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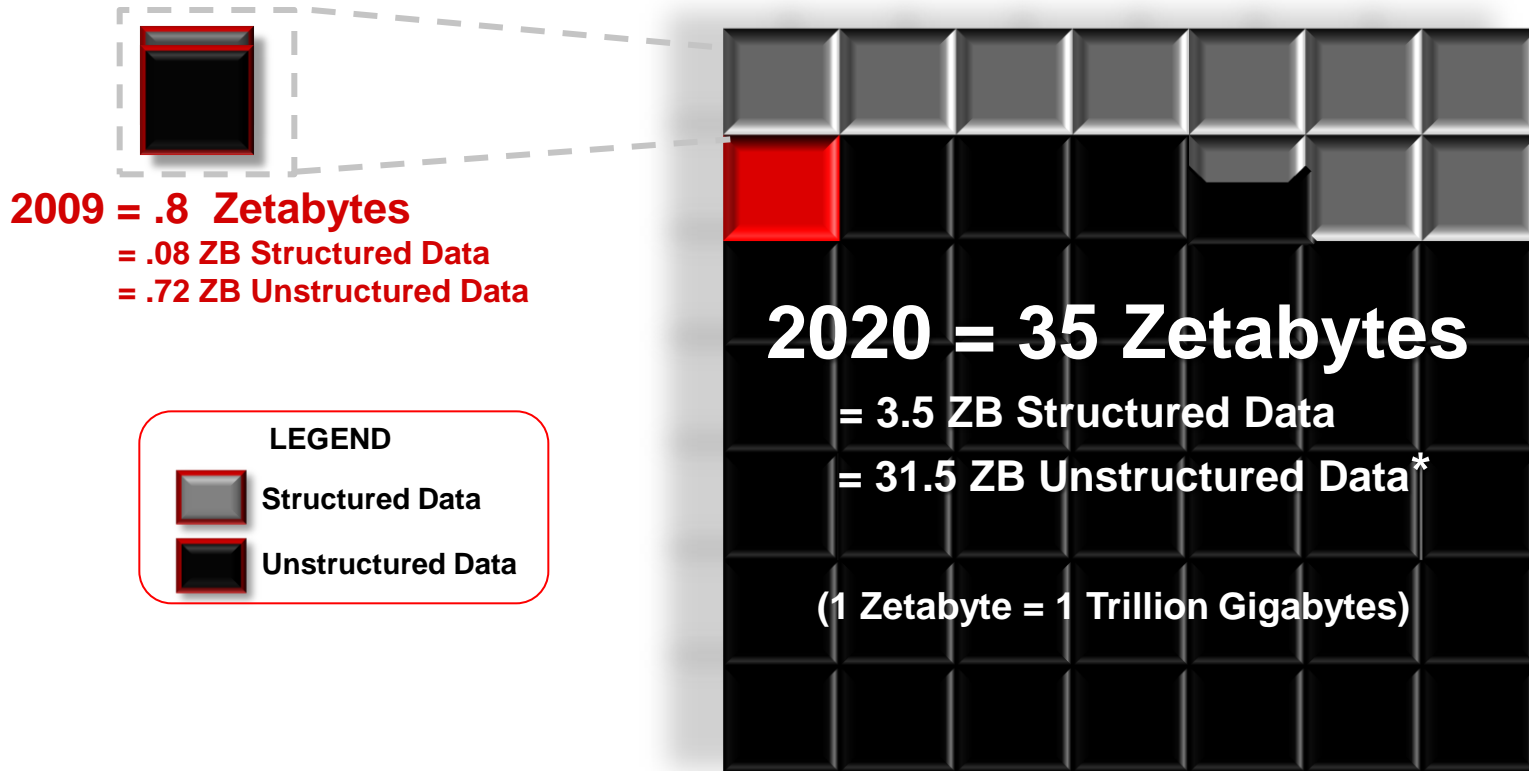
Big Data, Cloud Computing, Spatial Databases

Steven Hagan

Vice President Server Technologies

Big Data: Global Digital Data Growth

Growing leaps and bounds by 40+% Year over Year!

