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Introduction

Oracle SOA Suite, a member of the Oracle Fusion Middleware family of products, offers a one-stop solution for building, deploying, and managing Service-Oriented Architectures (SOA). With Oracle SOA Suite, services can be created, managed, and orchestrated into composite applications and business processes and thanks to Oracle SOA Suite’s hot-pluggable components, organizations can easily extend and evolve their existing environments instead of replacing them.

Over the years, tools used to implement Service Oriented Architectures (SOA) have become more and more capable, sometimes at the price of complexity. Oracle has always put the emphasis on the integration of the tools and simplification of the user experience, but with the 11g release of the SOA Suite, Oracle is taking radical steps to simplify SOA, without losing sight of the core principles of SOA or compromising on capabilities. Oracle SOA Suite 11g is the industry’s first complete Service Infrastructure. This Service Infrastructure offers a simple development experience and delivers a runtime of extreme performance & scalability that reconciles eventing and services, along with a unified management & monitoring console. Additionally, this same Service Infrastructure provides the foundation for Business Process Management spanning across system, people and documents. And existing Oracle SOA Suite 10g customers can uptake this new platform through a fully automated upgrade path.

In addition to the platform enhancements that we will review first, each and every product in the SOA Suite (adapters, B2B, OSB, BPEL and Human Workflow, Business Rules, BAM and CEP) comes with its own set of enhancements and we will be highlighting some of these in the second section of this whitepaper.
"I found Oracle SOA Suite, hands down, the most comprehensive and easy to use product on the market today for effectively developing and securing most services-based architectures."

James R. Borck, Infoworld, September 2007

Delivering the Service Infrastructure

The Service Infrastructure is the lynchpin of the radical simplification and optimization that Oracle SOA Suite 11g is delivering. This section will present Service Component Architecture, an emerging set of standards that provided the standards framework for building the Service Infrastructure.

Service Component Architecture (SCA)

Oracle reiterates its commitments to standards with its leadership in SCA

Oracle has always been a driving force in the world of standards, striving to incorporate standards in shipping products wherever possible. It is this commitment to standards that has allowed Oracle to deliver the industry’s only SOA Suite that could run on third-party middleware: JEE container, messaging, database, etc.

With SOA Suite 11g Oracle is once again reiterating its commitments to standards by leveraging an emerging set of standards: the Service Component Architecture (SCA). The SCA specifications were initially delivered by the Open Service-Oriented Architecture (http://www.osoa.org), a collaboration of various industry players co-founded by Oracle. These specifications are now being formalized into standards by the OASIS OpenCSA Member Section (http://www.oasis-open.csac.org/) through various technical committees under the continued leadership of Oracle and its partners.

What is SCA?

Service Component Architecture (SCA) is a set of industry specifications to simplify SOA application development and aims at answering some of the questions that emerged as SOA matured:
• How do you build service components?

• How do you assemble these components into composite applications?

• How do you deploy these composite applications?

• How do you manage these composite applications?

To answer these, SCA first provides a simplified component programming model for the implementation of business services. These services may be implemented in a variety of technologies (EJBs, Java POJOs, BPEL process, COBOL, C++ ...). Secondly it offers a language-neutral assembly model specification to simplify the composition and development of business services into composite applications. These applications are described using metadata, independent of any implementation language or deployment platform.
SCA is a very extensive set of specifications that deserves much more than a paragraph, but detailing them any further would go beyond the scope of this whitepaper.

**What is SDO?**

Service Data Objects (SDO) aims to provide developers with consistent means of accessing and handling data from heterogeneous sources. SDO is based on disconnected data graphs and mapping to actual data sources is executed by Data Access Services (DAS).

Leveraging SCA and SDO to deliver the Oracle SOA Suite 11g Service Infrastructure

SCA, for building and assembling composite applications, and SDO for data representation and manipulation are the two key specifications that Oracle SOA Suite 11g is leveraging to deliver a unified Service Infrastructure, key to the ground-breaking features that we will detail in the rest of this whitepaper.

