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Data Collection Solutions to Make Quick and Accurate Decisions

Presented by:

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Data Collection Solutions: Agenda

1. Introduction & Control System Data Access Examples

2. Data Collection and Reporting for Asset Efficiency

3. Transactional Data Collection

4. Historical Data Collection

5. Closing Thoughts / Question & Answer

Before we go any further...

Questions to ask!

Q. What data do you need to collect and present?

A. Well defined requirements will assist in selecting appropriate technology

Q. Why do you need to collect this data?

A. Identifies the business drivers

Q. Who is going to access this data & how does it need to be presented?

A. Identifies the 'customers' and reporting requirements

Q. What corrective actions will be taken using this data and what are the projected benefits of these actions?

A. Justifies cost and assists in identifying return-on-investment

The manner in which information is accessed and presented is most important!

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Part 1:
Introduction



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Data Collection Solutions

Introduction

Common Customer Statements:

“I just need to do some simple data collection...”

Q. “How can I get data from my controllers into Microsoft Excel?”

A. “Controller data is often accessed through communications software such as RSLinx Classic & RSLinx Enterprise”

Considerations:

Reporting in Excel using communications software and custom code

- Provides a low cost means for getting data out of your controllers
- Is often time consuming to implement
- Difficult to scale as collection requirements increase
- Difficult to support as scope changes
- Can be challenging to deploy based on infrastructure

“FactoryTalk VantagePoint accesses information from disparate data sources, organizes it in a way that is meaningful to all levels in a company and provides tools for analysis and reporting of that data via the web to help people make good business decisions.”

Technology Alignment...

Tools to meet your information needs

- *“Do you need to get data from your controllers and process historians into Excel for reporting and make these reports available in a web-browser?”*

✓ Yes

No

If answered “Yes” this could point to a need for FactoryTalk VantagePoint

- *“Do you have any projects where you need data from multiple systems for reporting and analysis?”*

✓ Yes

No

- *If answered “Yes” this could point to a need for FactoryTalk VantagePoint EMI*
Please attend the FactoryTalk VantagePoint session during the Expo!

- *“Does your company have any initiatives to increase productivity by looking at reasons for equipment downtime or measuring OEE (overall equipment effectiveness)?”*

✓ Yes

No

If answered “Yes” this could point to a need for FactoryTalk Metrics

- *“Do you need to exchange data between control systems and databases?”*

✓ Yes

No

If answered “Yes” this could point to a need for FactoryTalk Transaction Manager

- *“Do you need to collect & store manufacturing data such as speeds, temperatures, flow-rates, etc., for future analysis?”*

✓ Yes

No

If answered “Yes” this could point to a need for FactoryTalk Historian

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Part 2:
Data Collection & Reporting
for Asset Efficiency

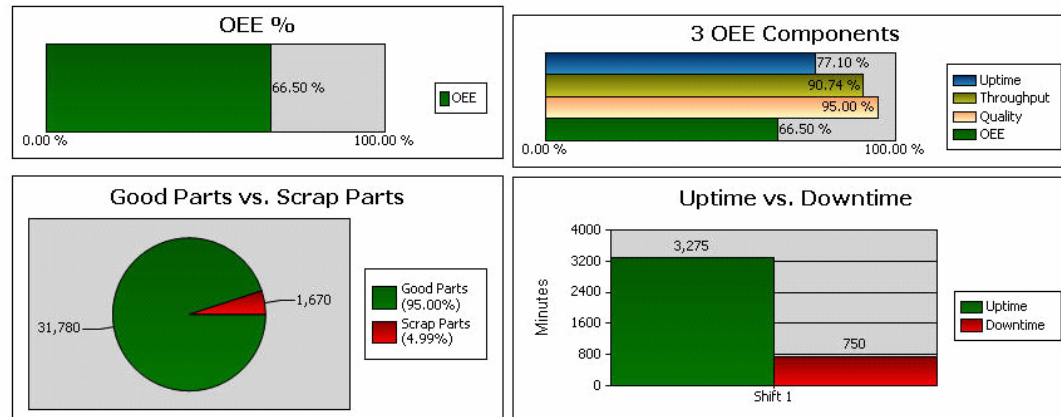
FactoryTalk Metrics - Product Overview

A Management Tool

- A “scorekeeper” for your process
 - Analyzes Overall Equipment Efficiency

$$\text{OEE} = \text{Availability} \times \text{Throughput} \times \text{Quality}$$

