S15701
Event Driven Patterns and Best Practices

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Oracle Complex Event Processing
The following is intended to outline our general product direction. It is intended for information purposes only, and may not be incorporated into any contract. It is not a commitment to deliver any material, code, or functionality, and should not be relied upon in making purchasing decisions. The development, release, and timing of any features or functionality described for Oracle’s products remains at the sole discretion of Oracle.
Today’s Session Agenda

• Oracle Complex Event Processing Platform Strategy and Advanced Features
  – Addressing Next Generation Business Demands
  – Highlight of Technology Integration
  – Extreme Performance on Exalogic

• New Customer Business opportunities with Oracle Complex Event Processing
  – Utilities: Commercial SmartMeter/Grid solutions with EnerNOC
  – Data Center Infrastructure Management with Emerson Network Power
  – Telecommunications: The Real Time Mobile Billboard by Turkcell Technology
  – Telecommunications: Next Generation Services Management with Telecom Italia
  – Financial Services: Strategic Capital Market Solutions showcase by Deloitte

• Summary and further EDA Technology Immersion at Openworld 2011
ENGINEERED FOR INNOVATION
Complete Holistic Event Driven Platform

Complete Strategic Real Time Event-Driven Integration and Application Infrastructure Solution Platform

Real-time business insight
- Preempt and react instantaneously to Enterprise, Environmental and Global Business conditions, Gain business insight using previously untapped, raw event sources – Oracle Sensors
- Vast business value of joining “Data in Motion & Data at Rest” – Real Time Predictive Analytics

Hot-pluggable world-class integration
- Transparent SOA infrastructure and Database Technology interoperability
  - Distributed, deployment ready, pre-integrated, in-memory Data Grid, and Java low latency determinism – Focus on HA/Scalability : Extreme Performance on Exalogic
  - Oracle Spatial and Oracle (JDBC) Data Mining, Data Cartridges – Focus on industry leading capabilities
- Lightweight high performance Java Event Server development and Deployment platform

Real-time business friendly analyst oriented visualization layers
- Business User focused Visual interfaces
  - Oracle Business Activity Monitoring, Business Process Management
  - Real-time Business Intelligence, Oracle Vertical Application solutions
Hardware and Software
Engineered to Work Together

Real Time Situation Awareness
Complete Technology Integration,
Extreme Performance
Business Level Abstraction
Streaming Event-Driven Architecture (EDA) Solutions

Lightweight, Low Latency, Extreme High Throughput, Java-based Application Development & Deployment Platform

- **Enriched Streams**
  - From any source: data streams, web services, Java, Database

- **Adapters**
  - Translate external events/data into java objects for processing

**Oracle Complex Event Processing**
Optimized Performance & Scalability

- **Processors**
  - Set of queries applied to the streams

- **Listeners**
  - Handle triggers raised by the processors

- **Events**
  - Implemented as JavaBean or Map

**Incoming Data Streams**

1 Million Events/Sec On a Single Node **

**Aggregate, correlate, filter data**
Can Handle Unlimited Queries

**Latency**

Instantaneous Perceptive Responses (low microseconds)

**Resulting Data fed to vast business opportunities with Java language**

** (30 Nodes currently available on Exalogic)**
EnerNOC
Energy Demand & Response Solutions
Leader in Demand Response and Energy Management

<table>
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<tr>
<th>Market Leadership</th>
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<tr>
<td>• Incorporated in 2003; Initial Public Offering in 2007</td>
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<td>• Based in Boston, Massachusetts</td>
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<td>• 579 MW at IPO → 6,650 MW at June 30, 2011</td>
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<td>• 1,308 C&amp;I sites at IPO → 10,700 at June 30, 2011</td>
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<td>• Over 700 demand response dispatches since IPO; over 220 in 2010; very active in 2011</td>
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<th>Financial Strength</th>
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<td>• $250m contracted revenue at IPO → $1.3Bln$^{(1)}$ on June 7, 2011</td>
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<tr>
<td>• Generated $45.1$m of Cash Flow from Operations and $25.8$m of Free Cash Flow in 2010</td>
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<tr>
<td>• Expect to internally generate cash in 2011 through 2013</td>
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<tr>
<td>• $79.2m Cash &amp; equivalents at June 30, 2011</td>
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| Innovative Smart Grid Energy Management Applications |

