

Semantic Technology: A Challenge or Opportunity for Building Enterprise Systems

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Agenda

- Semantic Web Vision
- Semantic Technology Challenge
- Use Cases
- Semantic Technology Opportunities
- Summary & Conclusions



Semantic Web Vision

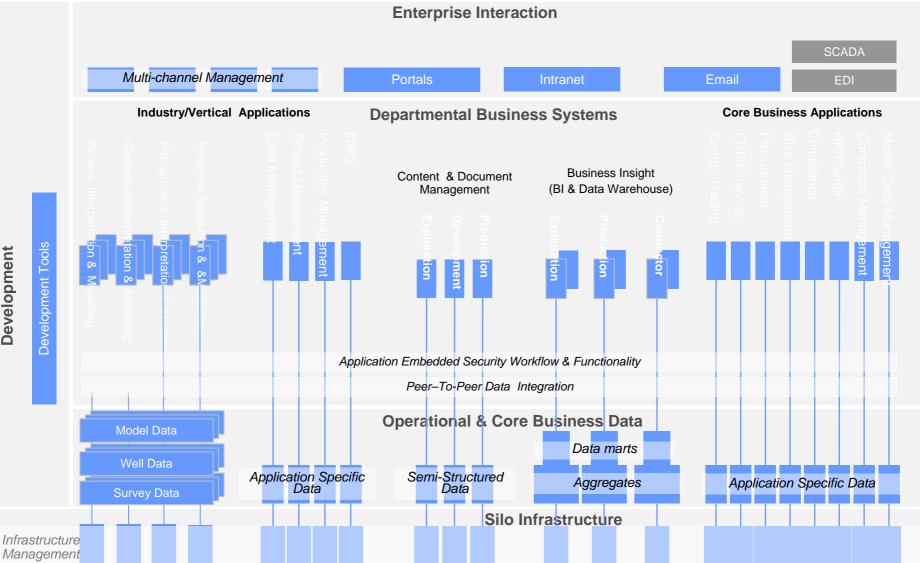
"I have a dream for the Web [in which computers] become capable of analyzing all the data on the Web – the content, links, and transactions between people and computers. A 'Semantic Web', which should make this possible, has yet to emerge, but when it does, the day-to-day mechanisms of trade, bureaucracy and our daily lives will be handled by machines talking to machines. The 'intelligent agents' people have touted for ages will finally materialize."