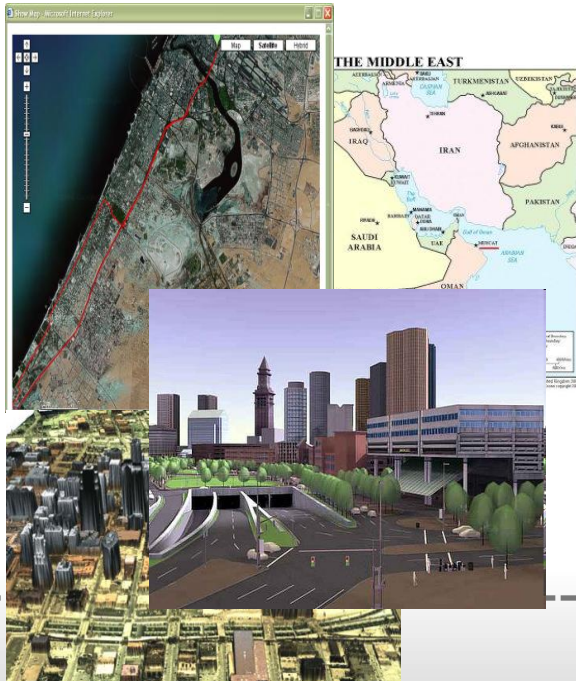


- Chart conservatively assumes a constant 9:1 ratio of unstructured data vs. structured data (based upon IDC's estimate that 90% of all digital data is unstructured).
- Chart does not reflect IDC's projection that unstructured data is currently growing twice as fast as structured data at the rate of 63.7% vs. 32.3% CAGR.

Source: IDC Digital Universe Study, A Digital Universe Decade – Are You Ready?, 2010

Big Data - Diverse Types & Response Time Requirements

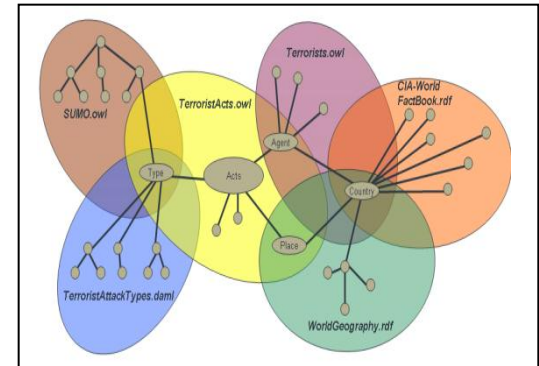
Semantic Graphs
– Connect the Dots



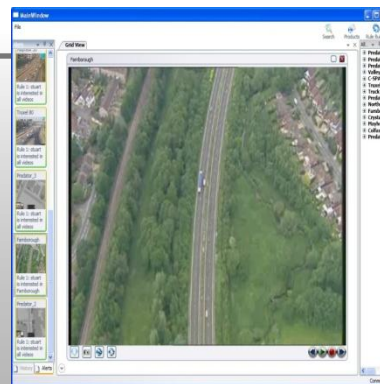
```
<?xml version="1.0"?>
<quiz>
<question>
Who was the forty-second
president of the U.S.A.?
</question>
<answer>
William Jefferson Clinton
</answer>
<!-- Note: We need to add
more questions later.-->
</quiz>
```

XML

Social Data



**Geospatial – Where is it
Happening?
In What Context?**
Raster
LIDAR



Video / UAV



Machine Generated Data /Sensors

Big Data: DHS Risk Analysis

External Data Sources
 Transactional &
 Operational Systems
 Contents Repository
 Databases
 Web resources
 Blogs, Mails, news



Real-time Data Streams

Search, Presentation, Report, Visualization, Query

BI

Text Files * Binary Images * XML * HTML * PDF * Excel * Map Files * Shape Files * User Sessions

Tables Relationships Charts Timelines Geospatial

Enterprise Data Management Infrastructure

Secured

GeoSpatial
 Historical Records
 POIs
 Demographics
 Customer Data
 Call Records
 Documents

Automatic Responses and Publishing

SMS
 Console Alerts
 EV Grid Management
 Workflow Initiation
 Real-time Dashboards

NIST Definition of Cloud Computing

Cloud computing is a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction.

This cloud model promotes availability and is composed of:

5 Essential Characteristics

- On-demand self-service
- Resource pooling
- Rapid elasticity
- Measured service
- Broad network access

