OSIsoft®

REGIONAL SEMINARS 2012

The Power of Data

Infrastructure for Streaming Data and Events: The PI System

Presented by **Alton Loe**

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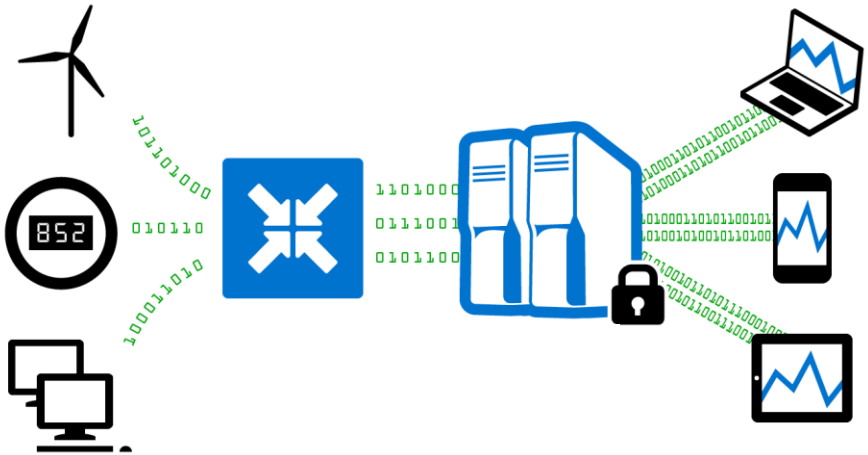
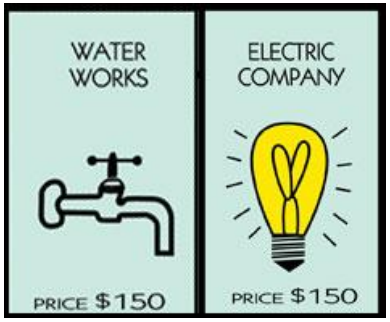
Some examples of infrastructure

1. Water
2. Electricity
3. Internet (Broadband)
4. Transportation
5. Gas
6. Telephone (voice)



Data Infrastructure?

Data as a Utility



In 2012 it is a general expectation that data about almost anything will be available without a lot of friction

Characteristics of an Infrastructure

Challenge 1

Information necessary to solve problem is located in many systems which are not compatible with one another.

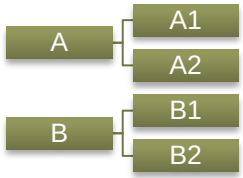
Challenge: Heterogeneous Data Landscape

Data Types

Time Series

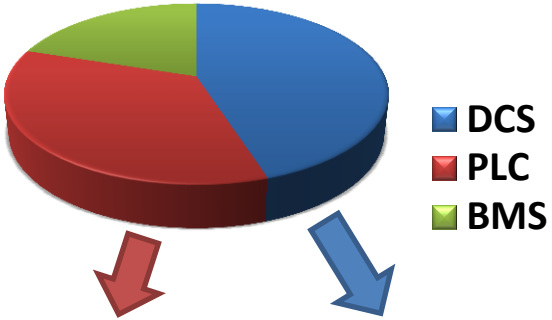
Relational

Hierarchical

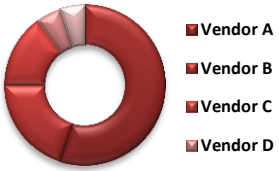


Unstructured

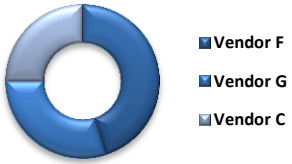
Process Control Systems



PLC Vendors



DCS Vendors



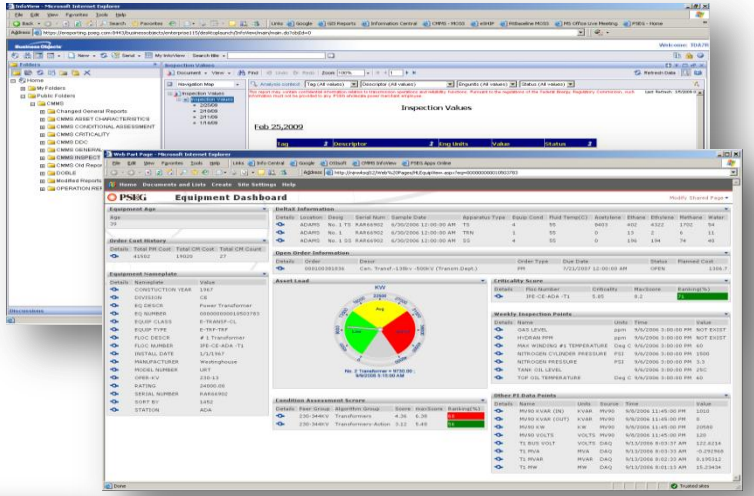
Geography

POWER & UTILITIES

PSE&G: Condition Based Maintenance

“We get a detailed breakdown on equipment costs and man/hours to service that gives us important business benefits. Without the use of the PI System, it would have taken us several months to gather and analyze the information.”

