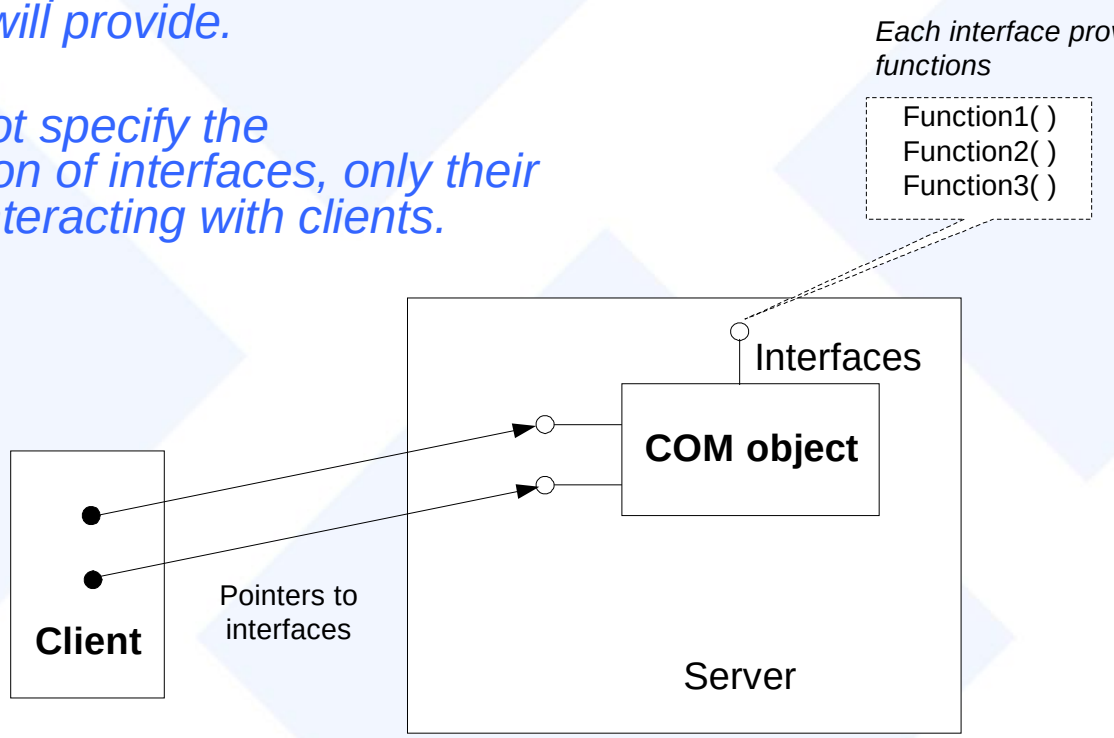


Unified Architecture Evolution



COM Interfaces

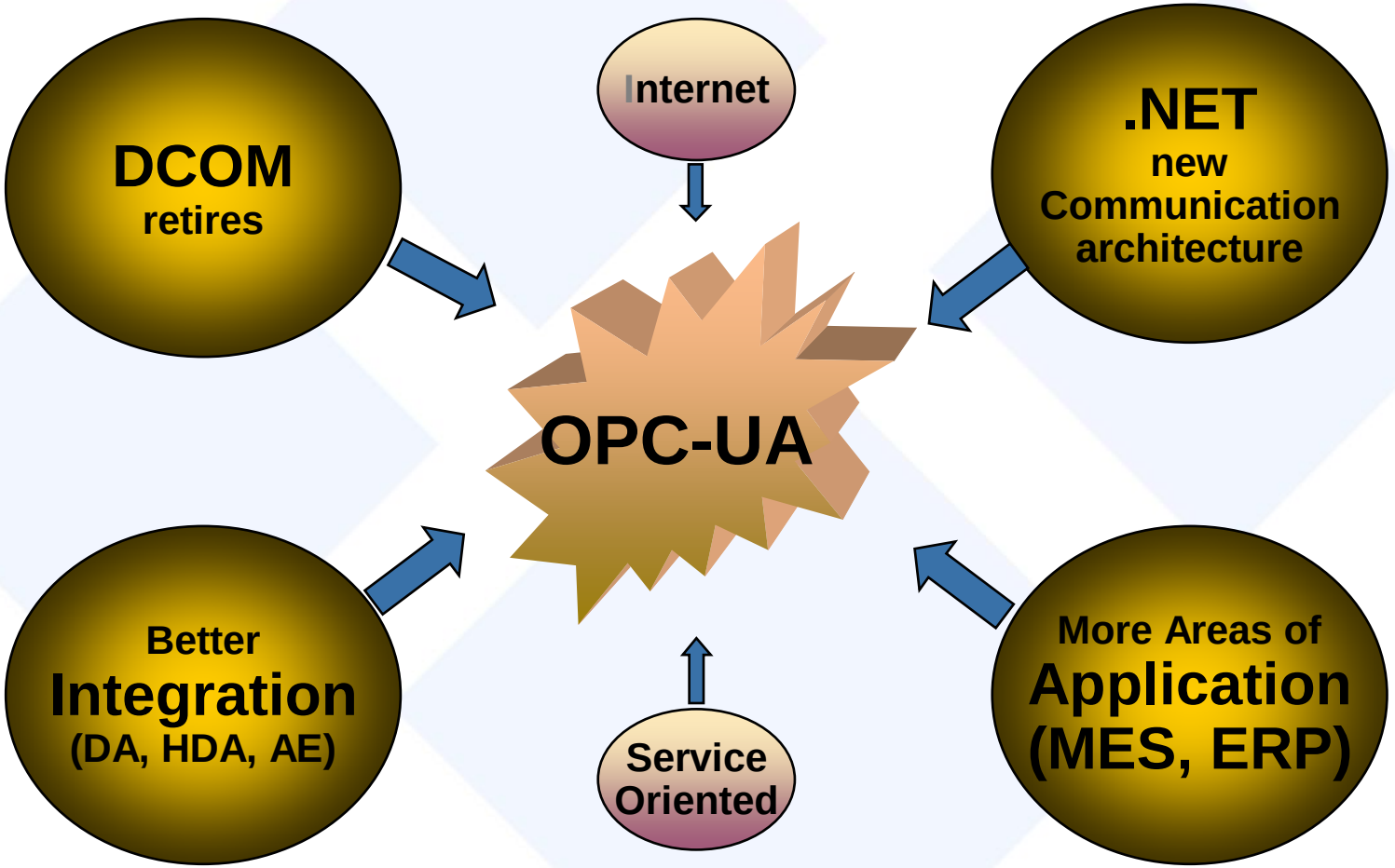
- *An interface is a collection of methods or related functions and procedures that perform some specific service that the COM object will provide.*
- *COM does not specify the implementation of interfaces, only their behavior in interacting with clients.*



A client accesses a COM object's services through pointers to its interfaces.