So what is exactly a Service Infrastructure? SOA has brought to the industry many best practices that have proved to be sound and stand the test of time. And as it is usually the case, the implementation of these best practices has helped crystallize the next set of requirements: how do you move from a collection of loosely-coupled applications to cohesive assemblies of reusable services? This should of course be achieved without sacrificing any of the flexibility of SOA – we do not want to go back building monolithic applications, but rather bring the ease-of-use and management of these single applications to the world of distributed computing. This is where the Service Infrastructure enters the picture. The Service Infrastructure is a rationalization of the various design-time tools, runtimes and monitoring environments into a cohesive, unified platform. Composite applications (i.e. applications built out of various components, of various technologies) are then executed on this Service Infrastructure.
Oracle SOA Suite 11g is the industry’s first full Service Infrastructure, covering all SOA and integration needs, from:

- Connectivity – to systems via adapters, but also to business partners via B2B

- Routing and virtualization

- Orchestration for building new processes and value out of existing services

- Human workflow to involve human beings in your applications

- Rules Engine to externalize specific logic and enable rapid changes
- Security and Auditing
- Governance to manage the developed assets
- System and Business Management and Monitoring

Simplified and Productive Development Tools for SOA

The first sets of benefits from the adoption of a Service Infrastructure in Oracle SOA Suite 11g is the simplification of the development experience.

Building a complete, end-to-end composite applications using most vendors offerings, would imply having to work with many different tools to perform very similar tasks, such as for instance creating WSDLs or schemas – you would create these for your orchestration processes, your routing flows etc. While SOA requires loose coupling for flexibility there is no reason for the development environments to be disjoint. Additionally, because the resulting composite applications contains heterogeneous artifacts in vastly different formats, with different storage requirements, there is no single tool that allows you to visualize and compose them – everything loosely holds together via the WSDL interfaces. This results in heavy metadata fragmentation. Such fragmentation makes certain seemingly trivial tasks, such as versioning of a composite application more involved than having to version a standard application.

While the 10g release of Oracle SOA Suite had already started addressing the metadata fragmentation issue, the Service Component Architecture specifications, and more specifically the Assembly Model, offers standard and elegant guidelines to go to the next step in addressing these challenges.

SOA Composite Editor

Building upon the SCA Assembly Model, Oracle is introducing in 11g the SOA Composite Editor. This JDeveloper tool is the single point of entry into SOA development. It allows integrators to build new applications at lower cost, simply by assembling composite applications from existing
services. Services (BPEL, workflows, ...), mappings, rules are all built in a graphical manner. The assembly of these various services and components is then done using Oracle JDeveloper’s new composite editor. This assembly task results, behind the scene, in a SCA assembly model (expressed using XML) as well as a number of other standard text-based artifacts, such as BPEL and XSLT. Some other benefits of working with these new composite applications:

- Because the composite is described using a single set of text-based artifacts it is very simple to version using common RCS tools. Putting a version number on these SOA composite applications until now was difficult since they really were a virtual entity, a loosely coupled collection of various applications.

- They can be deployed in a single shot, regardless of the number of components and technologies that they can contain.

Using the assembly editor, SOA developers can also generate their own unit tests, bringing to SOA the same rigor and trusted principles used in other development environments.

An important note to make at this point is that the introduction of this new entity, the composite application, does not fundamentally change the format of the underlying metadata used by each component. For instance, a process is still described using standard BPEL. The composite application is simply an over-arching descriptor of how all these components inter-relate. The 11g representation of a composite application is more descriptive and additive: it doesn’t fundamentally change any of the underlying representations. Layering SCA capabilities on top of the existing products was key to enable the automated upgrade between 10g and 11g, as well as to ensure that 11g was carrying forward the years of experience and stability built-in the SOA Suite.
Simplified Assets Management & Discovery

Re-use is a core principle of SOA. But a prerequisite to re-use is the ability to discover existing services that might meet your requirements. For this Oracle SOA Suite 11g is leveraging key additions from the BEA acquisition. Oracle Enterprise Repository (OER) integration allows assets from composite applications such as WSDLs or XSD Schema files to be harvested from the development environment. Harvesting automatically creates a representation of the service assets in the Oracle Enterprise Repository, including relationships and dependencies. Once harvested, services move through OER’s automated governance approval process, before they are exposed for runtime discovery through OSR. Assets are available for reuse, enabling developers to share development artifacts across
projects. In addition, 11g JDeveloper SOA Composite Editor now has full support to browse and consume services in the Oracle Service Registry UDDI 3.0 server.

Impact Analysis and Change Management

Through Oracle Enterprise Repository integration, organizations can view the interdependencies among SOA artifacts. This allows them to evaluate the impact of a change across their SOA ecosystem, and to mitigate the risks associated with change. The Enterprise Repository also automates workflow, allowing organizations to enforce a consistent change management and governance process across their organization.