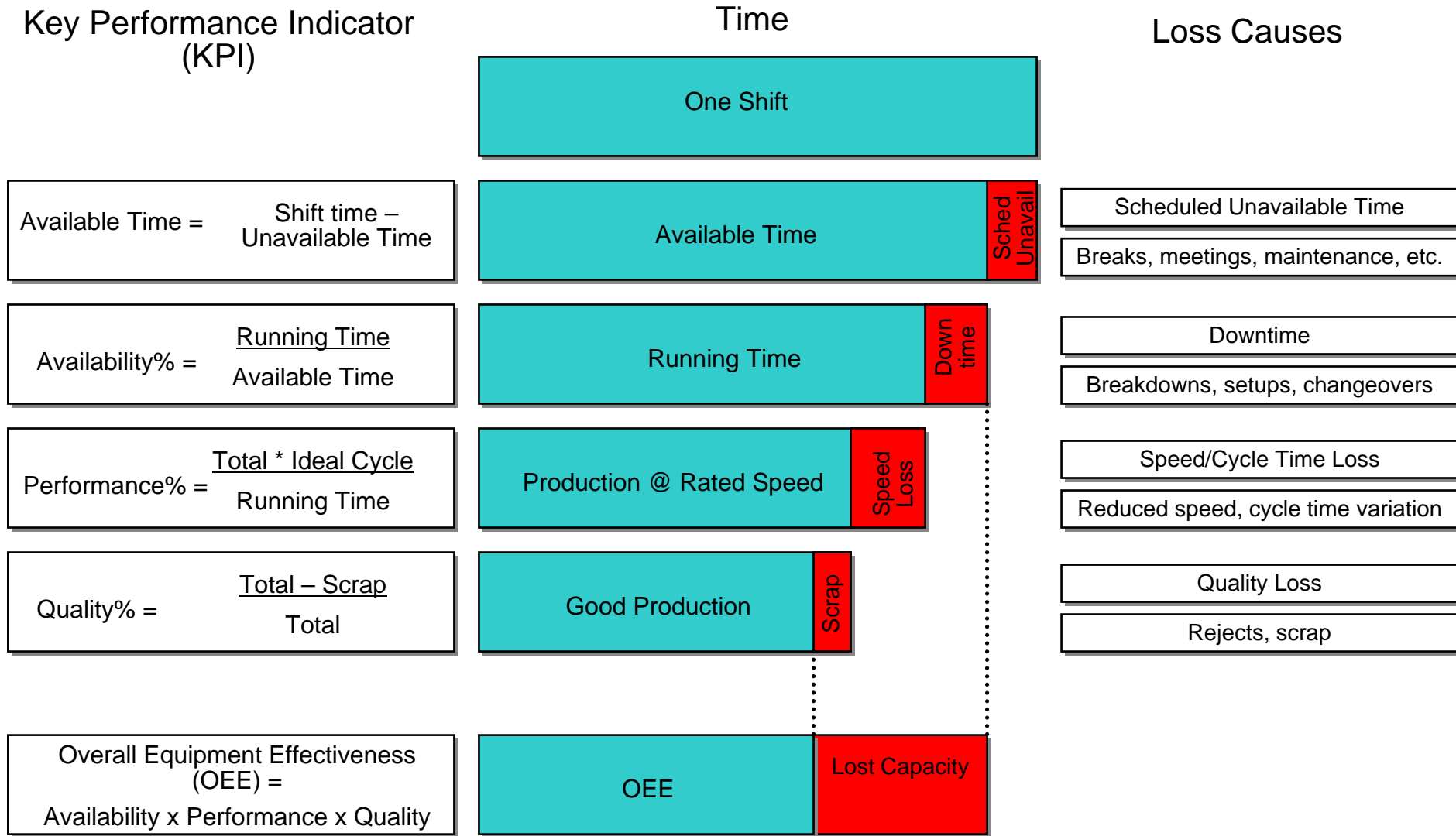
$$\text{OEE} = \frac{\text{RunningTime}}{\text{AvailableTime}} \times \frac{\text{Total Parts} \times \text{Ideal Cycle Time}}{\text{RunningTime}} \times \frac{\text{Good Parts}}{\text{Total Parts}}$$



- Not interested in OEE? What about the components used in the calculation?
 - **Availability/Uptime:** are machines running when they are supposed to?
 - **Performance/Throughput:** are machines running as fast as they should?
 - **Quality:** how much waste is being produced?
 - Production counts, cycle times, schedules, etc.