Angela Rothweiler Principal Engineer



PSE&G

Customer Business Challenge

- Providing the highest reliability Power Distribution is requirement
- Minimize Maintenance Costs
- Combine financial with operational data

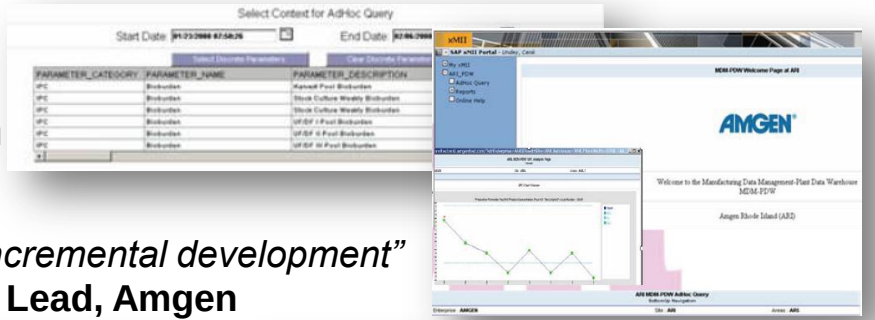
Solution

- Implemented automatic data collection and notifications to SAP PM
- Set up standard business rules for condition based maintenance using the PI System Analytics
- Provided focused view into equipment

Customer Results / Benefits

- Holds Reliability award for Mid Atlantic States for last 7 years
- Named most reliable Power Company in America
- Focused maintenance expenditures on needed targets

Amgen *: Paving the Road to Plant Data Integration



"We wanted to establish an architecture that enabled future incremental development"
Robert Gamber -- Principal Engineer, Platform Lead, Amgen

Customer Business Challenge

- Expedite the Commercialization Process by reducing engineering and conformance runs required
- Improve Operational Effectiveness through Increased ROA yields and success rates
- Increase Quality by identifying root cause to build quality into the process
- Deliver business and operational information better, faster, cheaper → The Perfect Plant

Solution

- Implemented the PI System as data historian and analytical engine.
- Used SAP's MII as the user interface and reporting and display tool for operators to interact with business data and product schedules
- Leveraged data in existing source systems to reduce risks associated with data replication – 85% of MII data came directly from Amgen's plant PI Systems

Customer Results / Benefits

- Able to provide operations with a "validated" single window of truth
- Provided a standard, repeatable manufacturing process characterization, monitoring and optimization by:
  - Optimize Process Improvements
  - Troubleshoot Process Issues
  - Resolve Non-conformance
  - Monitor in-process Control
  - Troubleshoot operational issues

*An Enterprise Customer

Challenge 2

Solving problems without a data infrastructure often means having to compromise on several fronts – fidelity of data, sampling rate, behaviors, scaling, stability etc.

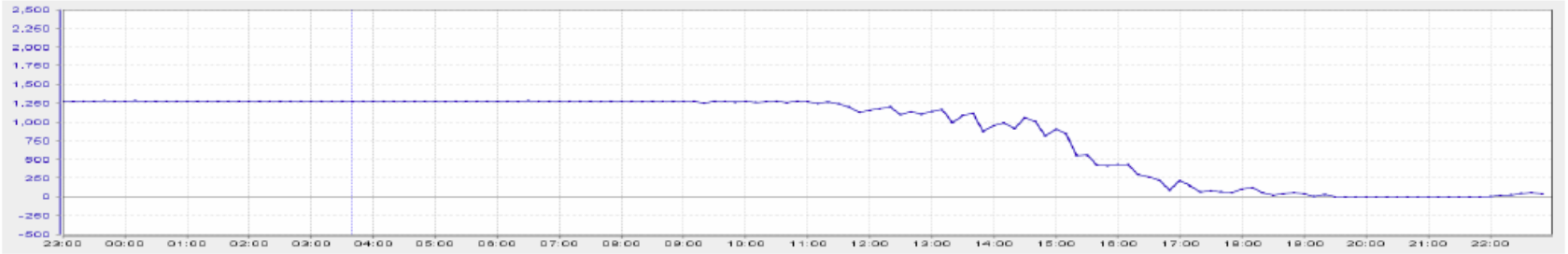
About Suzlon Group

- Global Wind Turbine Manufacturer
  - Est. 1995 in Pune, India
  - Acquired REpower Systems in 2011
- 5th Largest Wind Turbine OEM
  - Suzlon and REpower combine for 18+ GW installed capacity
  - Current Annual Manufacturing Capacity of 5,900 MW

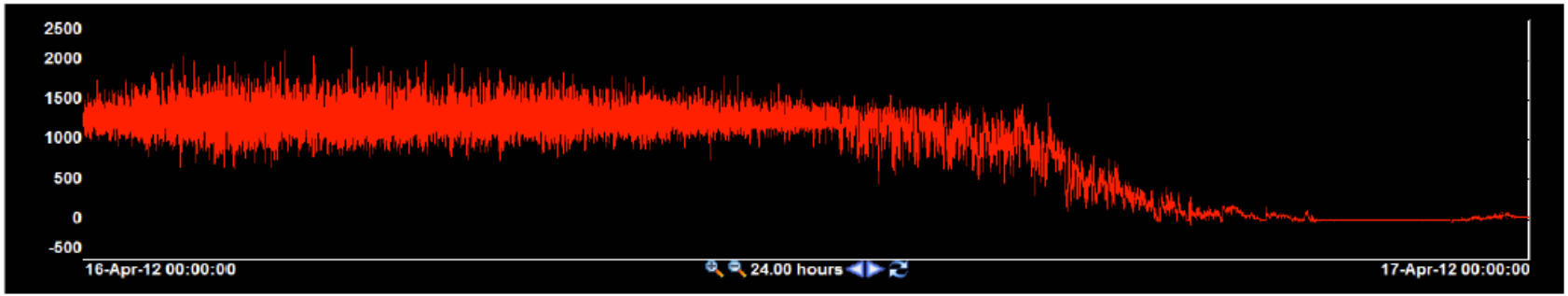
What could you be missing?

Active Power - 10 minute vs 1 second sampling

SCADA



PI



Suzlon*: Direct to Controller Integration Using OPC

SUZLON
POWERING A GREENER TOMORROW

"Having all analog values, digital states, fault states, user info, controller KPIs, and parameter settings adds a significant amount of value to a PI System."