COM/DCOM => XML

OPC Unified Architecture Motivation

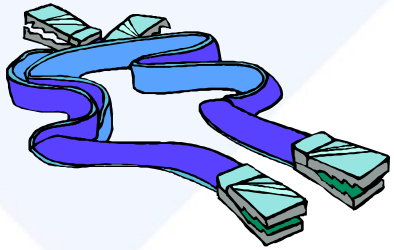


OPC Unified Architecture

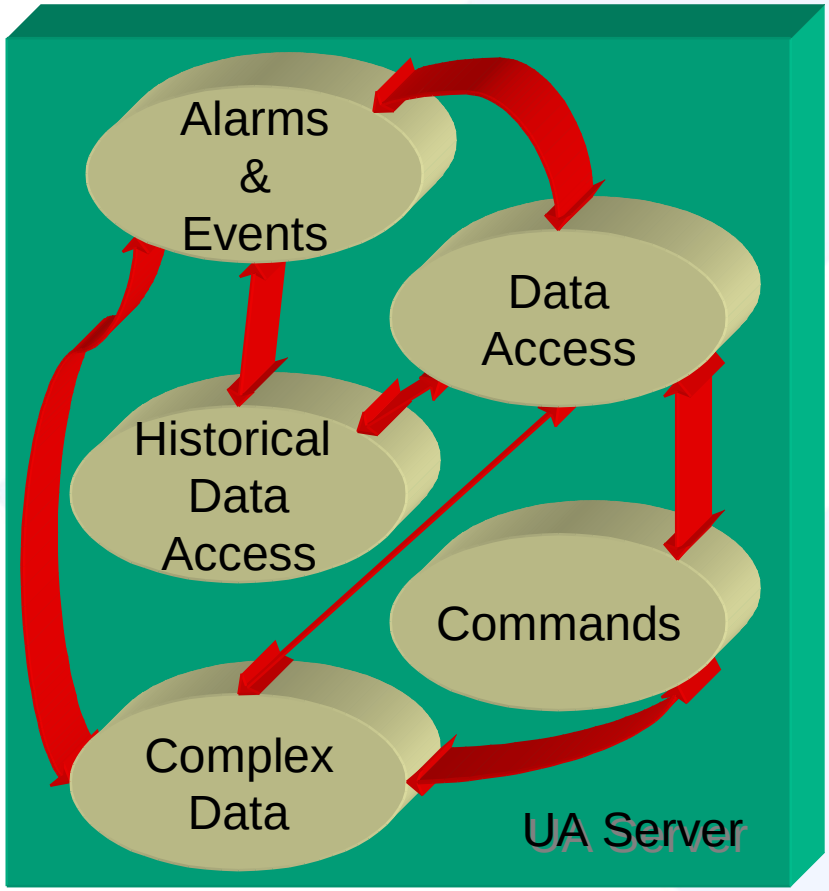
OPC-UA (OPC Unified Architecture) extends the highly successful OPC communication protocol, enabling data acquisition and information modeling/communication between the plant floor and the enterprise.

OPC Unified Architecture

- Web Services / XML
- Easy Configuration and Maintenance
- Increased Visibility
- Broader Scope
- Reliability Reliability Reliability
- Security Security Security
- Performance
- Platform Neutrality
- Legacy Products Plug Right In…



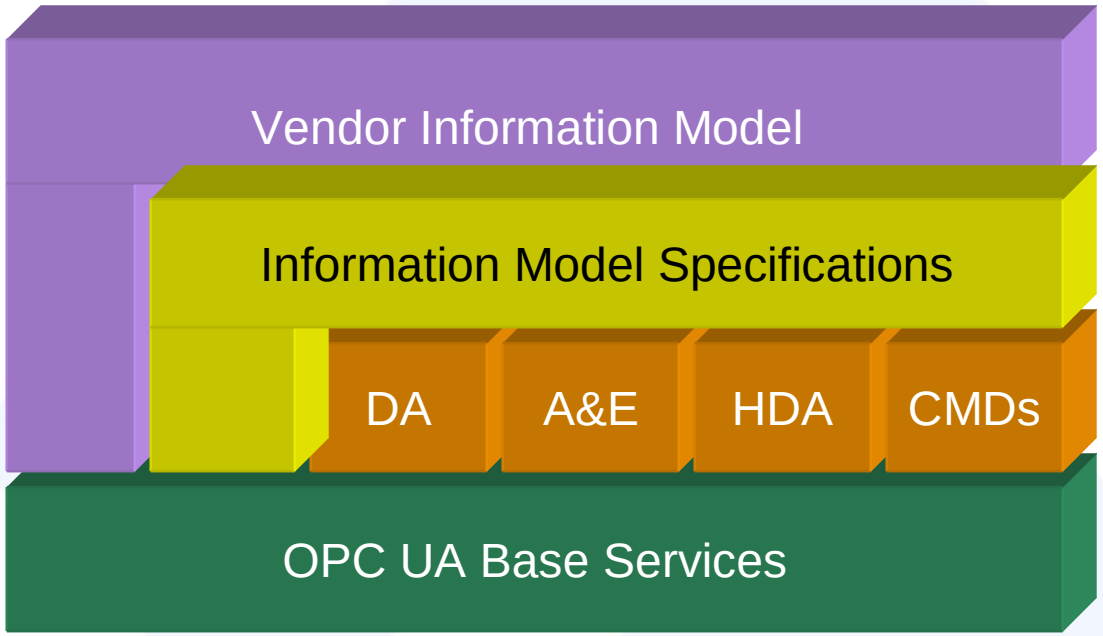
OPC Interface Unification



- SOA (Service Oriented Architecture)
- Single set of Services
  - Query, Read, Write, Subscribe…