Looking at service dependencies in Oracle Enterprise Repository's Navigator
Extreme Performance & Scalability

SOA applications, for instance those introduced to replace aging, inflexible and costly mainframes, are now mission-critical and call for ever increasing availability and extremely high performance. Oracle SOA Suite is uniquely positioned to meet these requirements by leveraging other key products in the Fusion Middleware portfolio but also thanks to innovations in its internal architecture.

Leveraging the proven reliability and performance of WebLogic Server, JRockit and Coherence

The default JEE infrastructure for Oracle SOA Suite 11g is provided by WebLogic Server, JRockit and Coherence, a combination that is widely recognized as delivering the highest levels of reliability, scalability and performance. This environment also offers new high-availability options. Oracle SOA Suite 11g relies on the whole-server migration capabilities of WebLogic, a feature that allows for automated failover, not just within one server but even across physical servers. Configuration is streamlined, thanks to WebLogic Server’s modularized architecture for installation and configuration. Coupled with the usage of Oracle Coherence for clustering this delivers a simple to install and configure, yet highly-available solution.

Highly Scalable Oracle Applications Grid

Oracle Fusion Middleware Application Grid technologies provide a foundation for enterprise computing that makes extremely efficient use of operational and hardware resources while enabling the highest flexibility and quality of service possible.

The combination of Oracle SOA Suite and Application Grid provides the next generation SOA infrastructure that combines service level abstraction, orchestration, and service mediation with service state data caching, service result caching, enterprise data access, and deterministic performance. This provides state-aware continuous availability for services, application data, and processing logic. SOA applications that are built with Oracle SOA Suite and Application Grid will scale with predictable latency under increased sustained loads.

Application Grid can cache results from service calls in a SOA environment, and can execute business logic in the grid relative to cached data. New levels of unmatched efficiency in
processing are achieved based on an intelligent combination of bringing the data closer to the processing, and the processing closer to the data.

Using OSB's Service Result Cache feature, backed by Oracle Coherence, SOA based applications may dramatically reduce or eliminate excessive loads on backend systems and services. Using OSB’s Service Result Cache, to offload mainframe requests, an organization can save $MM per year in mainframe costs.

Service Infrastructure

While adopting the SCA assembly model to represent SOA composites, Oracle also engaged in the rationalization of the various engines required to execute these composites. All individual engines, that were already all running in the same JEE container in 10g have now been consolidated in a single JEE application: the Service Infrastructure. This provided the opportunity to consolidate into one product several years of customer-driven optimization that were previously spread in multiple engines.

The first major improvement that derives from this common service infrastructure comes from the reduction of runtimes that minimizes one of the costliest operations in distributed computing:
marshalling/unmarshalling of data between applications. Service components in the Oracle SOA Suite share the same normalized message format.

In addition, all communications can take place in memory (for co-located components) avoiding the cost of going on the wire. Finally, the engine introduces a new feature called the document manager that leverages the XDK and compact DOM features of the Oracle database. Using this technology, users can finally route very large payloads and documents (several hundred MB) through their SOA infrastructure. The service infrastructure will page large XML documents to the database, fetching and loading in memory only what is required, when required, and in a totally transparent fashion to the user.

Real-time event processing capability at extreme throughputs

As the need for immediate real time response to an ever increasing deluge of both raw infrastructure and business orientated events grows, a solution is demanded across all industries to provide applications that can not only process these events but also seamlessly integrate with a SOA backend. These applications are architected to handle an extreme velocity
of event messages with latencies in, not seconds, but microseconds and can detect complex patterns in the flow of these events and message payloads.

Oracle CEP is a product, which has been designed and implemented to address these requirements and provides a complete "top-down" layered solution focused on extreme performance. Packaged with the the deterministic, latency focused, JRockit JVM, Oracle CEP is also empowered with the use of unique performance tooling available from the world's fastest JVM.

**Unified Management & Monitoring**

Another set of challenges introduced by SOA applications, distributed by nature, is the security, management and monitoring of the runtime engines as well as the data they process. This is another area in which the 11g release of the Oracle SOA Suite has brought key innovations.