FactoryTalk Metrics - Product Overview

Overall Equipment Effectiveness (OEE)



FactoryTalk Metrics - Product Overview

OEE Data vs. Event Data

- OEE data cannot tell you how to fix your problems
- FactoryTalk Metrics excels as an Event Tracking System
- Event Data can tell you Why and How
 - Why a machine is inefficient
 - How it is spending its time
 - How its efficiency can be improved
- Event Data is necessary for process improvement
- Custom, based on
 - Machine being monitored
 - Control system programming

Event Chart Top 10 Current Shift

Generation time: 6/24/2009 11:23:52 AM

Parameter Set: Current Shift Top 10 Category/Event

Time: Time Span: Past 1 Days Ending Now, -- Current Shift --

Grouping: Event Category (Row), Event Name (Row)

Sort: Event Category, Event Duration

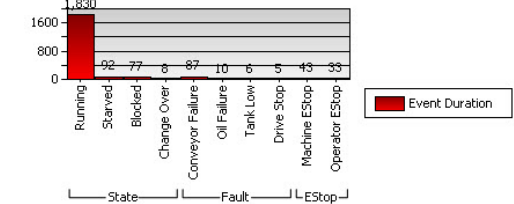
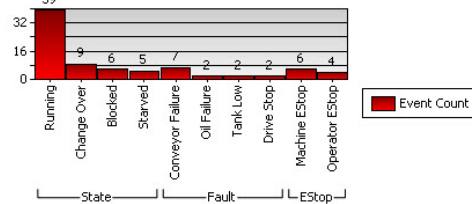
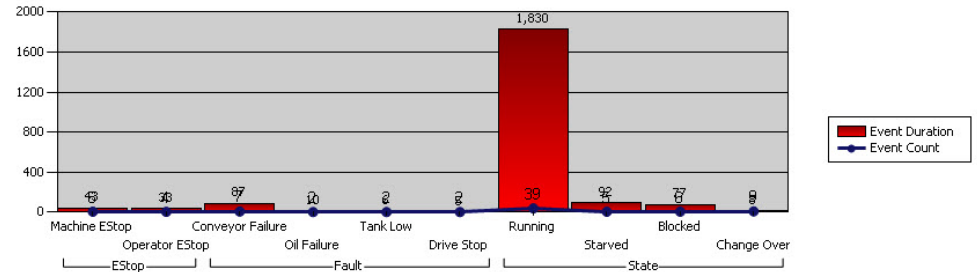
Plant Model Filter: None

Filter: None

Top N: TOP 10 Event Name USING Event Duration

☐

☐ Click to hide/show chart



☐ Click to hide/show data

Event Category	Event Name	Event Count	Total Duration	Min. Duration	Max. Duration	Avg. Duration	Detail
EStop	Machine EStop	6	00:42:58	00:04:34	00:12:01	00:07:10	Event Detail
	Operator EStop	4	00:32:42	00:02:42	00:10:41	00:08:10	Event Detail

FactoryTalk Metrics - Reporting

Does Metrics contain standard reports?