The UA Server embodies the functionality of existing OPC Servers using a single set of services

Specification Layering



IEC, ISA, OAGi, EDDL…

OPC Information Model

All Necessary Services

Clients written to just the base can still discover and access all data from the derived layers!

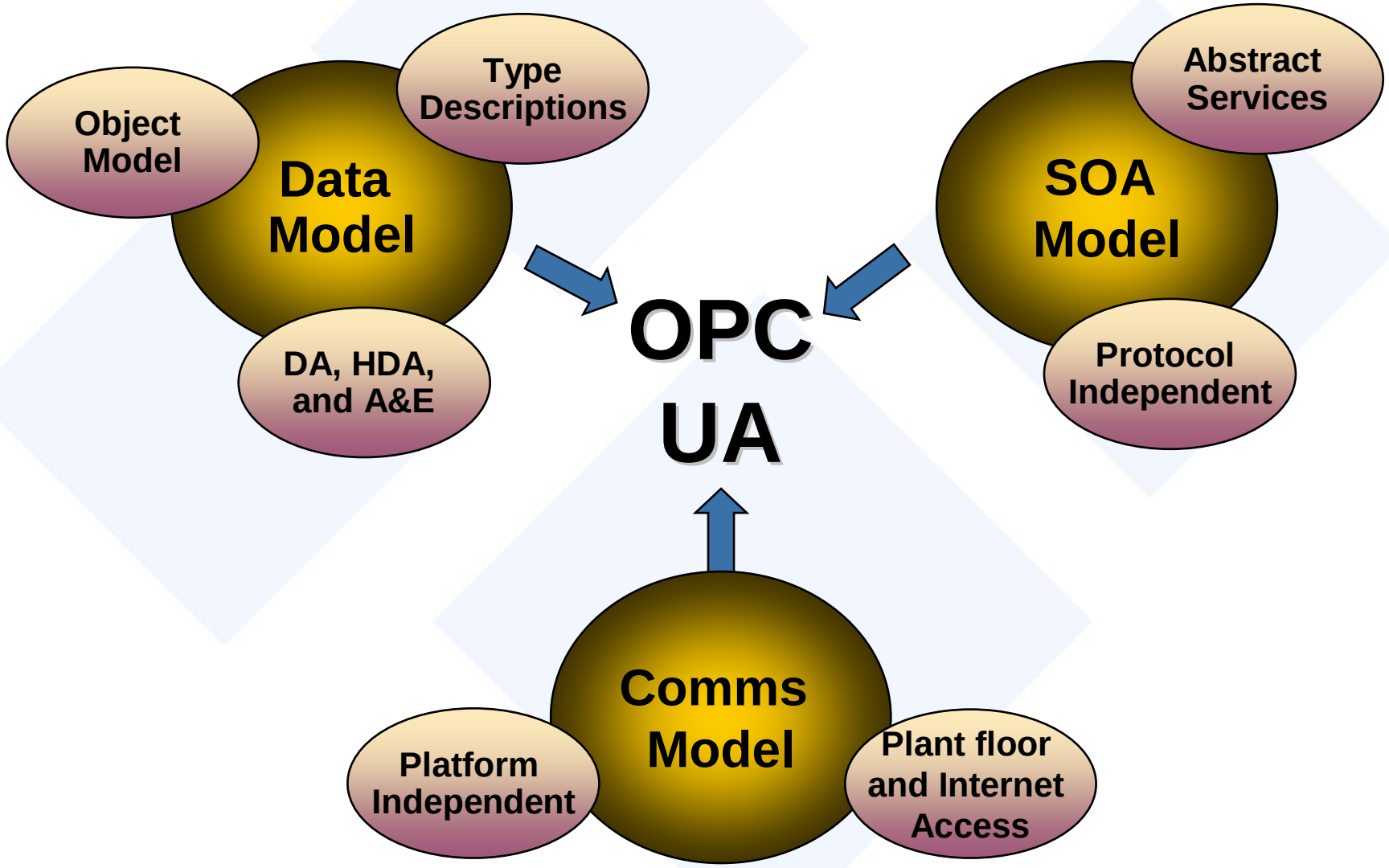
OPC Unified Architecture Base

- **Architecture**
  - Integration of DA, A&E, Commands, Complex Data, and Object Types
- **Designed for Federation**
  - abstract data/ information from the plant floor, through information models, and up to enterprise systems
- **Information Modeling**
  - development and deployment of standard information models to address industry domains specifics
- **Complex Data**
  - OPC Standard & Domain & vendor specific…..