**Integrated Security with Centralized Management of Policies**

The Oracle SOA Suite continues to leverage Oracle Web Services Manager (Oracle WSM) for security in 11g. Oracle WSM perpetuates and refines the model that clearly separates application logic from security concerns. It also enables a centralized management of policies that are then enforced locally. In 11g all aspects of security are truly integrated and available out-of-the-box without any extra installation of configuration:

- Policies can be attached directly in JDeveloper or in Enterprise Manager 11g Fusion Middleware Control
- Agents to enforce policies are built-in and preconfigured in the Service Infrastructure
- The management & monitoring of policies is centrally done in Enterprise Manager 11g Fusion Middleware Control, this includes statistics on policy reuse, violations, etc.
Oracle WSM leverages Oracle Platform Security Services (OPSS) for all its authentication needs and, renewing the constant focus of Oracle Fusion Middleware on standards, OWSM supports the latest WS-* standards in the area of security and policies, such as WS-Policy 1.2, WS-SecurityPolicy 1.1, WS-Security 1.0 and 1.1.

End-to-end Instance Tracking

If you ask a SOA administrator for the number one user request that they have to answer you will probably hear something along the lines of “where is my order?” (replace “order” with whatever your SOA application is processing). This seemingly trivial question is actually not so easy to answer in most SOA environments today. Think about it: this order could be in a variety of states and systems: it could still be in the database, it could be stuck somewhere in a process flow waiting for an approver to return from lunch – or it could have failed and be in need of manual recovery. Finding the answer to this question is dramatically easier in SOA Suite 11g. Enterprise Manager 11g Fusion Middleware Control, the management and monitoring console for SOA Suite 11g, provides users with a complete end-to-end flow trace of the execution of each message, across all service engines in SOA.
End-to-end flow trace in Enterprise Manager 11g, showing the actual progression of a message across multiple SOA engines.

In addition, one can search these flow traces using a variety of criteria, from time of execution, to state or even payload information such as order_id or country – the latter being enabled by yet another new feature in 11g: composite sensors. Sensors are used to capture and index specific fields of messages traveling through the service infrastructure. The user can subsequently use these sensor values to look for specific instances. In the above example of “where is my order?” composite sensors would allow us to search for a specific order using an order ID or customer ID.
Searching for a specific instance using payload data in Enterprise Manager 11g

Unified Exceptions Handling

Much like it can provide us with an end-to-end view of a flow trace across all SOA engines, Enterprise Manager 11g also provides a unified Exceptions Handling framework across these engines. Using this single facility, administrators can identify, locate, repair and recover faults in the system – one by one or in batch fashion. In addition, Enterprise Manager can also show the administrator the exact log entries corresponding to the fault, removing the need for manually looking for specific entries in large log files.
The unified Exceptions Handling framework in Enterprise Manager 11g allows for recovery of messages across multiple service engines

Unified Infrastructure for Eventing & Services

End-to-end Real-Time Agility

Reaching true real-time processing and visibility into your processes is the ultimate goal of any business. Release 11 goes one step beyond "real-time" messaging, common to most integration products nowadays.
First, events are first-class citizens in the Service Infrastructure, with the introduction of the Events Delivery Network (EDN). EDN is an abstraction on top of pub-sub messaging systems and provides:

1. A clean, declarative integration into SCA
2. Rich subscription models
3. Content-based subscriptions (XPath filters)
4. Optimized delivery paths
5. Run-time monitoring
6. Integrated tool support

Secondly, Business Activity Monitoring (BAM) has been ported from its initial .Net platform to J2EE and will be directly plugged into the Service Infrastructure, providing real-time insight into processes. Integration of the runtimes has allowed for a consolidation of sensors and translates into simplification of the task of building BAM dashboards.

Third, a new service component called Complex Events Processing (CEP) is introduced and enables identification of specific patterns in the massive amount of seemingly unrelated events transiting through the SOA infrastructure. The applications for CEP are multiple, ranging from basic administrative tasks (intrusion detection, etc.) to business applications (risk management, electronic trading, etc.). Oracle CEP uses a language called CQL, loosely based on SQL to express content and time-based patterns. This high-performance engine has been tested with massive amounts of events and extremely large rulesets.

**Automated Upgrade Path**

Upgrade of current Oracle SOA Suite customers to the new 11g platform has been a core requirement since the very early design phases of this release. The upgrade process is mostly automated with significant support for 10gR3 to 11gR1 metadata upgrade in JDeveloper. As
previously mentioned, this simple upgrade path has been vastly facilitated by two key factors: adhesion to standards and leverage of SCA. Indeed, while SCA allowed for radical integration of the tools and metadata, it preserves the underlying standard artifacts such as BPEL process definitions. Therefore, the upgrade process mostly means migrating existing assets with minor changes and wrapping them in a new, additional, composite model.