3 Service Models

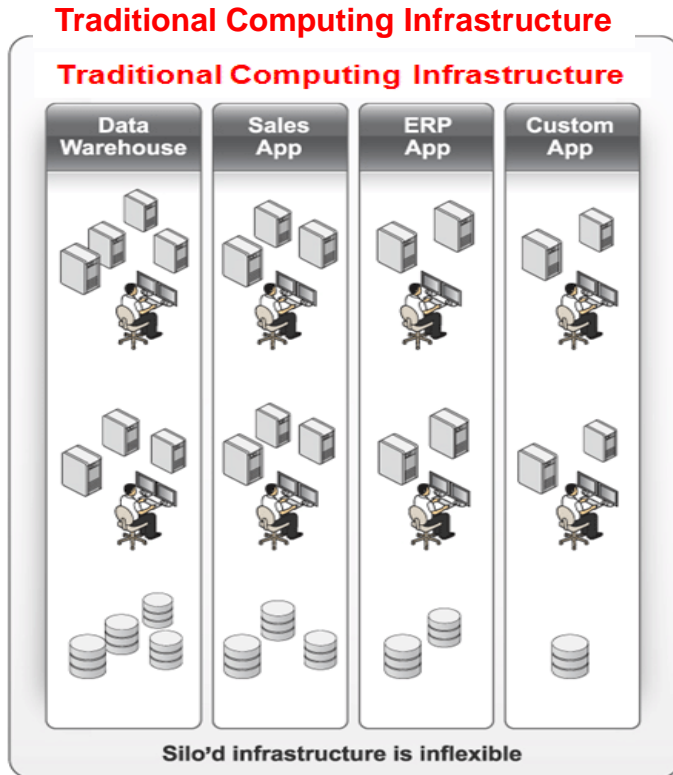
- SaaS
- PaaS
- IaaS

4 Deployment Models

- Public Cloud
- Private Cloud
- Community Cloud
- Hybrid Cloud

Traditional Large Computing Environment (No Cloud)

- Silos of dedicated hardware and software
- Single application per silo
- Difficult to size for peak load
- Difficult to scale
- Expensive to manage



Why a Cloud Framework Make Sense

- **Reduced Cost**

Cloud technology is paid incrementally, saving organizations money.

- **Increased Storage**

Organizations can store more data than on private computer systems.

- **Highly Automated**

No longer do IT personnel need to worry about keeping software up to date.

- **Allows IT to Shift Focus from Maintenance Activities**

No longer having to worry about constant server updates and other computing issues, government organizations will be free to concentrate on innovation.

- **More Mobility for Users**

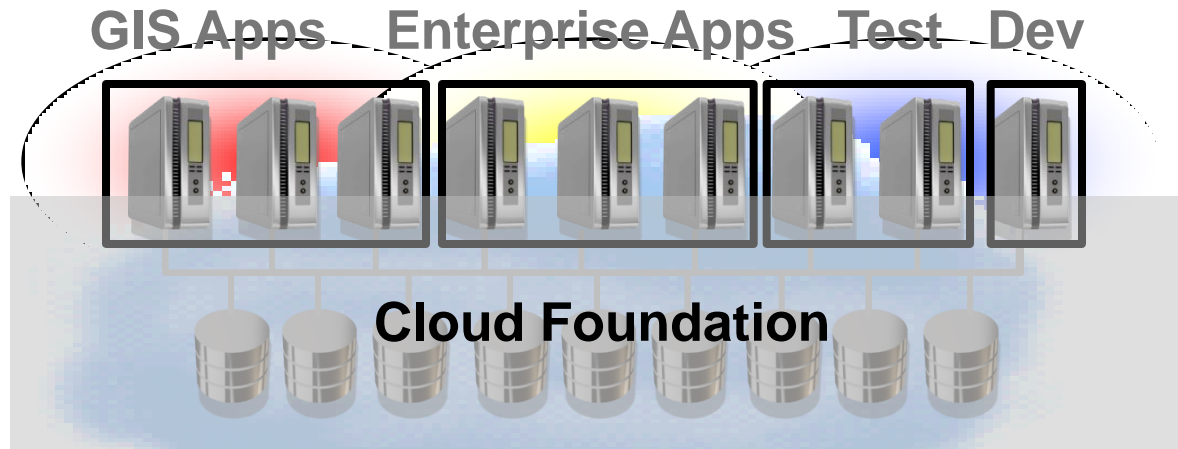
Employees can access information wherever they are, rather than having to remain at their desks.

3 Cloud Computing Concepts

- Application as a Service (SAAS)
 - End user apps delivered as service
 - Example: [Google Earth](#)
- Platform as a Service (PAAS)
 - Application platform middleware for developers to deploy custom apps
 - Example: [Oracle Public, Private Cloud](#)
- Infrastructure as a Service (IAAS)
 - Hardware and technology for computing power, storage, operating systems available for customer apps
 - Example: [Amazon EC2, Amazon S3](#)

Cloud Platform Framework for GeoSpatial

- Follow the Standards – ISO / OGC !