[Icons: DemandSmart, EfficiencySmart, SupplySmart, CarbonSmart]

ENERGY MANAGEMENT APPLICATION PLATFORM
Over 50GB of reading data enter our systems each day, validated and processed in Real Time by Oracle CEP.
Business Proposition for Using CEP at EnerNOC

- The need for an application platform built from the ground up to support high-volume, real-time streaming data
- The ability to perform complex real-time calculations and decision processing on streaming data
- Provide an application framework that is scalable and can easily integrate with legacy applications and systems
Emerson Power
Intelligent Data Centers
Enabling Business Critical Continuity

GRID
- Inbound Power
  - Utility AC
  - Generator

Power Reliability
- Power Switching and Controls

Power Systems and Connectivity
- AC Power Distribution
- UPS

Cabinets & Cooling
- Outside Plant Precision Cooling Integrated Cabinets

Embedded Solutions
- Embedded Power, Computing, and Micro-Cooling

Services
- Preventative Maintenance, Critical Space, Telecom, EF&I

Infrastructure Management & Monitoring
- Management Tools & Technologies, Integration & Operation Services
What is the Trellis Platform?

The only holistic DCIM platform of hardware, software and services for managing the critical operations of the data center

- Enabling smarter decisions resulting in:
  - Less risk of downtime while achieving greater efficiency
  - Allowing data centers to run at higher capacities
  - Improved compliance
Provides the Visibility and Control

Universal Management Gateway
Heterogeneous Communication
Multiple Protocol Support
Real-Time Collection

New Trellis Platform
Applications
Modular Construction
Multiple Protocol Support
Trellis Architecture

Oracle ADF
Oracle SOA
Oracle Enterprise 11G Database
Oracle CEP
Trellis Real-Time Fabric

Platform Services
Event Distribution Network
Applications
Dashboard

Communications
Data Points
Analysis CEP
Element Library Framework
Protocol Libraries
Physical Connections

Continuous Query
Response
Query Processing
Memory
Data
Time Series Database

Element Library Framework
ELEMENT LIBRARIES
- Site Link
- CRAC
- UPS
- PDU
- Storage
- Switch
- SP/Server
- Virtual

PROTOCOL LIBRARIES
- Modbus
- Velocity
- SNMP
- BACnet

Company Confidential
Event Processing Services
Data Aggregation Services

Event Processing Engine (CEP)

Event Repository

Aggregation

Aggregation

Aggregation

Aggregation

Aggregation

Oracle Database

EMERSON
Event consolidation and correlation services
Summary

Oracle CEP enables Emerson Network Power to create:

- Configurable services
  - Support custom adapters, installing dynamic event rules and local cache
  - Internal cache helps reduce I/O
- Ease of deployment
  - Light footprint, consumes less memory and processing power
- Real-time monitoring services
  - Monitors real-time streaming of events to detect system errors based on business rules
  - Support time window, match recognize, pattern matching
  - Process high volume of events in seconds
- Distributed event processing through CEP deployed in the Trellis Universal Management Gateway
- Integrated solution Oracle Fusion Middleware 11g
Turkcell Group – Regional Leader

› 9 countries
› 61.7 million subscribers
› Leadership in the region

Now we are in Germany...

- Segment focus
- Turkcell content & applications

*Subscriber numbers are as of Q1 2011
More About Turkcell

- Creates employment for more than 50,000 people in Turkey
- The first and only Turkish company listed on NYSE
- Complies with ISO9001, EU and US regulations
- Massive tax contribution to the Turkish government
- Corporate social responsibility projects on education, culture and sports
Turkcell Technology

We are an energetic team having **more than 17 years of experience** combined with an ongoing commitment to innovation.
Key Milestones

1994 - 2006

- TTECH company formed with 44 engineers

2007

- More than 10 years of experience in Turkcell ICT

2008

- TTECH Center put into service with 255 engineers
- First Turkcell Group customers

