ORACLE EVENT PROCESSING

ORACLE EVENT
PROCESSING
EMPOWERING FAST
DATA AND THE
INTERNET OF
THINGS

KEY FEATURES

- Deployable stand-alone, integrated in the SOA stack or lightweight on Embedded Java

- Comprehensive event processing query language supports both in-memory and persistent query execution based on standard SQL syntax

- Runtime environment includes a lightweight, Java-based container that scales to high-end event processing use cases with optimized application thread and memory management

- Both visual and Java-based development tooling for defining event processing applications and networks

- Enterprise class High Availability, Scalability, Performance and Reliability with an integrated in-memory grid and connectivity with Big Data tools

- Advanced Web 2.0 management and performance monitoring console

Oracle Event Processing is a complete solution for building applications to filter, correlate and process events in real-time. With flexible deployment options – stand-alone, integrated in the SOA stack or lightweight on Java SE Embedded, it proves to be a versatile, high performance event-processing engine. It enables Fast Data and Internet of Things – delivering actionable insight and maximizing value on large volumes of high velocity data from varied data sources in real-time. It enables distributed intelligence and low latency responsiveness by pushing business logic to the network edge.

Built on industry-standards including ANSI SQL, Java, Spring DM^{TM} and OSGi^{TM}, Oracle Event Processing provides an open architecture for sourcing, processing, and publishing complex events throughout the enterprise. With both a visual development environment as well as standard Java-based tooling, Oracle Event Processing ensures that your IT team can develop event-driven applications without the hurdle of specialized training or unique skill-set investment.

Introduction

The quantity and speed of both raw infrastructure and business events is exponentially growing in IT environments. Whether it is streaming stock data for financial services, streaming satellite data for the military or real-time vehicle-location data for transportation and logistics businesses, companies in multiple industries must handle large volumes of complex data in real-time. In addition, the explosion of mobile devices and the ubiquity of high-speed connectivity add to the explosion of mobile data. At the same time, demand for business process agility and execution has only grown. These two trends have put pressure on organizations to increase their capability to support event-driven architecture patterns of implementation. Real-time event processing requires both the infrastructure and the application development environment to execute on event processing requirements. These requirements often include the need to scale from everyday use cases to extremely high velocities of data and event throughput, potentially with latencies measured in microseconds rather than seconds of response time. In addition, event processing applications must often detect complex patterns in the flow of these events.

Sample Use Cases

Oracle Event Processing targets a wealth of industries and functional areas. The following are some use cases:

- **Telecommunications**: Ability to perform real-time call detail record monitoring and distributed denial of service attack detection.

- **Financial Services:** Ability to capitalize on arbitrage opportunities that exist in millisecond or microsecond windows. Ability to perform real-time risk analysis, monitoring and

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reporting of financial securities trading and calculate foreign exchange prices.

- **Transportation:** Ability to create passenger alerts and detect baggage location in case of flight discrepancies due to local or destination-city weather, ground crew operations, airport security, etc.

- **Public Sector/Military:** Ability to detect dispersed geographical enemy information, abstract it, and decipher high probability of enemy attack. Ability to alert the most appropriate resources to respond to an emergency.

- **Insurance:** In conjunction with Oracle Real Time Decisions, ability to learn to detect potentially fraudulent claims.

- **IT Systems**: Ability to detect failed applications or servers in real-time and trigger corrective measures.

- **Supply Chain and Logistics:** Ability to track shipments in real-time and detect and report on potential delays in arrival.

Enabling Fast Data and the Internet of Things

With exploding data from increased number of connected devices, there is an increase in large volumes of dynamically changing data; not only the data moving within organizations, but also outside the firewall. High-velocity data brings high value, especially to volatile business processes. However, some of this data loses its operational value in a short time frame. Big Data allows the luxury of time in processing for actionable insight. Fast Data, on the other hand, requires extracting the maximum value from highly dynamic and strategic data. It requires processing much faster and facilitates taking timely action as close to the generated data as possible. Oracle Event Processing delivers on Fast Data with responsiveness. Embedded OEP pushes processing to the network edge correlating, filtering and analyzing data for actionable insight in real-time.

Streaming Event Processing

OEP provides ability to join the incoming streaming events with persisted data, thereby delivering contextually aware filtering, correlation, aggregation and pattern matching. OEP delivers lightweight, out of the box adapters for common event sources. It also provides an easy-to-use adapter framework for custom adapter development. With OEP, organizations can identify and anticipate opportunities, and threats represented by seemingly unrelated events. OEP incremental processing paradigm can process events using a minimum amount of resources providing extreme low latency processing. It also allows it to create extremely timely alerts, and detect missing or delayed events immediately, such as the following:

- Correlated events: If event A happens, event B almost always follows within 2 seconds of it.

- Missing or Out-of-Sequence events: Events A, B, C should occur in order. C is seen immediately after A, without B.

- Causal events: Weight of manufactured items is slowly trending lower or a reading falls outside of acceptable norms. Signals a potential problem or need for maintenance.

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## Standards-Based Continuous Query Language

In addition to real-time event sourcing, the Oracle Event Processing design environment and runtime execution supports standards-based, continuous query execution across both event streams and persisted data stores like databases and high performance data grids. This enables Oracle Event Processing to act as the heart of intelligence for systems needing answers in microseconds or minutes to discern patterns and trends that would otherwise go unnoticed. Event Processing use cases require the speed of in-memory processing with the mathematical accuracy and reliability of standard database SQL. Oracle Event Processing queries listen to incoming event streams and execute registered queries continuously, in-memory on each event, utilizing advanced, automated algorithms for query optimization. While based on an in-memory execution model, however, Oracle Event Processing leverages standard ANSI SQL syntax for query development, thus ensuring accuracy and extensibility of query construction. Oracle Event Processing is fully compliant with the ANSI SQL '99 standard and is the first product available in the industry to support ANSI SQL reviewed extensions to standard SQL for real-time, continuous query pattern matching. The CQL engine optimizes the execution of queries within a processor leaving the developer to focus more on business logic rather than optimization.