- Based on Microsoft Reporting Services (MSRS) 2005
- Reports are a combination of Templates and Parameter Sets
- Report Templates
 - Performance report
 - Production report
 - Quality report
 - Throughput report
 - Uptime report
 - Event Summary report
 - Event Detail report
 - Root Cause Analysis report
- 58 “out of the box” reports
- Drill-down and drill-through in most Report Templates
- Dashboard
- Kiosk Mode

Rockwell Automation Home Administration Explorer Parameters Heading Status Info Help

1 of 1 100% Find | Next Select a format Export

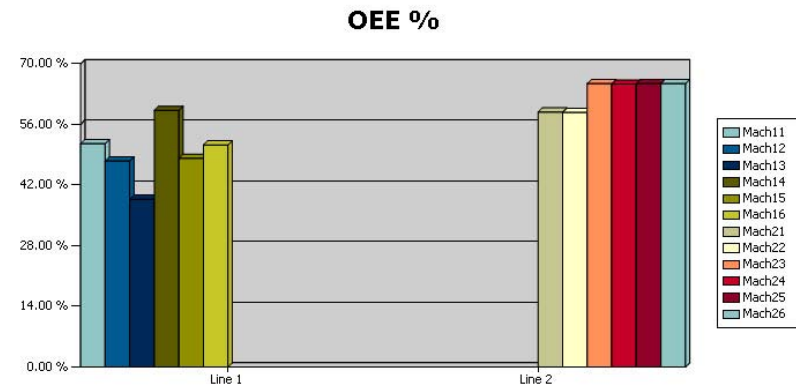
Performance Current Shift

Generation time: 6/24/2009 10:41:29 AM

Parameter Set: Current Shift by Line/WC
 Grouping: Line (Row), Work Cell (Row)
 Plant Model Filter: None

Time: All Time, -- Current Shift --
 Sort: None
 Filter: None
 Top N: None

Line	Work Cell	Uptime %	Throughput %	Quality %	OEE %
Line 1	Mach11	87.63%	65.38%	90.00%	51.56%
	Mach12	80.90%	65.32%	90.01%	47.56%
	Mach13	59.10%	65.56%	100.00%	38.75%
	Mach14	90.85%	65.23%	100.00%	59.26%
	Mach15	73.58%	65.50%	100.00%	48.20%
	Mach16	78.44%	65.38%	100.00%	51.28%
Line 2	Mach21	100.00%	65.42%	90.01%	58.88%
	Mach22	100.00%	65.29%	90.00%	58.77%
	Mach23	100.00%	65.42%	100.00%	65.42%
	Mach24	100.00%	65.32%	100.00%	65.32%
	Mach25	100.00%	65.43%	100.00%	65.43%
	Mach26	100.00%	65.43%	100.00%	65.43%



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Part 3:
Transactional Data Collection



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Are there different types of Data Collection?

Transactional vs. Time-Series Data

Transactional Data

Set of data in a data-processing area in which the incidence of the data is essentially random and unpredictable; hours worked, quantities shipped, and amounts invoiced are examples from, respectively, the areas of payroll, accounts receivable, and accounts payable.

Source - Answers.com

Time-Series Data

Quantities that represent or trace the values taken by a variable over a period such as a month, quarter, or year. Time series data occurs wherever the same measurements are recorded on a regular basis.

Source – BusinessDictionary.com

FactoryTalk Transaction Manager:

Why do we need it/how can it be used?

Applications Require:

- Reliable Data Transfer to/from Databases and Production Environment
- Data Storage with Confirmation Bind-back
- Automated Data Collection (no paper)

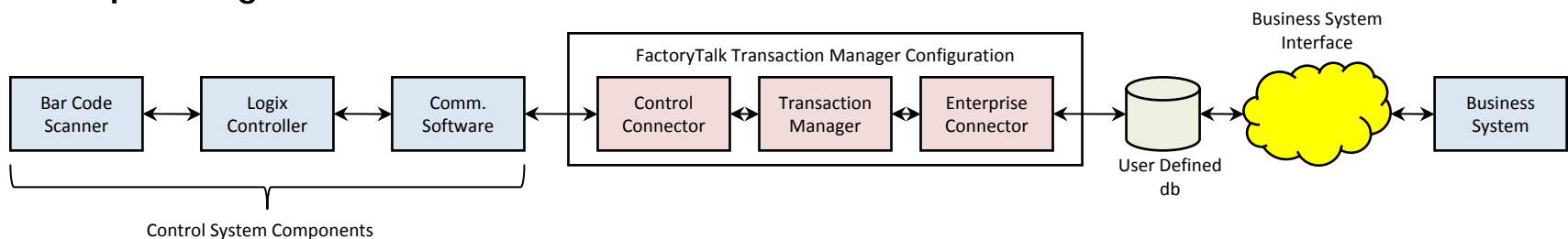
Common Applications:

- Recipe Management
- Tracking Applications
- Routing Applications (Bar Code, RFID, etc.)

