## Industrial Transformation IX Reference Architecture

### Ecosystem
- Industry Solutions
- Implementation Services & Support
- Third-party and Partnered Applications and Products
- Marketplaces

### Applications & Analytics
- NextGen Applications: Digital Twins, Smart Metering, Fleet Management, Connected Worker, Quality 4.0, EHS 4.0, and others
- Monitoring & Control
- Collaboration Social Search
- Analytics: Descriptive, Diagnostic, Predictive, Prescriptive, Prognostic
- Application & Integration APIs

### Development Tools & Libraries
- Integrated Development Environment: Python, JAVA, HTML5, No/Low Code, Device Deployment, etc.
- Microservices, SDKs, and Restful APIs
- BOTS and RPA
- Workflow/Orchestration Execution Engine
- Models: Physical, Visual, Mathematical, Computational
- Analytics: Statistics, Artificial Intelligence, Machine Learning, Natural Language Processing, Search & Optimization, Heuristics, etc.

### On-Premise, Edge, & Cloud
- Public, Private, Hybrid Cloud
- Edge Computing
- Scalable Storage
- Scalable Storage SQL/NoSQL
- Data Lake/Data Warehouse
- Hadoop, Spark
- Anomaly Detection
- Data Cleansing
- Aggregation
- Compaction
- Mashing
- Complex Event Processing
- Data Model: Structured, Semi-Structured, Unstructured
- Integration/Persistence

### Data Conditioning & Contextualization
- Device Identification, Asset Inventory & Visibility
- Network Infrastructure: Servers, Gateways, Firewalls
- ICS Active and Passive Detection and Control
- Communication Standards & Protocols: MQTT, OPC-UA, Wi-Fi, 4G/5G, AMQP, DDS, APIs, and others

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# INDUSTRIAL TRANSFORMATION

## IX PLATFORM

### ECOSYSTEM
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- Marketplaces

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### CONNECTIVITY
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# Industrial Transformation

## IX Infrastructure

### On-Premise, Edge, & Cloud
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- Data Cleansing
- Aggregation
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- Mashing
- Complex Event Processing
- Data Model: Structured, Semi-Structured, Unstructured
- Integration/Persistence

### Network, Security, & Connectivity
- Device Identification, Asset Inventory & Visibility
- Network Infrastructure: Servers, Gateways, Firewalls
- ICS Active and Passive Detection and Control
- Communication Standards & Protocols: MQTT, OPC-UA, Wi-Fi, 4G/5G, AMQP, DDS, APIs, and others

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## IX Applications and Analytics

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INDUSTRIAL TRANSFORMATION
IX 3 ARCHITECTURAL APPROACHES

THREE ARCHITECTURAL APPROACHES TO INDUSTRIAL TRANSFORMATION (IX)

CUSTOM
IX Infrastructure (IaaS)

BEST-OF-BREED
IX Infrastructure (IaaS)

VENDOR ECOSYSTEM
IX Infrastructure (IaaS)

LEVEL OF CUSTOM DEVELOPMENT AND INTEGRATION