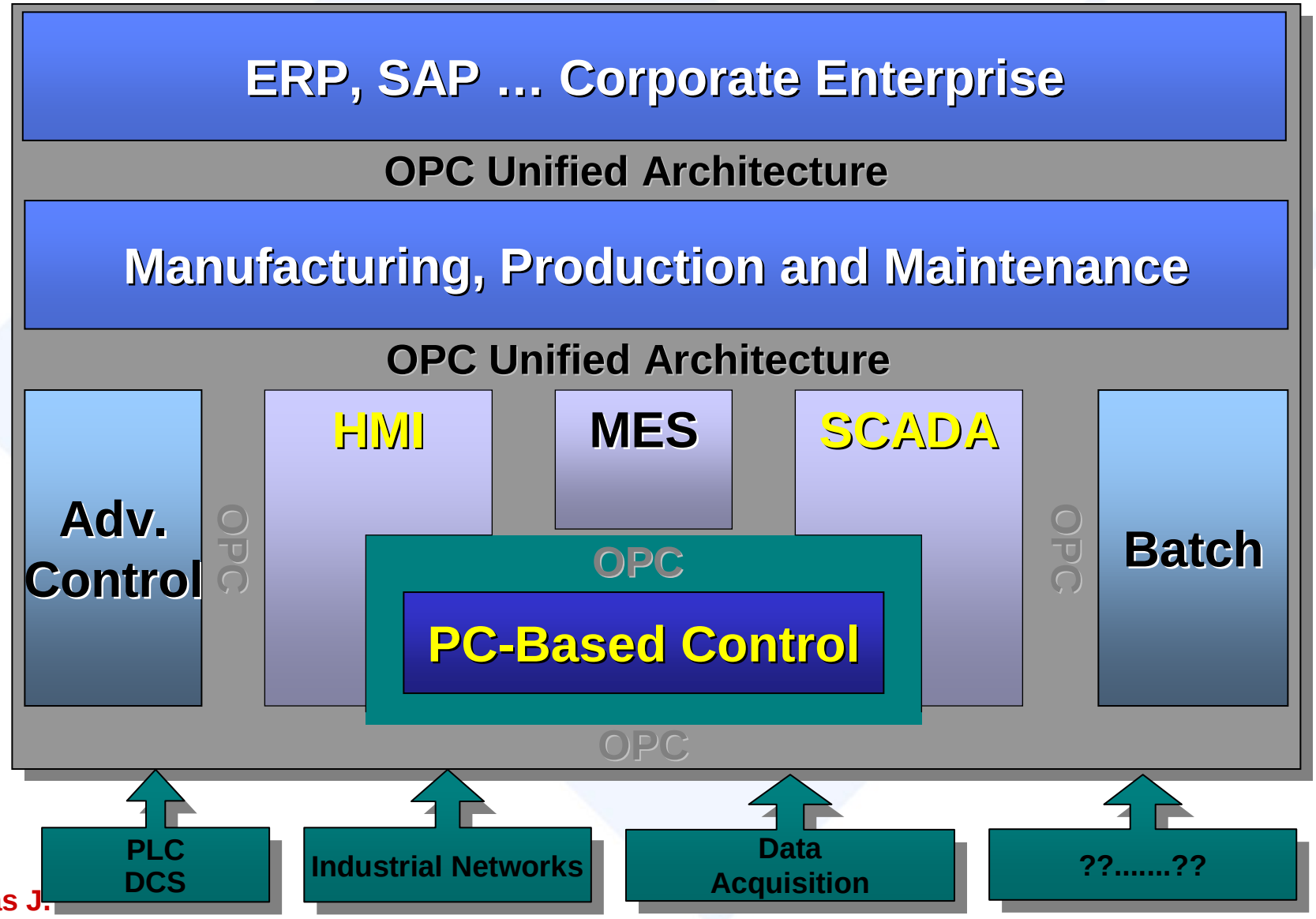
OPC Unified Architecture Base

- **Security**
  - Collaboration, Development & Reference
- **Enterprise Integration**
  - OPC UA standard messaging system
- **Robustness / Reliability Designed & Built in….**
  - NO Failures
  - Sequence numbers, keep-alives, resyncing, and support for redundancy
- **Commands**
- **Companion Standards**
  - industry groups define what OPC Unified Architecture “transports”