Chris Wozniak – Senior SCADA Engineer, Suzlon

Customer Business Challenge

- Park visibility was limited.
- System of processing event and statistical logs was difficult to work with.
- Disconnected systems for reporting limited to only 10 minute average data and pre-canned reports
- Faults and warnings required manually created notifications

Solution

- Implemented a PI System to store and report using high fidelity data
- Created custom dashboards and reports and shared them enterprise wide using SharePoint and PI Clients
- Create automatic fault notifications with custom content

Customer Results / Benefits

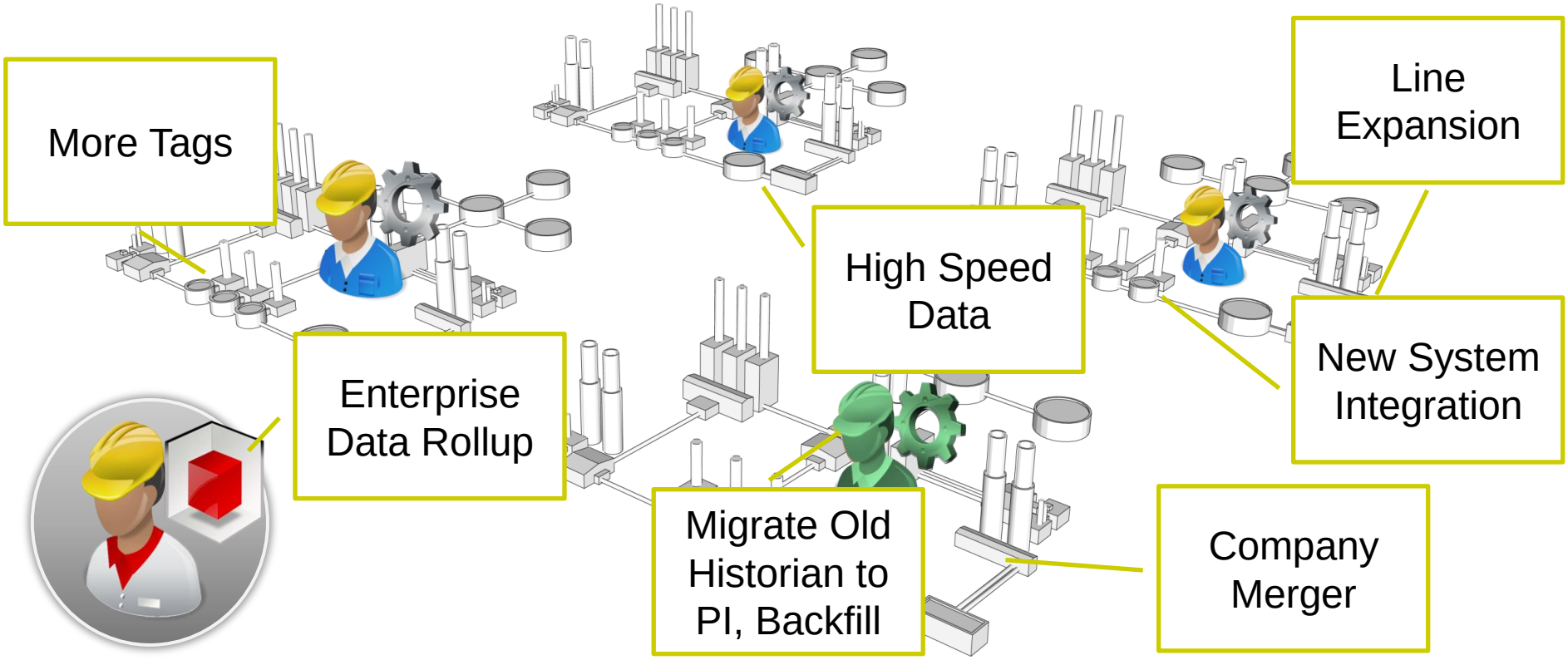
- Reduced manpower needed to resolve alerts freeing them up for higher value functions
- Ability to visualize and respond to new types of events and alerts
- Switched to Proactive modes using KPIs and ACE calculation vs only reactive modes

*An Enterprise Customer

Challenge 3

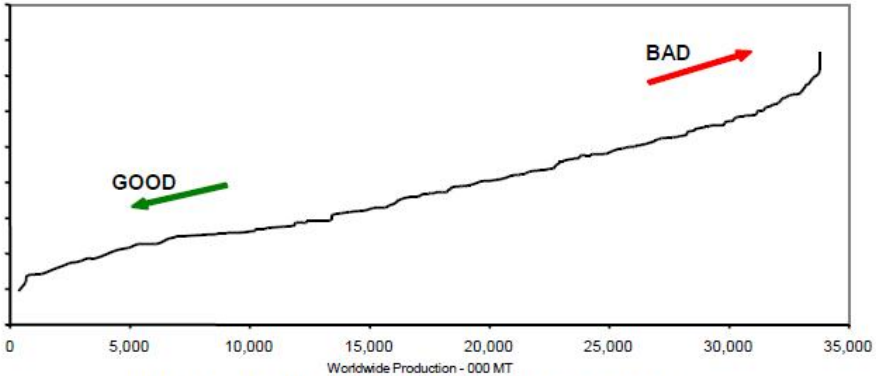
Business evolves over time. Change arrives in the form of expansion, acquisition, people, leadership, market, and passing knowledge from one generation to the next.