Tim Berners-Lee, 1999

Upstream Architecture Challenge

Current State Example

Development



Upstream Reference Architecture Challenge

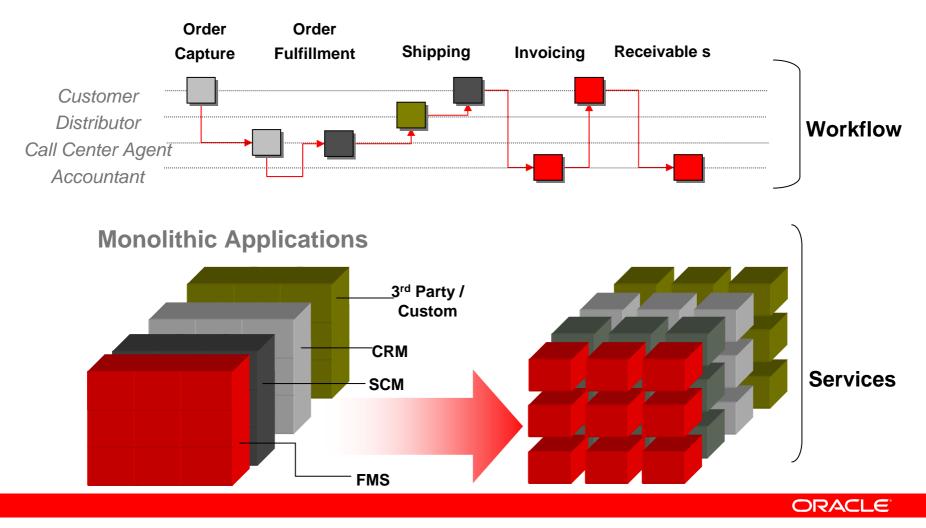
Vision Example

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Enterprise Management

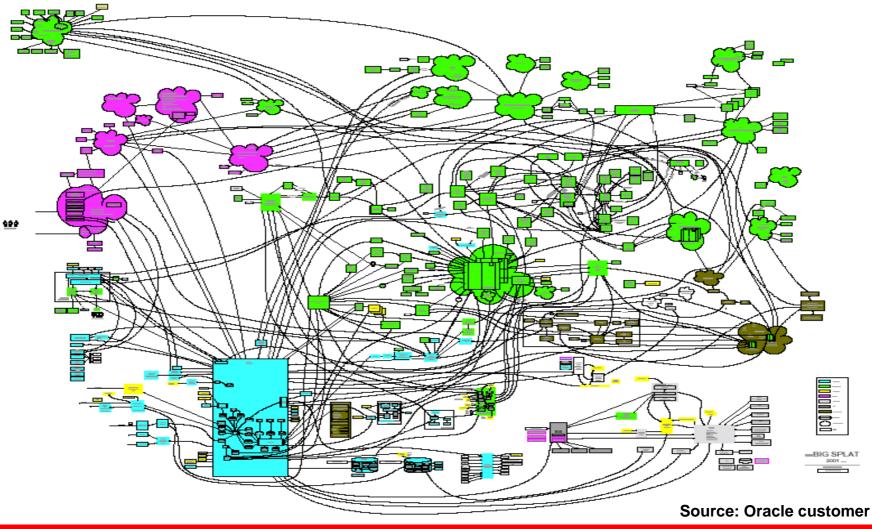
Enterprise Business Services & Processes Challenge

Example: Order Fulfillment



6

Enterprise Information Challenge



ORACLE

Data Explosion Challenge

- 17 billion devices on the Internet by 2012
- Sensors everywhere = huge data volumes
- IP and telephony convergence
 - "SIP is the 3rd great protocol of the Internet" Vint Cerf
 - Nearly 4 billion communication devices
- Networked content continues to increase dramatically
- Social computing techniques maturing
 - Wikis, blogs, RSS are just the start