As for BAM users, the upgrade process consists of running the upgrade assistant to copy the data in the 10g repository to the 11g repository and starting up the new JEE engine.

Product Highlights

In the previous sections we have concentrated on new features that were introduced at the platform level and available across multiple products. This next section will go through each product in the Suite and highlight some of the key features that they are introducing with their 11g release.

Unified Connectivity: Adapters and Bindings

Oracle Adapters enable disparate applications to be plugged in the SOA Suite service infrastructure, in a standards-based fashion, regardless of the interfaces they expose. Adapters are lightweight, highly scalable, are configured graphically and leverage the Java 2 Connector Architecture (J2CA) 1.5 specification. The same adapters and underlying connectivity framework are used by all the 11g components such as OSB, BPEL, Mediator, BPM etc. Oracle Adapters enable you to communicate with:

- Packaged Applications
- Legacy Systems
- Oracle Applications (E-Business Suite)
- Technologies (Database, Advanced Queues, JMS, Socket, File, FTP, MQ etc.)
11g adapters offer significant new features—both at design and run time. These include, but are not limited to:

- Brand New TCP Socket Adapter
- Large Payload support
- File/FTP adapter support Active / Active cluster
- Industry's best Oracle Applications Adapter
- Integration with Integration Repository of E-business Suite R12
- Changed Data Capture (CDC) adapters
- New features and enhancements in Database, JMS and applications adapters

Oracle Service Bus (OSB)

Oracle Service Bus is built on the foundation of AquaLogic Service Bus, the industry’s most scalable and capable service bus, and enriched with unique features from the Oracle Enterprise Service Bus.

New features in 11g include:

- **Java on the bus**: ability to route native Java objects without requiring any conversion to XML, therefore making huge performance gains.

- **Transactional Proxy**: provides the designer with the ability to initiate XA transactions in the bus, in addition to being to propagate them as in the past.

- **Result Caching**: this feature was designed for speed and massive scalability, at the request of some of the largest SOA environments in the world. It leverages Oracle Coherence to cache service invocation results for a given time-to-live period. In addition
to performance, this feature offers other side benefits, such as for instance cutting down the cost of invoking certain services, such as mainframes, when this cost is calculated on a per-invocation basis.

- **Cross-Reference**: a feature that is heavily used for application to application integration and that can map given attributes from one environment to another.

**BPEL Process Manager & Human Workflow**

**BPEL (Business Process Execution Language)** is the standard for assembling a set of discrete services into an end-to-end process flow, radically reducing the cost and complexity of process integration. Oracle BPEL Process Manager has been the flagship and driving force of Oracle SOA Suite and is adding in 11g new features to its popular capabilities.

New features include:

- Scalable DOM for reduced memory consumption. This allows for very large payloads, even gigabytes in size

- Entity variables based on the "claim-check" concept whereby instead of passing large amounts of data around, a reference to the data is passed instead

- Support for newer XSLT (transformation) constructs

**Human Workflow** lets people participate in your business processes for scenarios like approval, escalations, error management, etc. While typically integrated with BPEL processes, the Human Workflow service component can also be used independently in any composite application.

New features include:

- Rich JSF-based client framework for out-of-the-box Worklist application

- ADF task flow forms for sophisticated display and multi-page forms
• Use of new Java Platform Security layer for user/role lookup, including support for Oracle Virtual Directory (OVD)

• Rule-based routing for complex routing scenarios

• New channel for notification: Instant Message (IM) notifications

• Support for digital certificates when taking actions on tasks

• Microsoft Office integration: Use Excel to initiate tasks or access worklist tasks

• New To-do and Sub-tasks

• End-to-end instance tracking across entire composite application

Business Rules

Oracle Business Rules provides a high performance rule system that addresses the increased requirement for agility, business control and transparency and empowers business users to change their business policies and decisions more rapidly.

In Oracle SOA Suite 11g, major efforts have gone into tightly integrating Oracle Business Rules with the rest of the SOA Suite technologies.

New features include:

• **JDeveloper integration** - Rules Component available in the SOA Assembly editor.

• **Decision Tables** - displays multiple related rules in a single spreadsheet-style view. Empowering business user to model rules in a more natural approach.

• **Decision Tables Conflict and Gap Analysis** - Help business users to quickly find and resolve conflicting rules and automatically create missing rules to cover the entire
universe of possible condition values. In this way helping to speed development of valid, consistent business.

- **Rule Activation and Effective Dates** - to specify periods when rule is effective.