Change, business as usual



Aluminum Smelting Economics

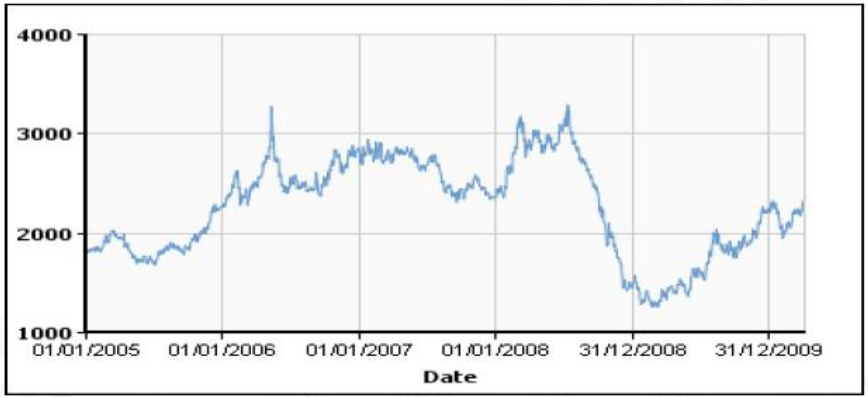
Energy is 30-40% of Aluminum Production Costs….



Worldwide Smelter Cash Production Costs

Warrick Operations is Alcoa's Largest Operating U.S. Smelter

- 330,000 MT capacity/year



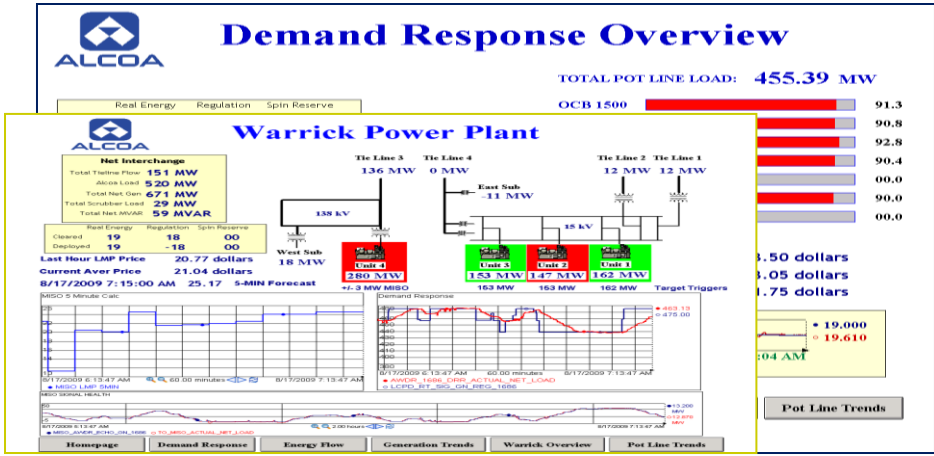
Competition in a Worldwide Commodities Market….

POWER & UTILITIES

Alcoa*: Industrial Scale Demand Response

Warrick is Alcoa's Largest Operating US Aluminum Smelter

- 330,000 MT capacity/year
- Energy is 30-40% of Aluminum Production Costs
- Generate power for Smelter & Rigid Packaging



Brian Helms
Power Markets Coordinator
Alcoa Power Generation

ALCOA

Customer Business Challenge

- Worldwide commodities price competition
- Older (1960s) facility
- Business took a major hit due to economic downturn
- Needed to find a way to sustain the business & keep from going under

Solution

- Use PI for energy regulation – Sell generated electricity back into Midwest ISO (MISO)
- Monitor MISO for energy demand notifications, and respond accordingly
- Submit forecasted load data from PI
- Focused on selling regulation (20MW) and spinning reserve (40MW)

Customer Results / Benefits

- Total project cost was $700,000
- Project payback was in 4 months
- System runs efficiently
- Gets a weekly check from MISO for the power they generate in the grid
- Use this money to sustain their Aluminum business
- Revenue now above competition

*An Enterprise Customer

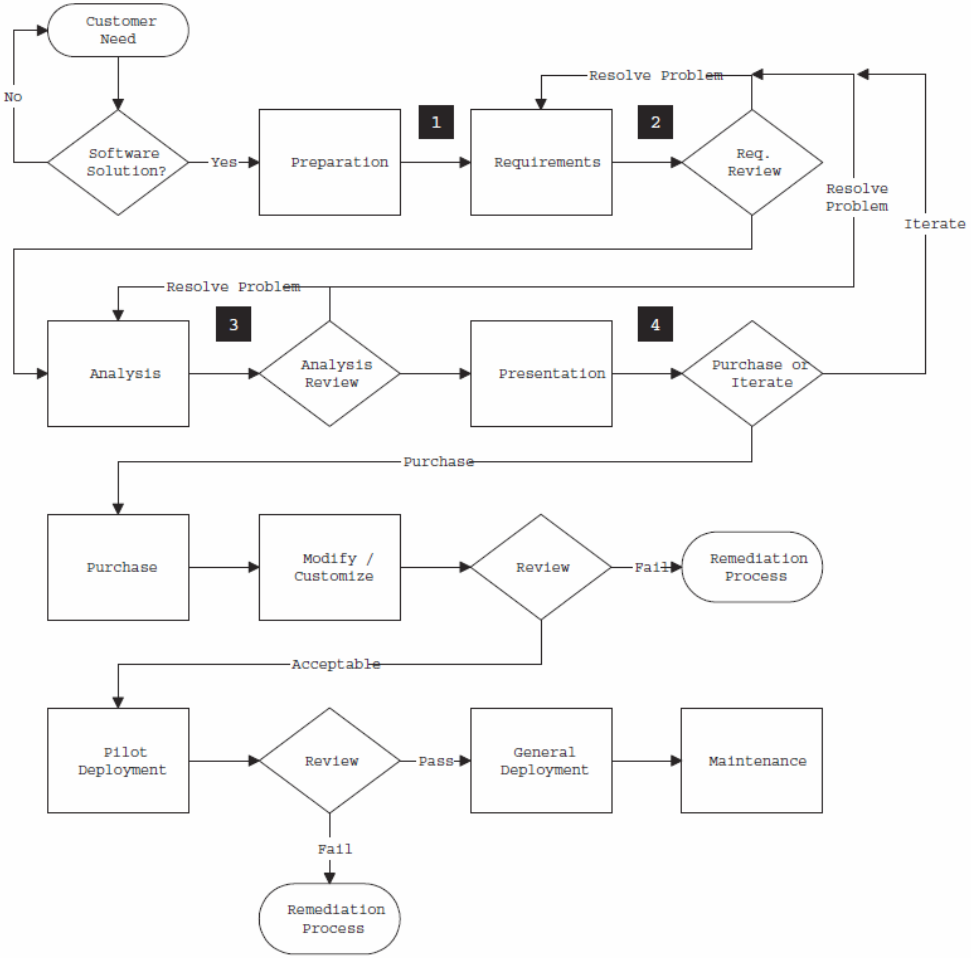
Challenge 4

Procurement costs and change costs for software are expensive -- money and time -- and the probability of success decreases with each additional system. N+1.

