Siemens Industrial Turbomachinery AB

Big Data and Diagnostics

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Tiles of life
Siemens is present in the areas: Healthcare, Energy, Infrastructures and Cities, and Industry

- 340,000 (48,000 R&D) co-workers
- SIT: 2,800 (500 R&D) + 700 external
- SIT: 12 000 MSEK turnover
- SIT: 95 % of sales is exported
- SIT: 16,000 visitors annually
Adaptation to constant change

Wikipedia: M.C. Escher, Sky and water, 1938
Big Data and Diagnostics – SIT perspective

- Maturity in industry
- Price of technology
- Quickly increasing fleet
- Large amount of data
- New business model
- Information hub
- New tools

Correlation between scope, operation and maintenance plan.

Customized maintenance based on planned needs and actual use.
Moving into the future of gas turbine operation

Today

Standard maintenance based on standard scope and EOH

Correlation between operation and EOH.

New

Customized maintenance based on planned needs and actual use

Correlation between scope, operation and maintenance plan.
Remote Diagnostic Service
Main tasks

1. Data Collection at Site
   - Customer Access Gateway

2. Data Transfer (cRSP)
   - Customer Intranet
   - Customer Firewall
   - Siemens Firewall
   - cRSP Servers

3. Central Data Storage / Admin
   - Siemens STA-RMS Servers

4. Automated Data Processing
   - Agents, Dashboard

5. Final Data Analysis
   - Siemens Expert

6. Proactive Notifications
   - Diagnosis / Prognosis supplied via Reports

7. Real Time Troubleshooting

8. Customer
# Data analysis tools

## Specific Rules and Trending
- Timeseries Data (Analytics, Trending)
  - Sensor Check
  - Event Analyzer
  - Predictive Trender
  - Performance Index
  - Auxiliaries Analyzer
  - Bearing Monitor
  - Compressor Monitor

## Early Warning
- Knowledge Base (Fingerprints, Models and Rules)
  - Inferred Events
  - Performance
  - Vibration
  - Combustion
  - Combustion Pulsation

## Event Processing
- Knowledge Base (Patterns and Rules)
  - Out-of-Range Pattern Detection
  - Complex Event Analysis
  - Sensor Validation

## Automated Reasoning
- Knowledge Base (Cases and Rules)
  - Sequence of Events Analysis
  - Case-based Reasoning
  - Text mining

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Some challenges from diagnostics perspective

How to quickly and economically:

- Maintain data quality?
- Transfer wisdom to system?
- Maintain/sustain the knowledge in systems?
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