FactoryTalk Transaction Manager: Software Architecture

- Middleware which connects Control Systems to Database(s)
- FactoryTalk Transaction Manager Elements Include:
 - Control Connector(s) & Transaction Manager
 - Enterprise Connectors (Database Connectors – ODBC, OLEDB, OCI)
- FactoryTalk Transaction Manager Configurations Include:
 - Connector Definitions
 - Tags Originating from Control System
 - Connections to User Defined Database(s) Objects
Tables, Views, & Stored Procedures
 - Transaction Criteria
Tags linked to Database Object for Bi-Directional Data Transfer
- Licensing
 - Tag-Based
 - Standard and Professional (includes Microsoft SQL Server Std. Edition License)

Example Integration Scenario:



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Part 4:
Historical Data Collection



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FactoryTalk Historian:

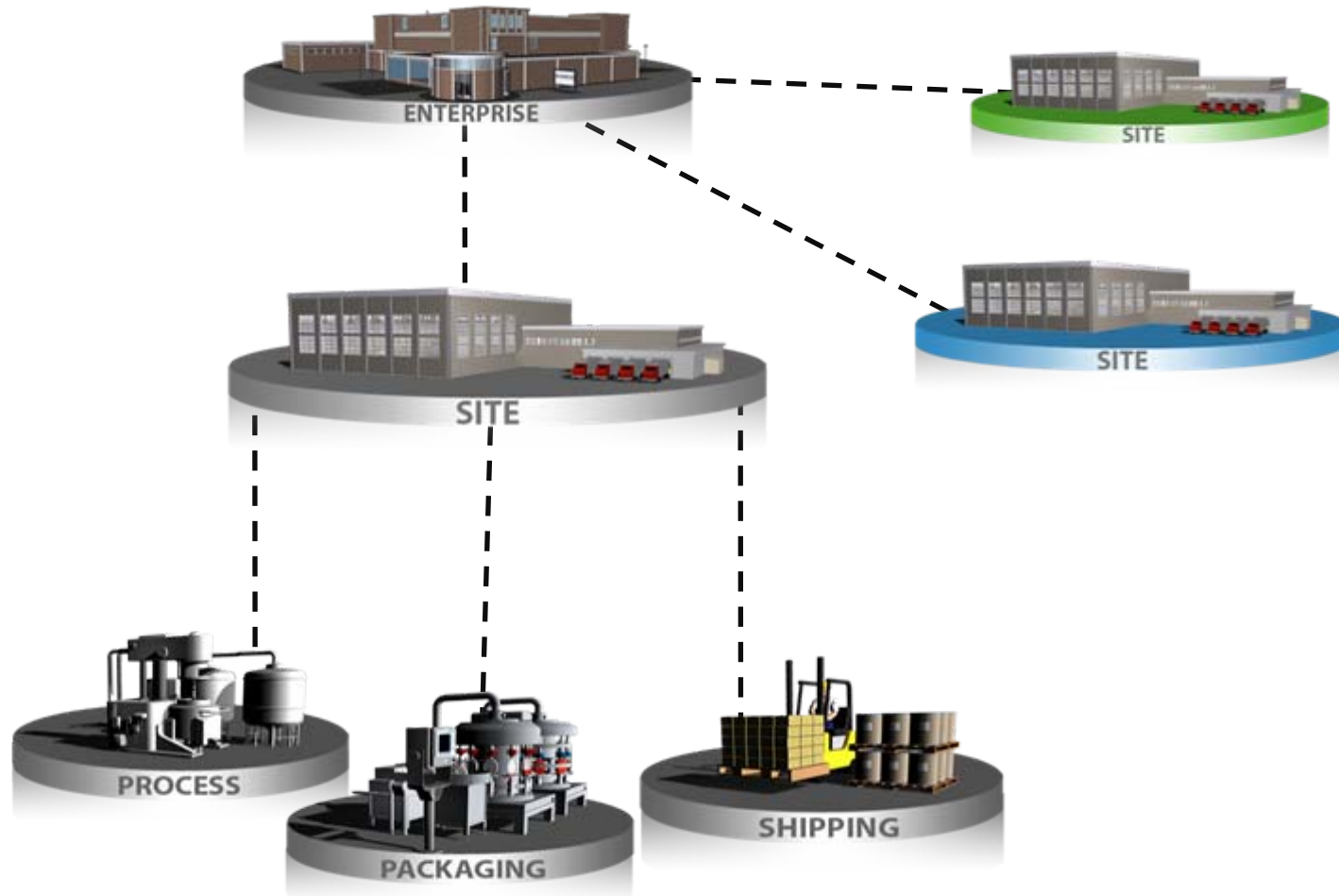
Why do we need it/how can it be used?