"Small agile beats big slow--big agile beats everything."

Information Week 2011, Top 10 CIO Priorities http://www.informationweek.com/global-cio/interviews/top-10-cio-priorities/

Fun Stuff


Customer Need
No
Software Solution?
Yes
Preparation
1
Requirements
2
Req. Review
Resolve Problem
Resolve Problem
Iterate
Resolve Problem
3
Analysis
Analysis Review
Presentation
4
Purchase or Iterate
Purchase
Purchase
Modify / Customize
Review
Fail
Remediation Process
Acceptable
Pilot Deployment
Review
Pass
General Deployment
Maintenance
Fail
Remediation Process

Challenge 5

Preserving and enhancing knowledge is key to success. Infrastructure is forever, people and spot solutions are not.

More Data Challenges

Harder to Search & Find Information

Speaking Different Languages

External Data Sources

Homosapien Spreadsheet Data Integration

Multiple Versions of the Truth

Nalco Company:

Essential Expertise for Water, Energy, and Air℠

- World's leading process improvement company
- 70,000 customers in more than 130 countries
- 75 years of experience in the hydrocarbon industries

*An Enterprise Customer

Nalco's Value Proposal

"This solution allows us to offer our customers high-quality performance data, and allows them and our service engineers to optimize treatment programs for maximum cost/performance and sustainability credits, as well as benchmark their operations ."

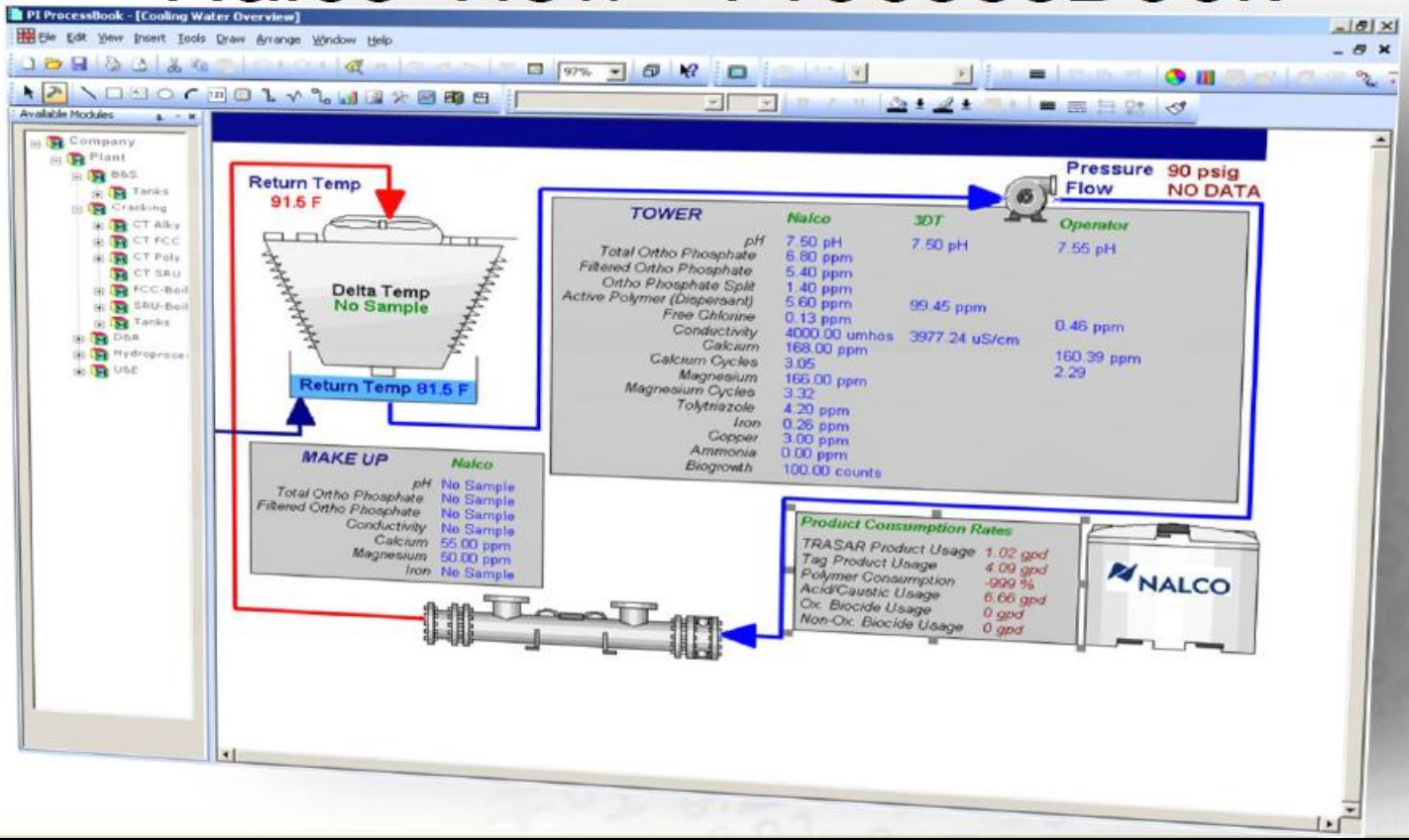
- Visibility Across Customer Chain
- Software + Services
- Enabling People to Provide Value-Add