Event Processing Network (EPN)

Oracle Event Processing allows for both SQL and Java code to be combined to deliver robust event processing applications. Leveraging standard industry terminology to describe event sources, processors, and event output or sinks, Oracle Event Processing provides a meta-data driven approach to defining and manipulating events within an application. Oracle Event Processing developers use a visual, directed-graph canvas and palette for application design to quickly outline the flow of events and processing across both event and data sources. Developing the flow through drag and drop modeling and configuration wizards, the developer can then enter the appropriate metadata definitions to connect design to implementation. When necessary or preferred, with one click, developers are then able to drop into custom Java code development or use the Spring™ framework directly to code advanced concepts into their application.
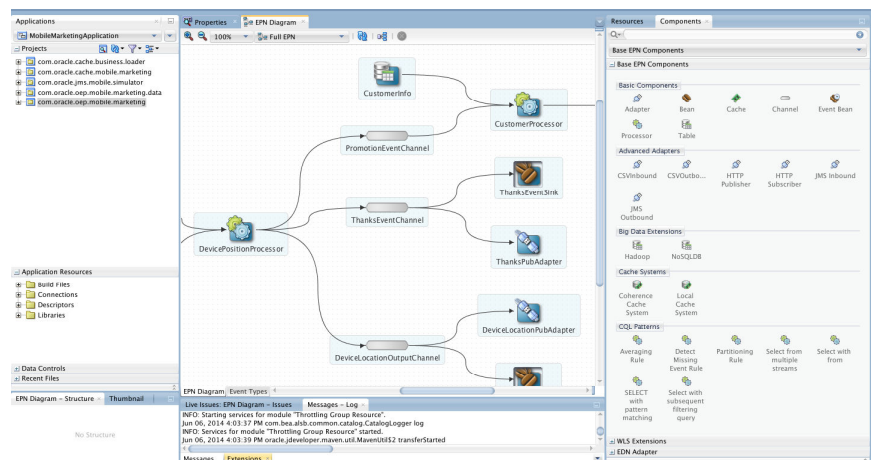

Visual Event Processing Network Development Environment

Lightweight Container

Event driven applications are frequently characterized by the need to provide low and deterministic latencies while handling extremely high rates of streaming input data. The underpinning of Oracle Event Processing is a lightweight Java container based on an OSGi™ backplane. It contains mature components from the WebLogic JEE application server, such as security, logging and work management algorithms, but leverages those services in a real-time

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event-processing environment. An integrated real-time kernel provides unique services to optimize thread and memory management supported by a JMX framework enabling the interaction with the container for performance and configuration. Web 2.0 rich internet applications can communicate with the platform using the HTTP publish and subscribe services, which enables them to subscribe to an application channel and have the events pushed to the client. With a small footprint Oracle Event Processing is a lightweight, Java-based container, delivers faster time-to-production and lower total cost of ownership.
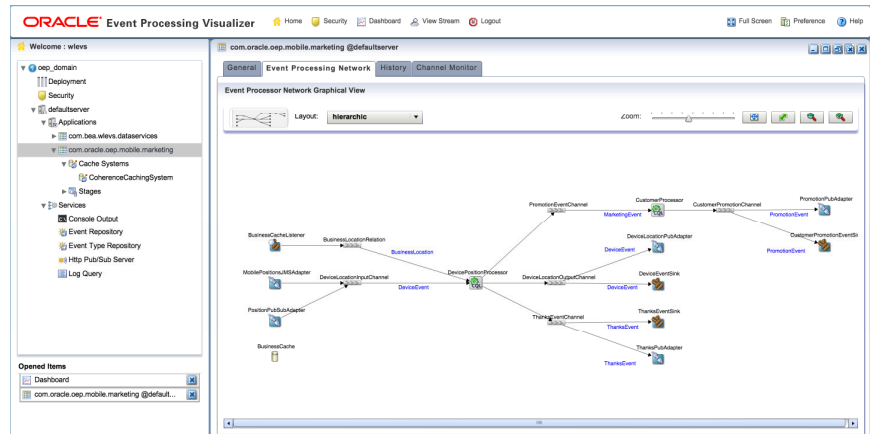
Oracle Event Processing Runtime Administration and Monitoring

Integrated Enterprise Quality Infrastructure

Oracle Event Processing has the ability to handle millions of events per second with microseconds of processing latencies on standard, commodity hardware or optimally with Oracle Exalogic. This is achieved through a complete "top-down" layered solution, not only with a design focus on high performance event processing use cases, but also a tight integration with enterprise-class real-time processing infrastructure components. The OEP architecture of performance-oriented server clusters focused on reliability, fault tolerance and extreme flexibility with tight integration into the Oracle Coherence technology enables the enterprise to predictably scale mission-critical applications across a data grid, ensuring continuous data availability and transactional integrity. In addition, Oracle Event Processing allows for deterministic processing, meaning the same events can be fed into multiple servers or the same server at different rates achieving the same results each time. This enables incredible advantages over systems that only rely on the system clock of the running server.

Hardware and Software, Engineered to Work Together

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