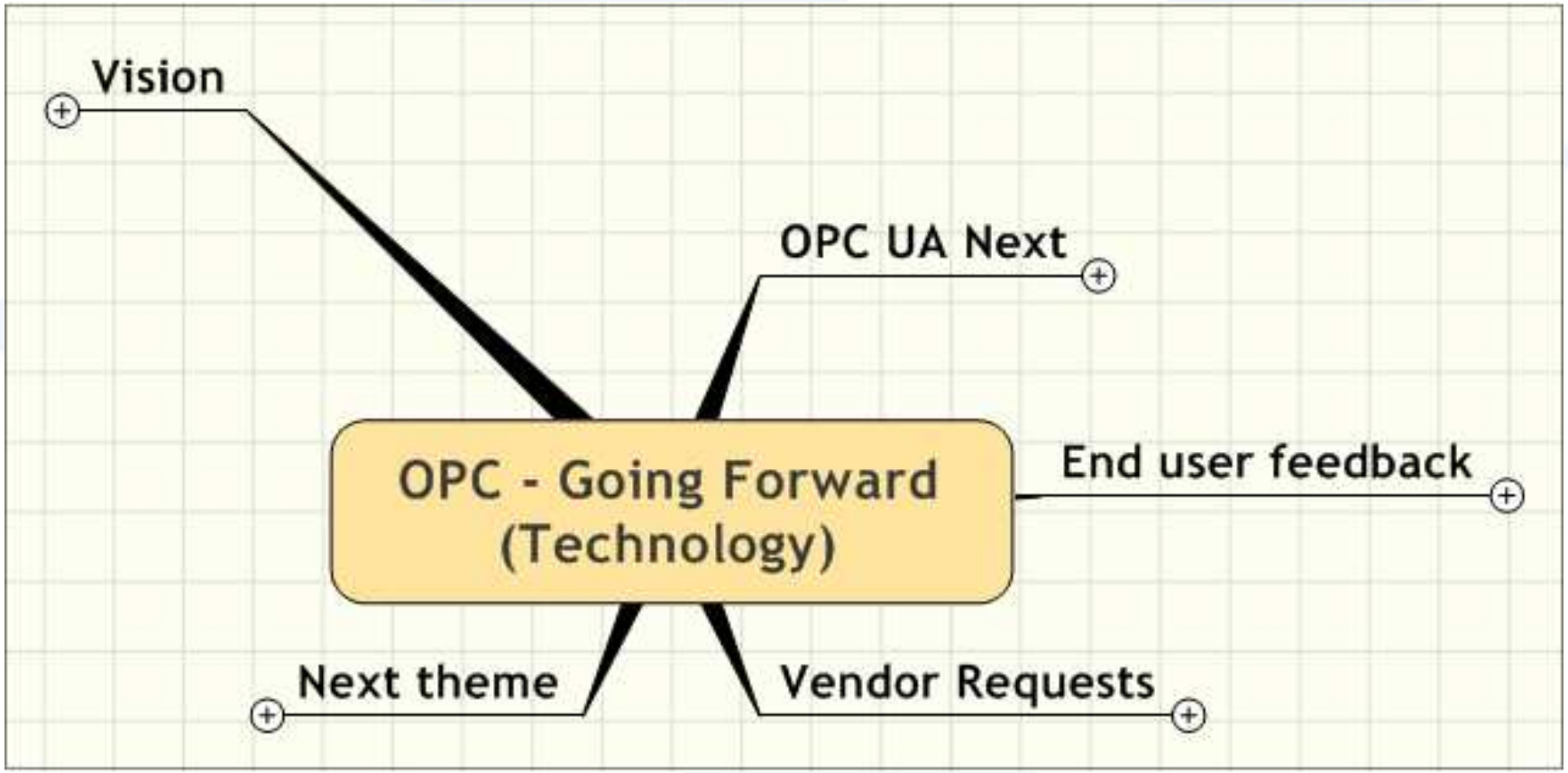
Putting it all together



OPC Provides Industry-Standard
interOperability, Productivity & Collaboration



OPC - Going Forward (Technology)