Do you need to collect time-series data for the purpose of

- Optimizing Production Process
 - Monitor and improve asset utilization
 - Increase yield / decrease downtime / improve actual availability
- Improving Product Quality
 - Determine root causes for variability
 - Decrease scrap and rework
- Centralized Data Collection & Storage for Compliance
 - Regulatory entities (EPA, DEP, FDA, etc.)
 - Satisfying customer requirements and limiting liabilities
- Monitoring, Optimizing, & Reducing Energy Consumption

Historians provide the infrastructure to store large volumes of time-series data

Historian Strategy & Product Introduction: A New Twist - Distributed Strategy

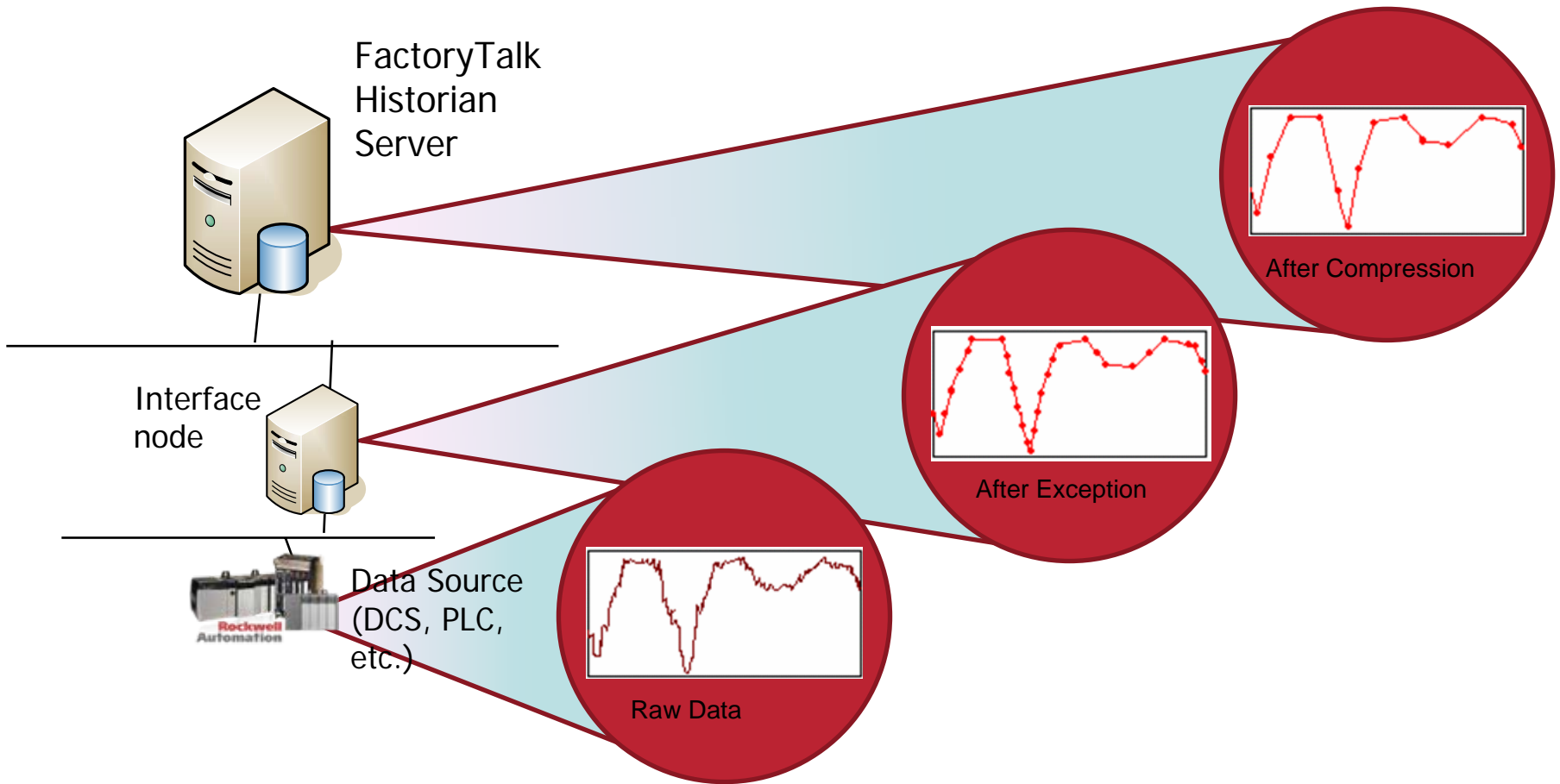


Pervasive Information Across Enterprise, Site, Machine/Device

Rockwell Automation Historian Strategy: FactoryTalk Historian Positioning Statements

- FactoryTalk Historian Enterprise Edition
 - Aggregates and stores large volumes of time-series data from multiple sites
 - Target availability 2nd half, calendar 2010
- FactoryTalk Historian Site Edition
 - Site (Plant) or Historian dedicated to a Process Control System
 - Hosted on Windows-based operating systems
 - Data collection rates to *250mS (Ethernet Comms. to Rockwell Controllers)
 - Available since December 2008, currently shipping version 2.10
- FactoryTalk Historian Machine Edition
 - Hosted in ControlLogix chassis (1756 form-factor)
 - Web-based user interface for configuration and data retrieval
 - Integration with FactoryTalk Historian Site Edition
 - Data collection rates to 10mS across ControlLogix backplane
 - Available now!

FactoryTalk Historian Site Edition: Optimized Data Storage - Exception & Compression



Notes:

- Exception and Compression provide two levels of “filtering”
- Exception and Compression settings are configurable
- The same concepts apply for Machine Edition and Enterprise Edition

FactoryTalk Historian Machine Edition (ME): Product Overview

Commercial Details:

- 1756-HIST1G - 1gb & 1756-HIST2G - 2gb