- **Aggregates** - Allow to model complex rules when the conditions have a view spanning multiple facts.

- **Dictionary Links** - Spread rules across dictionaries for reuse and access control

- **ADF-BC Integration** - Support for the use of ADF-BC View Objects as rule fact types*.*

- **Decision Point API** - Simple API for runtime dictionary access, rule session pooling, and ADF-BC fact type assertion

- **Easier to Use** - Simple point-and-click editor for IF-THEN rules authoring; switch back and forth between Simple and Advanced mode, hiding unnecessary complexity from business users.

### B2B

Oracle B2B is an eCommerce gateway that enables the secure and reliable exchange of business documents between an enterprise and its trading partners. It supports B2B document standards, security, transports, messaging services, and trading partner management. The 11g release of Oracle B2B offers tight integration with the rest of Oracle SOA Suite.

New features include:

- **Security**: Central Management: Users / Policy / Key Stores, SSO, role based access

- **Usability**: Enhanced UI Design: Ajax / ADF

- **Performance**: Enhanced throughput & Large Document Support
• **Interoperability**: A first-class component of Oracle SOA Suite, tightly integrated through the new B2B binding available in the SOA Assembly Editor.

• **Visibility**: Enhanced Reports, Metrics

• **Management**: Enterprise Manager & WebLogic Server Integration

• **Document Management**: Partner Document Definitions, Auto Retry, Re-submission, Vertical Nomenclature & Visualization

• **Partner Management**: Partner Cloning, Auto-Agreement Generation

• **Documents & Delivery**: New Standards, Transports, Exchanges

**Business Activity Monitoring (BAM)**

Oracle BAM provides a framework for business users to create dashboards for real-time monitoring of critical business operations. End-users also have the ability to take corrective actions via the BAM dashboard.

Oracle BAM 11g is a J2EE application tightly integrated with the rest of the SOA suite technologies.

New features include:

• JDev integration with the new J2CA-compliant BAM adapter available in the SOA Assembly Editor.

• Enhanced integration with BPEL PM for real-time updates via the sensor framework

• Native JMS connectivity for JMS Queues and Topics

• ODI integration with BAM knowledge modules for high volume data e.g. Datawarehouse or one time data uploads
• Enterprise Manager integration for application configuration and monitoring

Complex Event Processing (CEP)
Oracle CEP is a Java application server for the development and deployment of high-performance event driven applications. It can detect patterns in the flow of events and message payloads, often based on filtering, correlation, and aggregation across event sources, and includes industry leading temporal and ordering capabilities. It supports ultra-high throughput (1 million/sec++) and microsecond latency.

New features include:

• **Industry leading Continuous Query Language (CQL) integration.** A rich, SQL 99 compliant, industry standards focused, event language with SQL extensions for powerful pattern recognition. A comprehensive feature set includes over 150 built in Maths and Statistical functions, tightly integrated with Oracle Database, TimesTen and Oracle Coherence for highly scalable and reliable event management across distributed caches.

• **Advanced Visualized Event Tooling.** Simplified visual event processing network (EPN) IDE construction and editing with many developer focused usability enhancements. The latest empowering, Visualizer Web 2.0 Client for the Configuration, Management and Performance Analysis now provides dynamic CQL statement visualization, which enables the creation of complex queries with an "easy to use" palette of statement clauses element icons. A complete array of runtime diagnostic features are also available now to portray the optimized Query Plan statistics and observe real time event stream flows through an Application's Event Processing Network.

• **High Availability, Scalability and Reliability Implementation features.** Oracle CEP Domains and Servers provide a transparent integration with Oracle Coherence enabling both at the infrastructure and application layers, direct cache access for scaling out across a distributed computing grid. The Coherence cache is a "first-class citizen" participating dynamically as an event node within the Event Processing Network.
Governance: Registry & Repository

Conclusion

The Oracle SOA Suite 11g is a major milestone for Oracle but also the industry as a whole and takes the notion of cohesive integration stack a giant step further. It delivers a wealth of ground-breaking new features, in a complete, cohesive and fully standards-based Suite. Its tight integration leads to the most important features of Oracle SOA Suite 11g: the simplification of the design experience, the extreme performance of the runtime and the complete end-to-end visibility provided by the unified management & monitoring platform. Best of all, these new features are available to existing Oracle SOA Suite 10g users through a simple, automated upgrade path.

References

1. Service Platforms Emerge as the Foundation for SOA, SOA World Magazine, August 2007 – Greg Pavlik & Demed L’Her