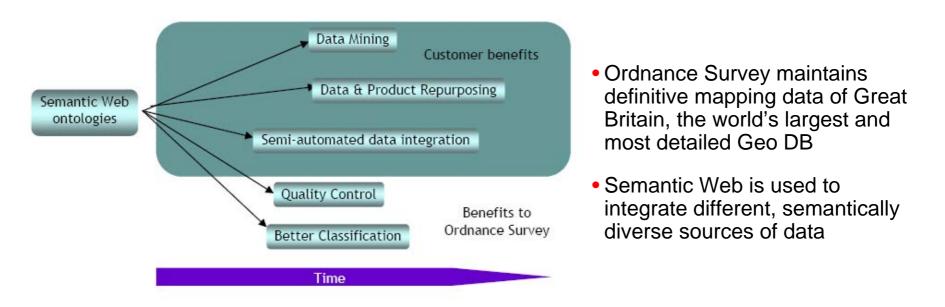
& Communications Interactions

2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015

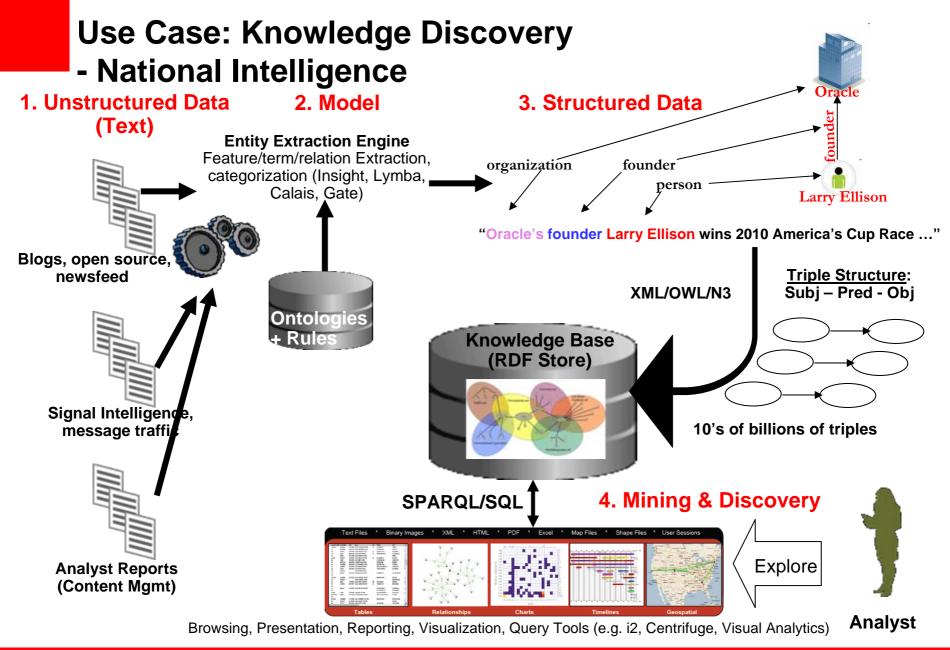
Source: Adapted from IDC data 2005/6

Use Case: Information Integration using Geographic Data



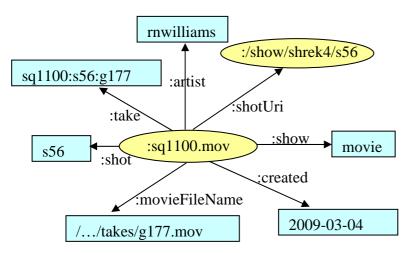


- General ontologies already developed to bridge differences in terminology
- The data is queried efficiently via the ontology or RDF
- Advantages include efficient data integration, data repurposing, and better quality control and classification



Use Case: Movie Image Discovery - Dreamworks

 An example RDF graph describing a movie shot



 One RDF based application uses SPARQL to find movie information

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Use Case: Cisco Enterprise Collaboration Platform



 Cisco's first-ever enterprise software solution

 RDF serves as metadata model for blogs, wikis, calendar, IM, WebEX, voice, and video

Integrates vital communications and collaboration tools with everyday business applications into a single interface

Use Case: Content Search for Collaborative Communities

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2004 (63)	AAAAA 20	Author Group	R12 release has been anounced on Here. According to the event Jan 31st/1st Feb is the the day for release.			
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		Others (42)				
			A new SOA year has begun - what will the SOA Santa bring?			
		Logal Privacy	Clemens Utschig - Utschig 2007-01-04			
		a- (rinner)	Wow, the new SOA year is here - and many cool things are about to arrive. But before looking into the future, lefs look back into 2006 - and what happened there.			
			My first year, living in San Francisco and working within a wonderfull group, envisioning future and creating our next generation products went by- and I must admit it was far better than I thought it'd be.			
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•Oracle Technology Network (OTN) aggregates many sources of content through a single portal

•Oracle's taxonomy is used for annotation of news feeds

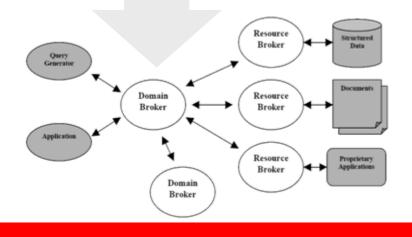
•Semantic Web allows dynamic re-aggregation of results and leads to more comprehensible search results

•Advantages include enhanced search and navigation, and more powerful user interface