The Result: Dynamic Access to Real-Time Data

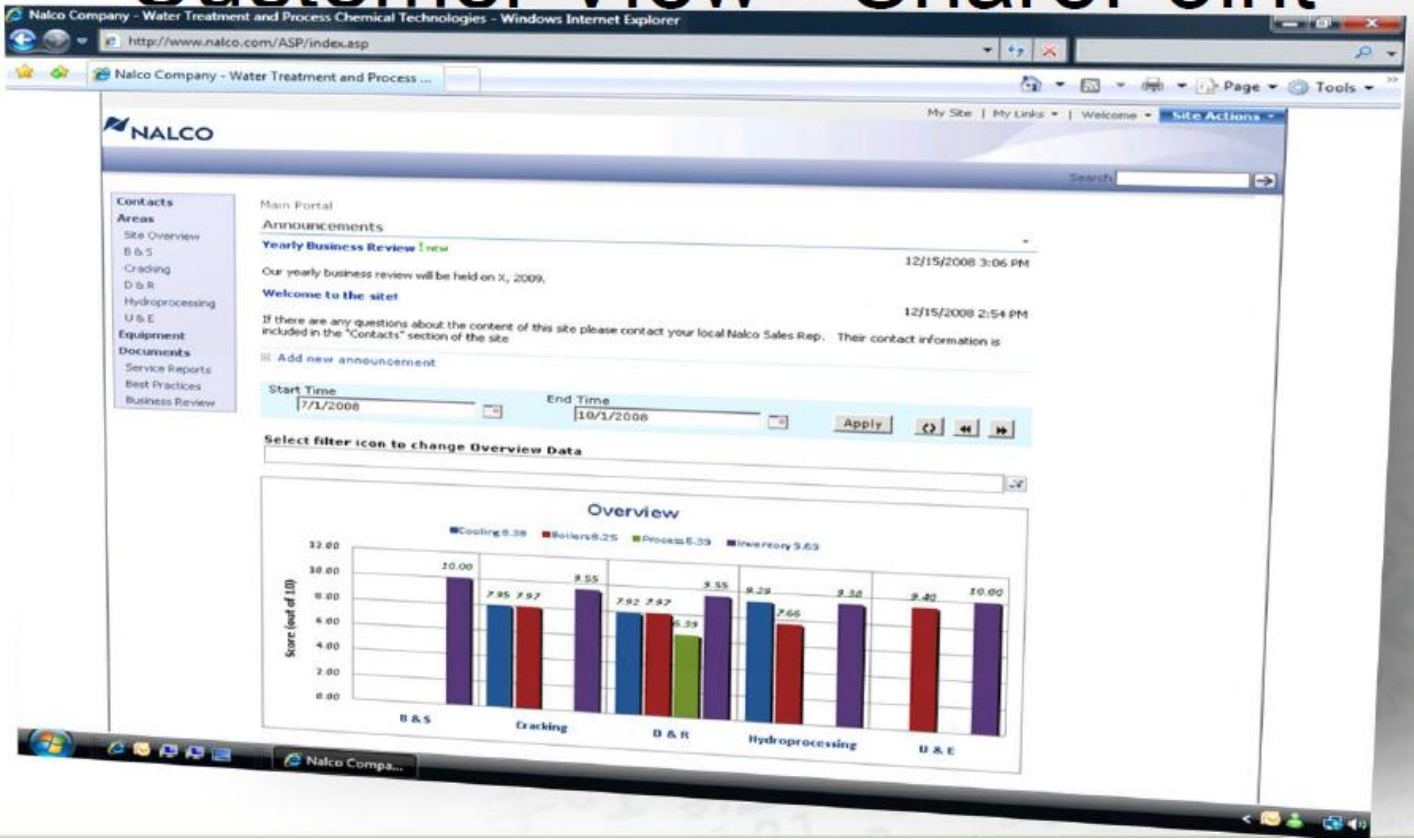
- Integration of Nalco and Customer data to provide the whole picture
- Condition-based maintenance and performance optimization
- Role-based visibility into plant operations and performance
- Summary and KPI information to customers and Nalco management
- Client-based tools to provide plant engineers with additional customized information analysis

Put the results in customers hands to bring greater value to the service Nalco provides

Nalco View - ProcessBook



Customer View - SharePoint



Challenge 6

Regulatory evolution and sustainability initiatives are driving the need for data for reporting and accountability.

What has changed

- Clean Air Act
- FERC
- NERC CIP
- Sarbanes Oxley
- 21CFR Part 11
- OSHA Cal/OSHA

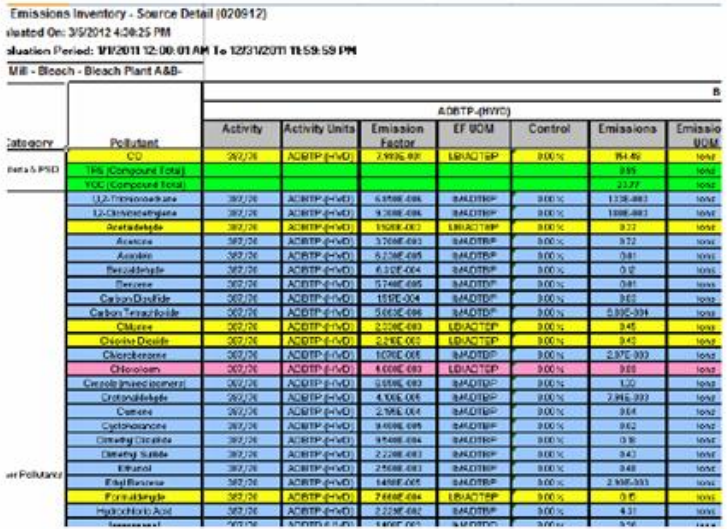
PULP & PAPER

International Paper

Environmental Monitor: Automation Journey

"The CEMR system allowed us 30 days to analyze data before (Information Collection Request) deadline."