- Max 40 Historian MEs per Historian SE server
- Need licensing for Historian SE for integration with SE server.
- Add-on profile to Logix5000 that can provide basic control
- Integration with client tools (Process Book, Data Link, & View SE Trend)
- Beta Testing – September/October
- Availability – March 2010

Key Technical Specs:

- 2500 Events/Sec, Max 2500 points
- 10mS Max Scan Rate (or 25 datapoints)



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Part 5:
Closing Thoughts /
Question & Answer



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Review...

Questions to ask to ensure the right fit...

Q. What data do you need to collect and present?

A. Well defined requirements will assist in selecting appropriate technology

Q. Why do you need to collect this data?

A. Identifies the business drivers

Q. Who is going to access this data & how does it need to be presented?

A. Identifies the 'customers' and reporting requirements

Q. What corrective actions will be taken using this data and what are the projected benefits of these actions?

A. Justifies cost and assists in identifying return-on-investment

Technology Positioning

Tools to meet your information needs

- **FactoryTalk VantagePoint**
 - Ties multiple data sources together
 - Enables modeling to abstract data sources and use recognizable terms
 - Makes information available easily through a web browser
- **FactoryTalk Metrics**
 - Equipment-centric view, monitors machines
 - Configurable application dependent on “control system” connectivity
 - Pre-defined reporting
- **FactoryTalk Transaction Manager**
 - Middleware which connects Control Systems to Database(s)
 - Database layout (schema) is defined by the user
- **FactoryTalk Historian**
 - Collects values of process variables over time
 - Visualization is typically a line chart

Our licensing models are scalable – start with a limited scope and grow over time!

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Thank you for
participating!

Questions?



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