Use Case: Manufacturing and Design Knowledge Exchange - Boeing

```
<db:DatabaseTable rdf:about="&LDMDEV;AIRCRAFT"
    db:Label="AIRCRAFT">
    <db:PartOfDB rdf:resource="&LDMDEV;LDMDEV"/>
    <db:PartofDB rdf:resource="&am;CH-47"/>
    <db:AssociatedClass rdf:resource="&am;CH-47"/>
    <db:DatabaseColumn
    rdf:about="&LDMDEV;AIRCRAFT.AC_SERIAL_NUMBER"
    db:Label="AC_SERIAL_NUMBER">
     <db:PartofTable rdf:resource="&LDMDEV;AIRCRAFT"/>
     <db:PartOfTable rdf:resource="&LDMDEV;AIRCRAFT"/>
     <db:AssociatedSlot rdf:resource="&uo;AircraftSerialNumber"/>
</db:DatabaseColumn>
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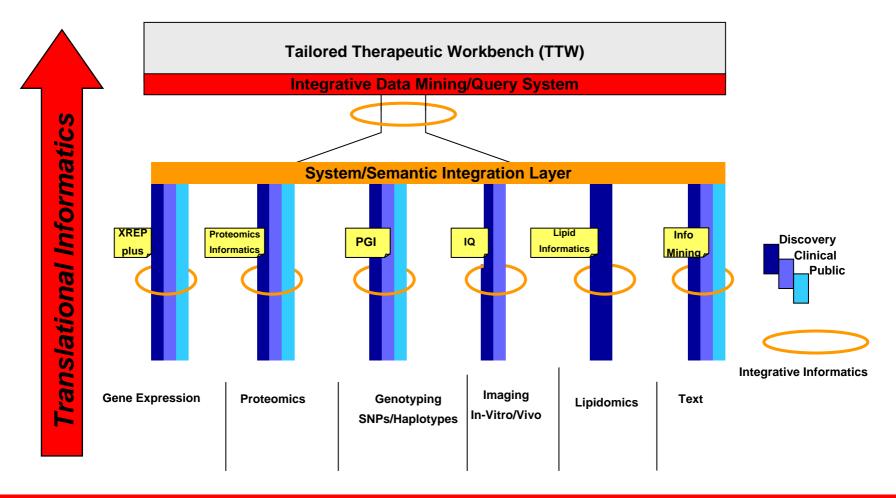
[join db1 "Aircraft" to db2 "CH-47" and db1 "AC_SERIAL_NUMBER to db2 "AircraftSerialNumber"]



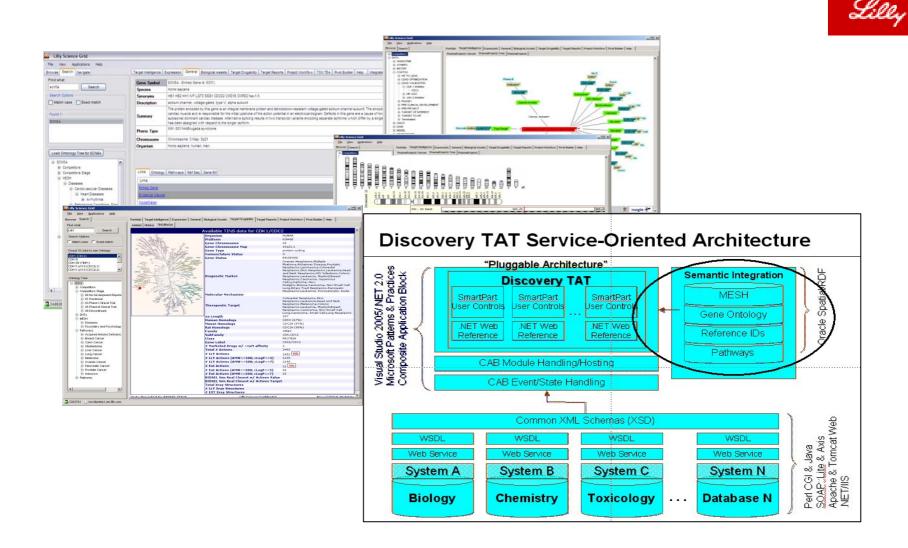
- Reduced cycle time in airplane program development.
- Reduced cycle time in customer service and product support.
- Reduced transaction costs.
- Support for global design and business activities.
- Improved access to content regardless of location or format, allowing for business to be conducted anywhere.