INTERNATIONAL PAPER


Emissions Inventory - Source Detail (020912)
leated On: 3/5/2012 4:30:25 PM
luation Period: 1/1/2011 12:00:01 AM To 12/31/2011 11:59:59 PM
Mill - Bleach - Bleach Plant A&B-

		ADBTP-(HVD)						
Category	Pollutant	Activity	Activity Units	Emission Factor	EF UOM	Control	Emissions	Emissio UOM
	CO	387/26	ADBTP-(HVD)	7.990E-001	LB/ADTBP	0.00%	154.49	tons
data & PSD	TRS (Compound Total)						0.05	tons
	VOC (Compound Total)						23.77	tons
	1,2-Trimethylbenzene	387/26	ADBTP-(HVD)	6.850E-006	lb/ADTBP	0.00%	1.33E-003	tons
	1,2-Dichloroethylene	387/26	ADBTP-(HVD)	9.300E-006	lb/ADTBP	0.00%	1.00E-003	tons
	Acetaldehyde	387/26	ADBTP-(HVD)	1.920E-003	LB/ADTBP	0.00%	0.22	tons
	Acetone	387/26	ADBTP-(HVD)	3.700E-003	lb/ADTBP	0.00%	0.72	tons
	Acrolein	387/26	ADBTP-(HVD)	6.230E-005	lb/ADTBP	0.00%	0.01	tons
	Benzaldehyde	387/26	ADBTP-(HVD)	6.310E-004	lb/ADTBP	0.00%	0.12	tons
	Benzene	387/26	ADBTP-(HVD)	5.740E-005	lb/ADTBP	0.00%	0.01	tons
	Carbon Disulfide	387/26	ADBTP-(HVD)	1.510E-004	lb/ADTBP	0.00%	0.03	tons
	Carbon Tetrachloride	387/26	ADBTP-(HVD)	5.003E-006	lb/ADTBP	0.00%	5.00E-004	tons
	Chlorine	387/26	ADBTP-(HVD)	2.330E-003	LB/ADTBP	0.00%	0.45	tons
	Chlorine Dioxide	387/26	ADBTP-(HVD)	2.210E-003	LB/ADTBP	0.00%	0.43	tons
	Chlorobenzene	387/26	ADBTP-(HVD)	1.070E-005	lb/ADTBP	0.00%	2.07E-003	tons
	Chloroform	387/26	ADBTP-(HVD)	4.000E-003	LB/ADTBP	0.00%	0.00	tons
	Cresols (mixed isomers)	387/26	ADBTP-(HVD)	6.050E-003	lb/ADTBP	0.00%	1.20	tons
	Crotonaldehyde	387/26	ADBTP-(HVD)	4.100E-005	lb/ADTBP	0.00%	7.94E-003	tons
	Cumene	387/26	ADBTP-(HVD)	2.190E-004	lb/ADTBP	0.00%	0.04	tons
	Cyclohexanone	387/26	ADBTP-(HVD)	9.400E-005	lb/ADTBP	0.00%	0.02	tons
	Dimethyl Disulfide	387/26	ADBTP-(HVD)	9.540E-004	lb/ADTBP	0.00%	0.18	tons
	Dimethyl Sulfide	387/26	ADBTP-(HVD)	2.220E-003	lb/ADTBP	0.00%	0.43	tons
	Ethanol	387/26	ADBTP-(HVD)	2.560E-003	lb/ADTBP	0.00%	0.48	tons
er Pollutants	Ethyl Benzene	387/26	ADBTP-(HVD)	1.480E-005	lb/ADTBP	0.00%	2.90E-003	tons
	Formaldehyde	387/26	ADBTP-(HVD)	7.440E-004	LB/ADTBP	0.00%	0.15	tons
	Hydrochloric Acid	387/26	ADBTP-(HVD)	2.220E-002	lb/ADTBP	0.00%	4.31	tons
	Isopropanol	387/26	ADBTP-(HVD)	1.400E-003	lb/ADTBP	0.00%	0.36	tons

Customer Business Challenge

- Consolidate environmental reporting using live process measurements

Solution

- Built solution around the PI System installed in the 1990's

Customer Results / Benefits

- Achieved cross report consistency
- Gained ability to respond to "Impossible" data requests
- Enabled sustainability goals by providing a common data source