2009

- First out of group customers
- 361 engineers

2010

- First Telia Sonera group customers
- 321 engineers

Today

- Team of 400+ people with 15 customers in 14 countries
Mobile Billboard

Make an offer

Give an information

Send an advertisement

Continuous Intelligence Platform on OCEP

Also visit: Session ID: 07813
Session Title: Location-Based Data, Marketing, and Sales Services with Spatial Technologies
Solution Architecture

Mobile Billboard

TTECH Continuous Intelligence Platform (CIP)

Oracle Real Application Cluster

Oracle CEP Domain

Oracle Enterprise Linux

Identical Commodity Machines

Service Layer

Application Layer

Server

Software Layer

Operating System Layer

Hardware Layer

Oracle Enterprise Linux
• TTECH CIP on Oracle CEP
  – Enriches Turkcell’s ability to capture real-time events in its GSM network
  – Enables Turkcell to give its subscribers a dynamic, wide and targeted range of offers
  – Improves service clients revenue generation by adding new marketing capabilities to their portfolio
Some Numbers

- 800,000 events per second
- 50 simultaneous campaign/offer capability
- Responsiveness under 1 second
- With scalable architecture, ready to expand on 0-day
Telcom Italia
Real Time Services
Customer Overview

**Leader** in fixed-line and wireless telecommunication services in Italy.

Majority owner of **Telecom Italia Mobile**, Italy's leading provider of wireless communications.

Core operator in fixed-line and wireless communications for **Latin America** and the **Mediterranean region**.

**2010:**
- Revenues: 27,571 millions €
- EBITDA: 11,412 millions €
- Profits: 3,121 millions €
- Fixed-line network accesses: 15.4 millions
- TIM line network accesses: 31 millions
Use Case 1: Enterprise Infrastructure Monitoring (C.E.M.)

- Process E2E Monitoring
- Application Monitoring
- IT Resources Monitoring

Correlating events from the "machine" according to specific monitoring axes.
Use Case 1: Enterprise Infrastructure Monitoring (C.E.M.)
Use Case 1: Enterprise Infrastructure Monitoring (C.E.M.)
Use Case 2: Service Chain Monitoring (MO.DEL.S.)

**IT Infrastructure**
- OPSC
- GateKeeper

**Mobile Network**
- SMS-C

**Flow**
- End of Call SMS Emission Request Reports
- End of Call SMS Delivery Reports

**ETL/Correlation/Reconciliation**

**Monitoring**
Solution Architecture

MO.DE.L.S.
High throughput
• Expected to handle event throughput up to $10^6$/sec and microsecond latency
• Expected volumes (MODELS): approximately 100 GB/day

High configurability
• Custom OCEP adapters, EPN network, CQL

Real-Time monitoring
• Continuous, automated business process monitoring
• Different time periods can be compared in terms of traffic and business
• Rapid evaluation of the expected impact of changes in business processes
• Rapid detection of system malfunctionings to allow for a prompt and effective response
• Trend analysis for a preemptive management of potential system failures

Easy integration
• Fully Oracle-driven solution

A Winning Equation!
Oracle in the Financial Front Office
Deloitte Showcase
Event-Driven Patterns and Best Practices
Aggregated Risk, On demand

3rd October 2011
Industry Drivers
The Capital Markets industry is facing unprecedented change fuelled by regulatory and competitive pressures brought on by the credit crisis

Regulatory Impact
- Changes in regulation, e.g. Dodd-Frank
- Increased supervision
- More stringent capital requirements

Cost Pressures
- Operational efficiencies
- Systems rationalisation
- Increased use of vendor solutions

Industry Consolidation
- Fragmented risk architectures
- Integration of risk management systems – business and technology

Risk Data Consolidation
- Single view of risk across the organisation
- Need to see updates real-time
- Ability to react to volatile market conditions

Aggregated Risk, On Demand
- Efficient connectivity through common infrastructure
- Consistent database and messaging models for data quality
- Event driven processing for on demand risk analytics
- Visualisation tools for enhanced decision making
Evolution of risk technology

New technologies that have emerged recently are now sufficiently mature that they can be considered for mission critical applications such as risk and data management.