- Flexible infrastructure adaptable to unseen future needs.

Use Case: Integrative Data Mining and Ad Hoc Query

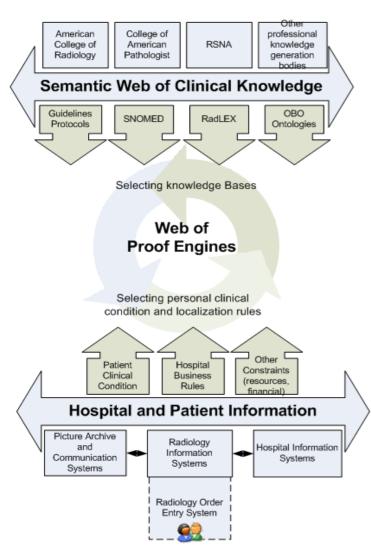




Use Case: Drug Discovery / Target Assessment Tool



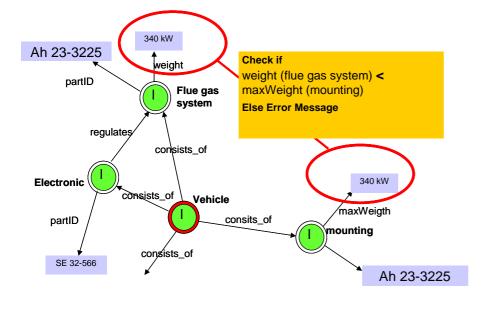
Use Case: Clinical Health Care Decision Support - AGFA



- Supports a natural separation of general medical knowledge captured in the Appropriateness Criteria (guidelines), and the adaptation rules that denote local and execution context. This separation allows knowledge bases to be developed and validated by professional bodies. These knowledge bases end up having better credibility and are easier to keep up to date.
- A standards-based, application neutral platform, for expressing and connecting to the existing corpus of knowledge.
- Ease the burden of developing and maintaining a "complete" knowledge base by one medical organization or vendor.
- Ability to trace the provenance of facts and rules used in medical decision-making, and providing explanation and proof. This is very important in the healthcare domain.