OPC Roadmap

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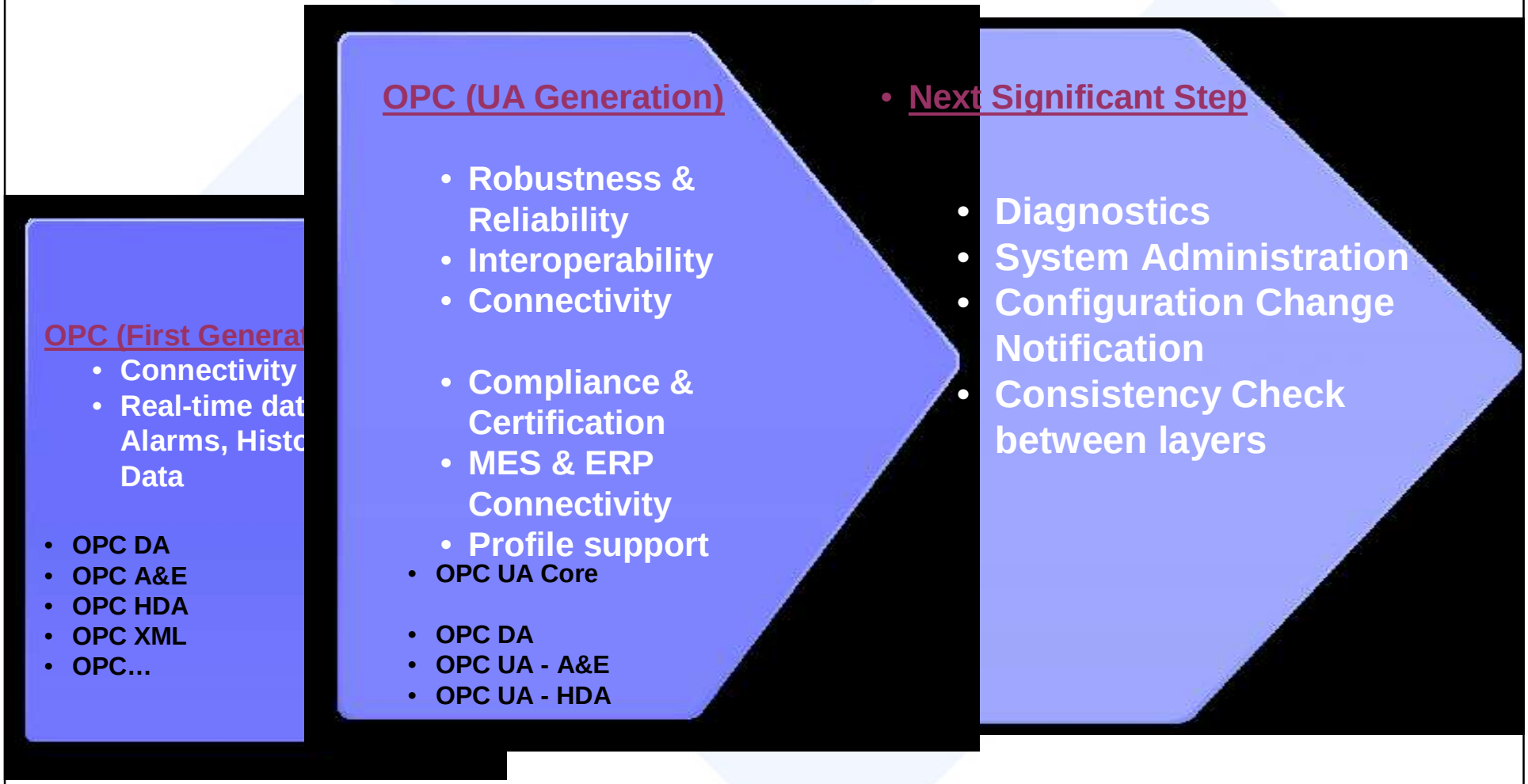
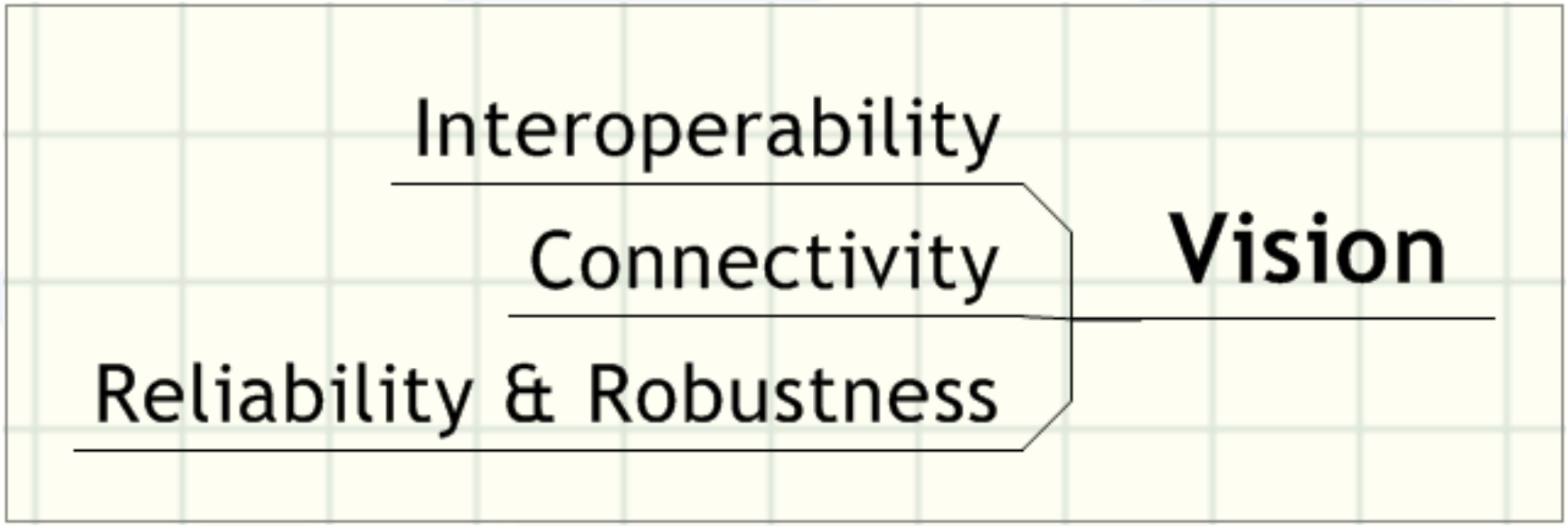
FUTURE



Vision



Transition from Device Connectivity to Data connectivity

OPC is Dedicated to Interoperability

- Security
- Reliability
- Interoperability
- Performance
- Adopted Standard
- Open Platform
- Automation to Enterprise Integration
- Openness, Productivity & Collaboration

Questions?

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  & Executive Director
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