Conventional:
- On Demand
- Many legacy architectures have a significant proportion of bespoke software making it difficult to provide on demand analytics
- Separate technology footprint that sits outside of the rest of the infrastructure
- Often requires significant hardware platform to run
- Adaptable to existing infrastructure
- Can be very efficient in terms of hardware resources
- Highly customisable through configuration and scripting
- Limited functionality 'out of the box'
- Can choose components that meet non-functional requirements – many components are specifically designed to separate non-functional and functional concerns
- Can be made part of the existing infrastructure
- With effort, can be made very efficient in terms of hardware resources
- Completely customisable depending on available skills and resources
- No functionality 'out of the box'
- Few examples of bespoke developed, on demand risk systems

Emerging:
- components can be combined to provided a close match to the functional and non-functional requirements of a Bank.
- Adaptable to existing infrastructure
- Can be very efficient in terms of hardware resources
- Highly customisable through configuration and scripting
- Limited functionality 'out of the box'
- Can choose components that meet non-functional requirements – many components are specifically designed to separate non-functional and functional concerns
- Separate technology footprint that sits outside of the rest of the infrastructure
- Often requires significant hardware platform to run
- Difficult to customise – often limited to small changes to existing functionality
- Rich functionality 'out of the box'
- Meeting non-functional requirements can be a challenge
- Typically based on a separate database – difficult to achieve on demand risk
Case Study: Proof of Concept for Credit Risk
Industry Collaboration to define a reference architecture for On Demand Risk

The objective of the POC is to demonstrate how the integration of Oracle CEP technology and Panopticon visualisation technology is used to provide real-time credit exposure measurement for OTC derivatives trading. This can be integrated with real-time risk engines such as QuIC.

- Controls workflow of inbound transaction data
- Orchestrates calling of QuIC for generation of scenario MTM’s for new trade
- Displays results using advanced visualisation techniques

- Generates Monte Carlo scenarios
- Calculates scenario MTM of trades through time using full revaluation
- Aggregates new trade scenario MTM’s with existing positions and applies collateral and netting before calculating PFE

Combination of Oracle, Panopticon and the QuIC Product Suite is high complementary and integrates the key components of a risk architecture.

Providing a front-end via Panopticon and QuIC Analyzer provides a powerful reporting capability for business users.
Data Visualisation
Use Case: End of Day Exposure Calculation
Data Visualisation
Use Case: Pre-Deal Limit Check
The Infinite Power of Oracle Complex Event Processing
Immerse yourselves in Oracle Event-driven Architecture Technology (CEP)

**Related Sessions**

- **S15701**: Event Driven Patterns and Best Practices  
  **Venue**: Marriott Marquis Golden Gate A  
  **Monday, Oct. 3: 11:00 AM**

- **S26360**: Using Real-Time GPS Data with Oracle Spatial and Oracle Complex Event Processing  
  **Venue**: Marriott Marquis - Golden Gate C3  
  **Monday, Oct. 3: 7:30 PM**

**Related Demos**

- **229**: Oracle Complex Event Processing  
  Oracle Complex Event Processing is a complete platform for building applications to process and analyze events in real time so that downstream systems are driven by true, timely intelligence. Oracle Complex Event Processing's standards-based, open architecture can overcome challenges in any industry. Advanced temporal management, spatial analysis, real-time predictive analytics, and intuitive systems integration with powerful pattern matching capabilities make it the perfect choice for all event-based applications. Using the visual development environment with standard Java-based tooling, Oracle Complex Event Processing ensures that your IT team can quickly deliver powerful event-driven applications.  
  **Venue**: DemoGrounds, Moscone SOUTH  
  **Monday 10/3/11, 12:30PM**

**Related Labs**

- **30900**: Complex Event Processing and Business Activity Monitoring Best Practices  
  **Venue**: Marriott Marquis - Salon 3/4  
  **Monday 10/3/11, 12:30PM**
Hardware and Software
Engineered to Work Together