Use Case: Diagnostic Tools for Complex Machinery



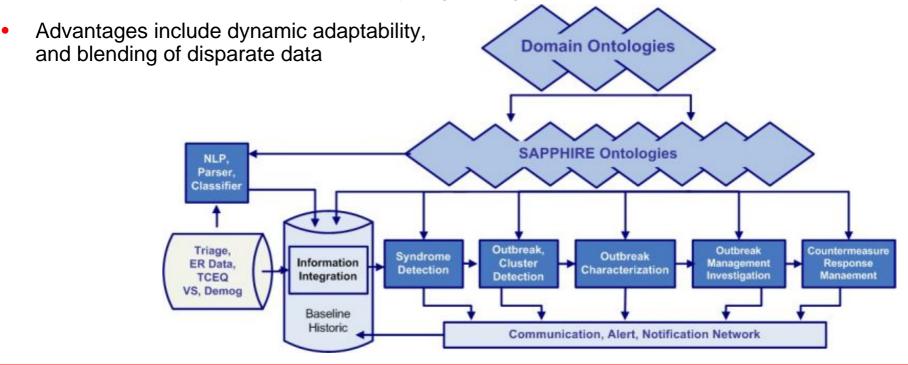


- Use of Semantic Web for generation of a diagnostic engine that can compute necessary procedures on the fly
- A question may be "What are the preliminary steps to test the resistor of the air conditioning engine on a Renault Clio 2006?"
- RDF is used as a flexible bus for exchange of information that originated from engineering departments to repair shops
- OWL is used to model a repository of repairs and diagnostic methods
- Reasoning tools are based on Boolean and probability constraints compilation
- A REST web services architecture is used, with the services returning RDF or HTML depending on content negotiation

Use Case: Public Health and Disaster Preparedness

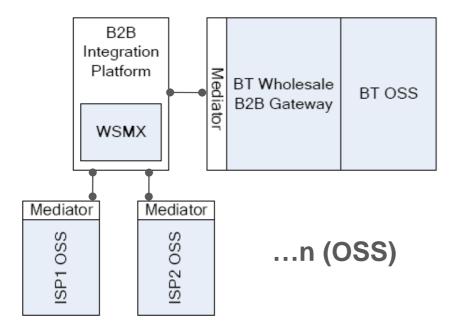
University Of Texas

- A system that integrates data from multiple disparate sources
- Data can be viewed from many different perspectives, e.g. disease surveillance, environmental protection, biosecurity and bioterrorism, veterinary surveillance
- New data feeds can be absorbed easily, e.g. during the Katrina disaster