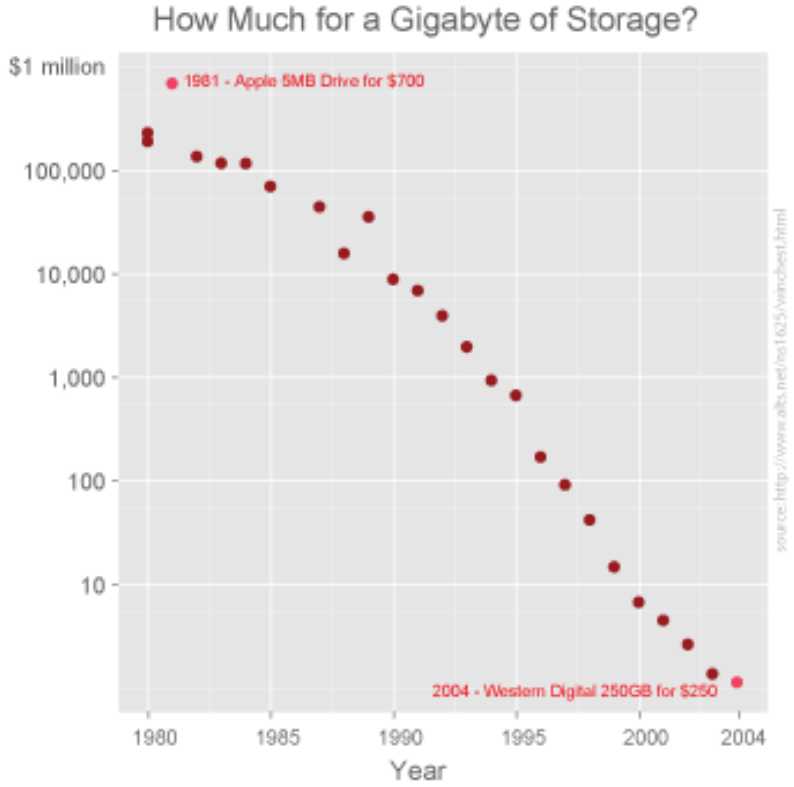
Why Infrastructure is Better

(and by extension PI)

Going beyond data collection

- Cost of storing data is quickly approaching the cost of the electricity to keep it online.

- It's more than just collecting it. How it is found, accessed, and consumed matters

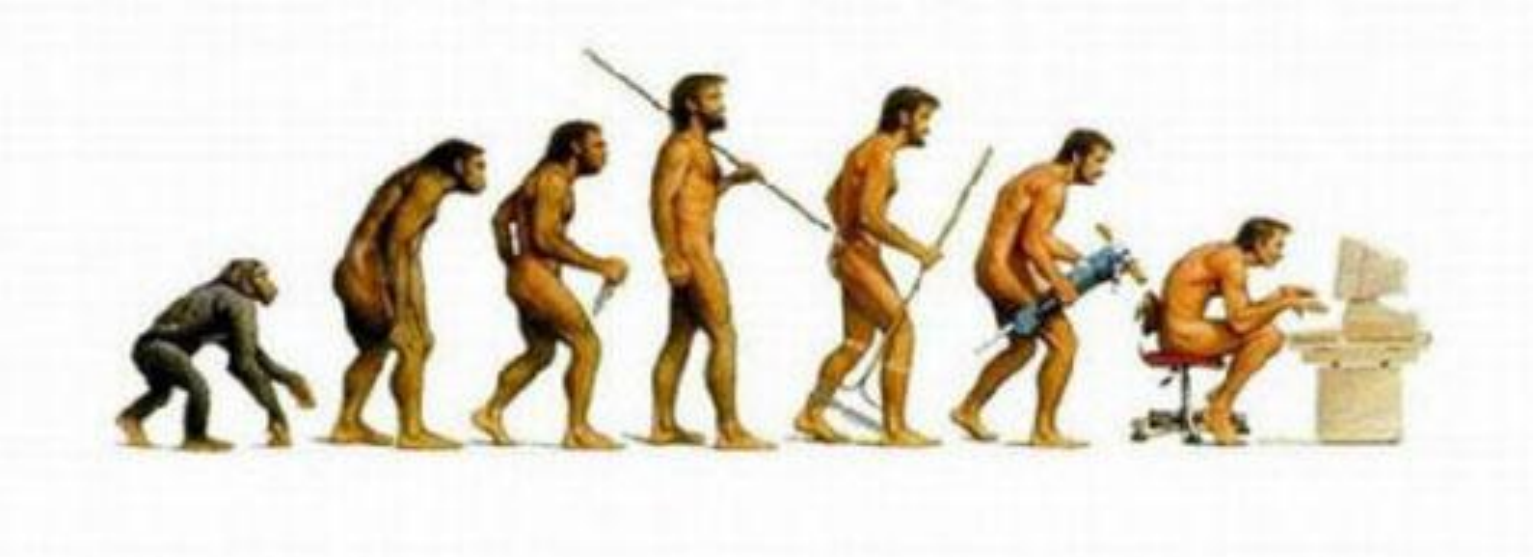


Neutral Vendor

- One of only two pure-play vendors left. (Industry consolidation, not selling)

- Unique capabilities
  - Asset centric capabilities
  - Event Management
  - Industry leader in data security
  - Highest performing and best scaling total solution

System Evolves over time



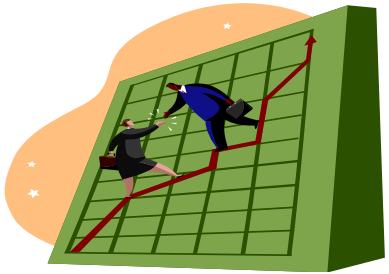
Solutions vs Infrastructure

- Cost curves (Capital vs Operational)
- Support Lifecycles
- Where does the knowledge end up
- Probability of Success
- Evolution of requirements over time
- Project N+1 costs less
  - Faster delivery of value
  - Start when people are ready (less RFP process if you already have it)

For the skeptics

- World class support technical support
- CoE
- Partner Solution Showcase
- vCampus
- Professional ecosystem

Enterprise Agreement = Partnership



- An EA is a partnership relationship between OSIsoft and the customer, not merely a vendor relationship
- It is a collaborative path towards customer success with OSIsoft products
- It is a partnership that extends across an entire portfolio of your customer’s assets as opposed to a “buy as you go” plan
- The focus of the enterprise agreement is returning value to the customer

Components of an Enterprise Agreement

- Enterprise Software Licensing
  - Unlimited licenses for servers and clients
  - Software Installation and Configuration and Upgrades
- Enterprise Services
  - Enterprise Project Management
  - Architecture Assistance and CoE Support
- Enterprise Support
  - Asset Monitoring
  - Vouchers for Training and Events

Alton Loe

alton@osisoft.com

Director

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