Use Case: B2B Integration using Semantic Mediation

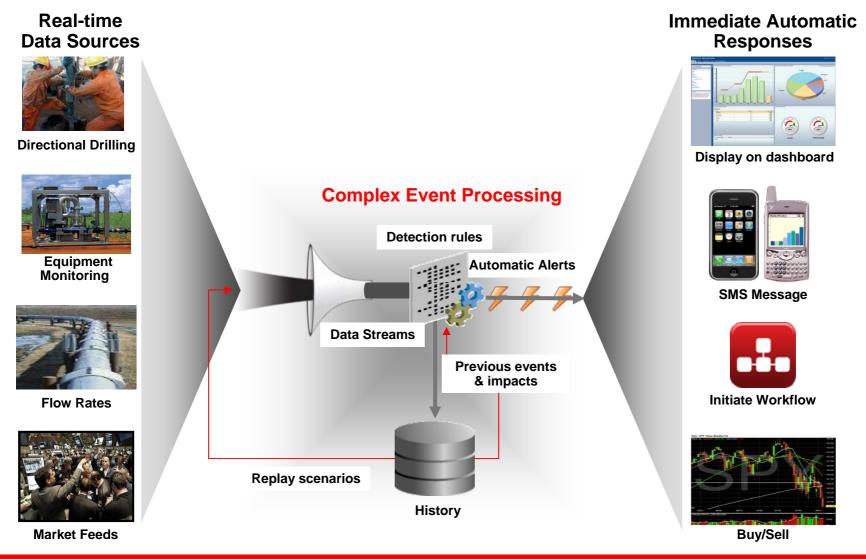




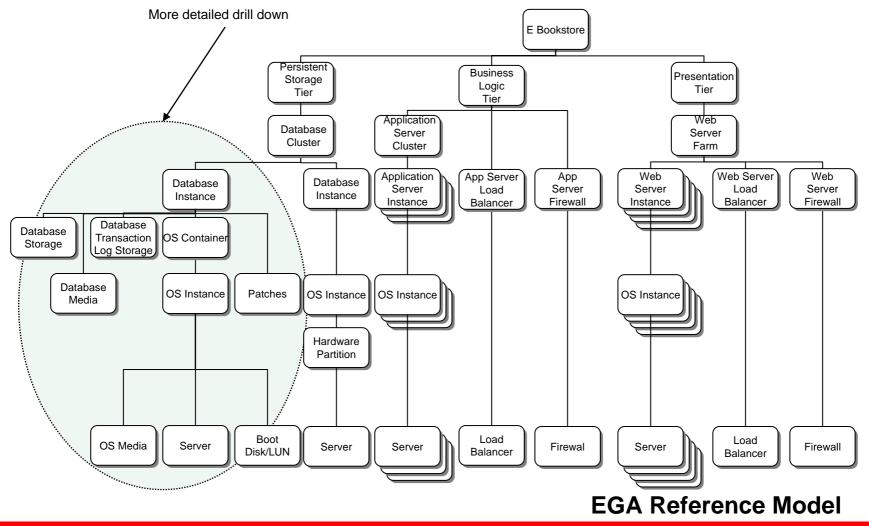
- BT uses semantic descriptions of system interfaces and messages to support integration of Operational Support Systems (OSS)
- Internet Service Providers integrate their OSS with those of BT (via a gateway)

• The approach helps overcome the increasing complexity of supply chains, reduces costs and time-to-market, ontologies allow for a reuse of services

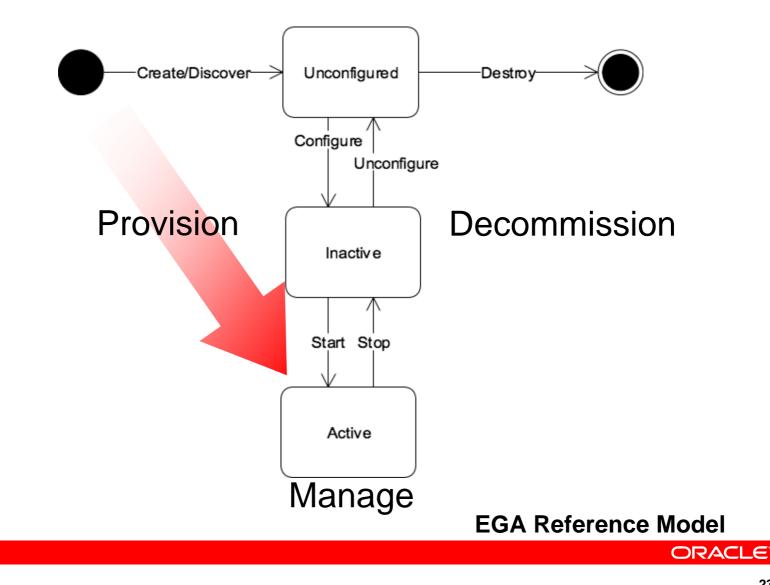
Opportunity: Event Driven Architecture Enablement Real-time Event Processing Trend



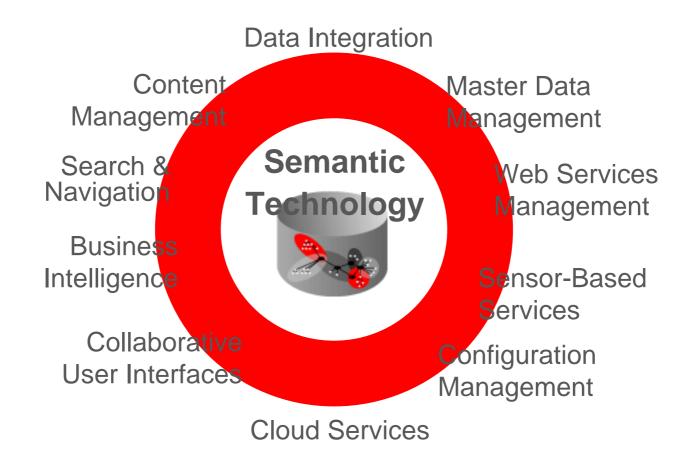
Opportunity: Cloud Service Enablement



Opportunity: Cloud Service Enablement



Summary



Conclusions

- Key semantic technologies are mature
- Semantic technologies are key enablers for Enterprise-wide solutions
- Useful data and ontologies exist but more are needed
- Model the real world rather than data artifacts
- A little semantics goes a long way
- Build upon infrastructure incrementally