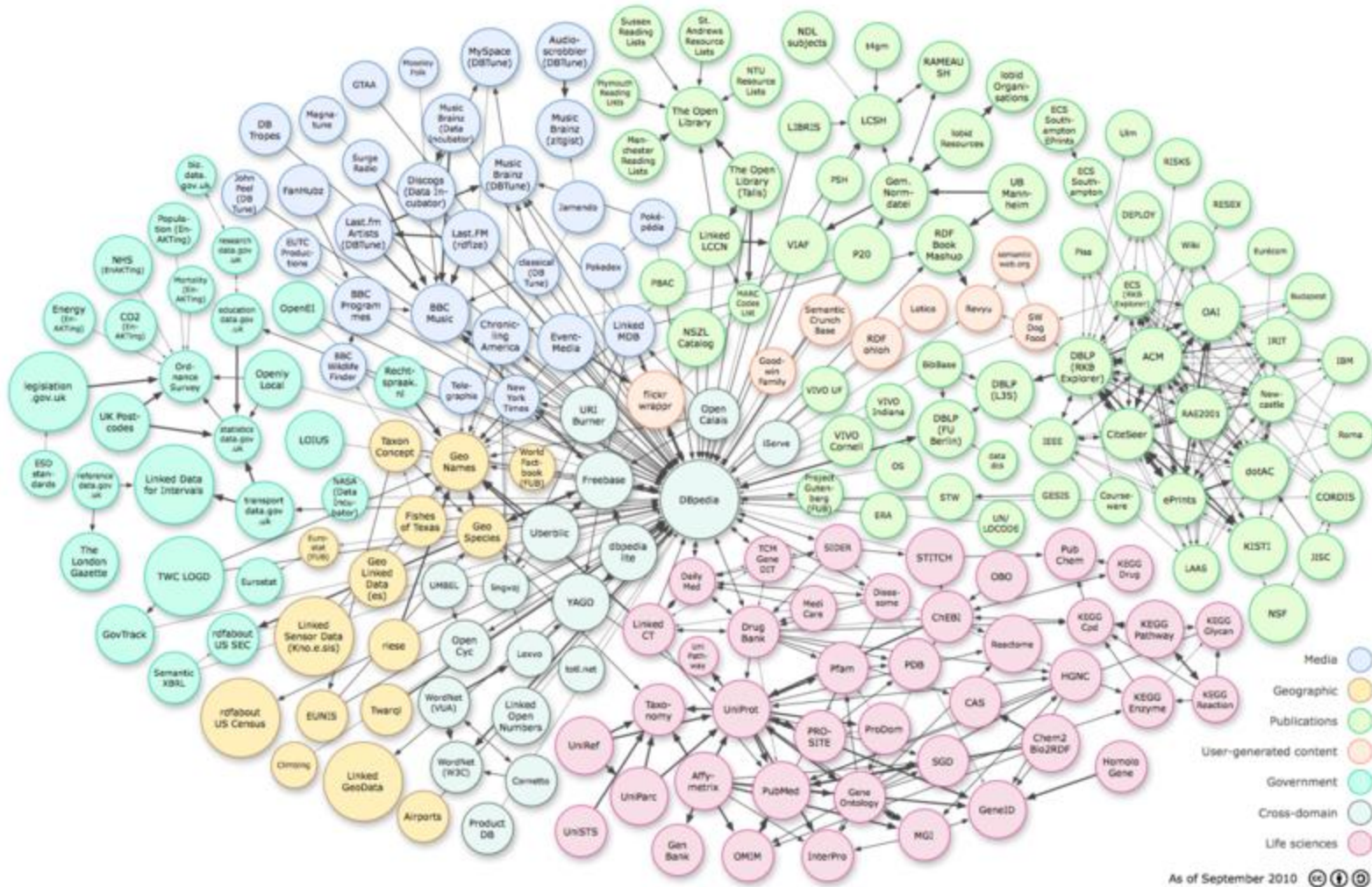
- **Application Server:** SOA, Identity Management, OGC Web Services, Geocoding, Routing, Java and XML Frameworks, Process Execution, Portals; Java, XML, C, and .Net APIs
- **Spatial Database:** ISO/OGC-compliant. Native Raster, 3D, LiDAR Point Clouds, Planar and Network Topology. Coordinate Transformation, Spatial indexes, functions, and operators.
- **Massively parallel,** highly available, scalable processors and storage

Public Cloud - Security Concerns:

An Option is a Private Cloud

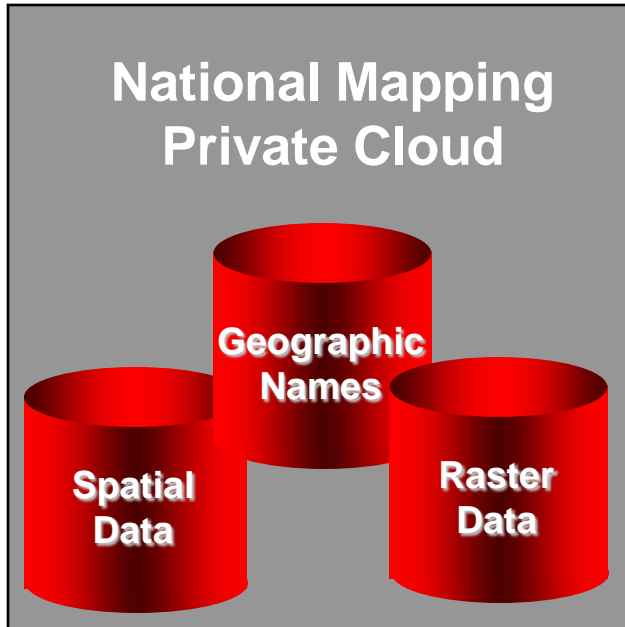
- Application Security
- Vulnerability Management
- Data Privacy
- Identity Management
- Data Storage
- Data Transfer
- Liability and Recourse
- Personnel and Physical Security

Linking Your Cloud with other Clouds

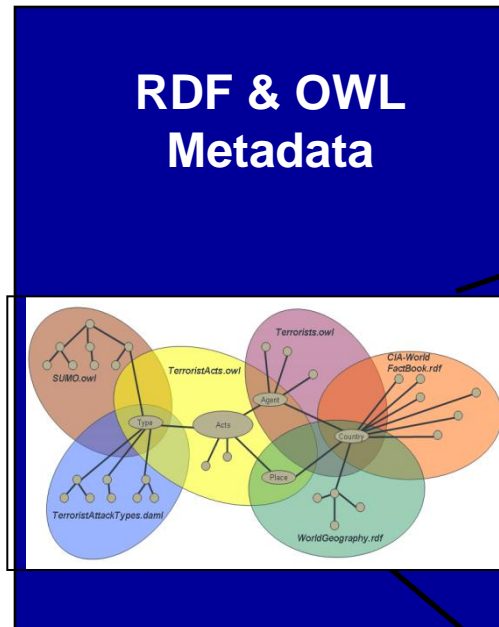


Cloud: Leveraging Semantic Web

Application Ontologies



- Simple Features
- GeoRaster
- Topology
- Networks
- Gazateers
- ...



- Data Integration
- National Map schemas
- Geographic names
- Temporal
- Naïve Geography
- ...



Environmental Monitoring



Famine Relief



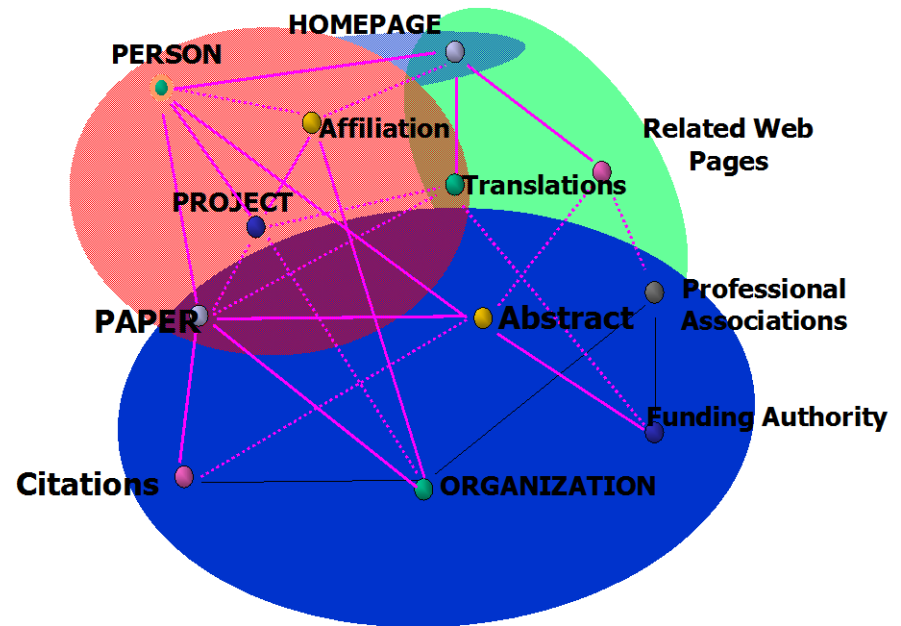
Disaster Response

Cloud: It's Not Just about "Static Linking"

"Semantic Cities *"

- Integrate domains of knowledge through common vocabularies (ie SKOS)
- Manage relationships between collections of images and associated metadata
- RDF as flexible and extensible data model supports powerful search and end-user discovery of related content
- Rich platform for data integration, data repurposing, and better quality control and classification

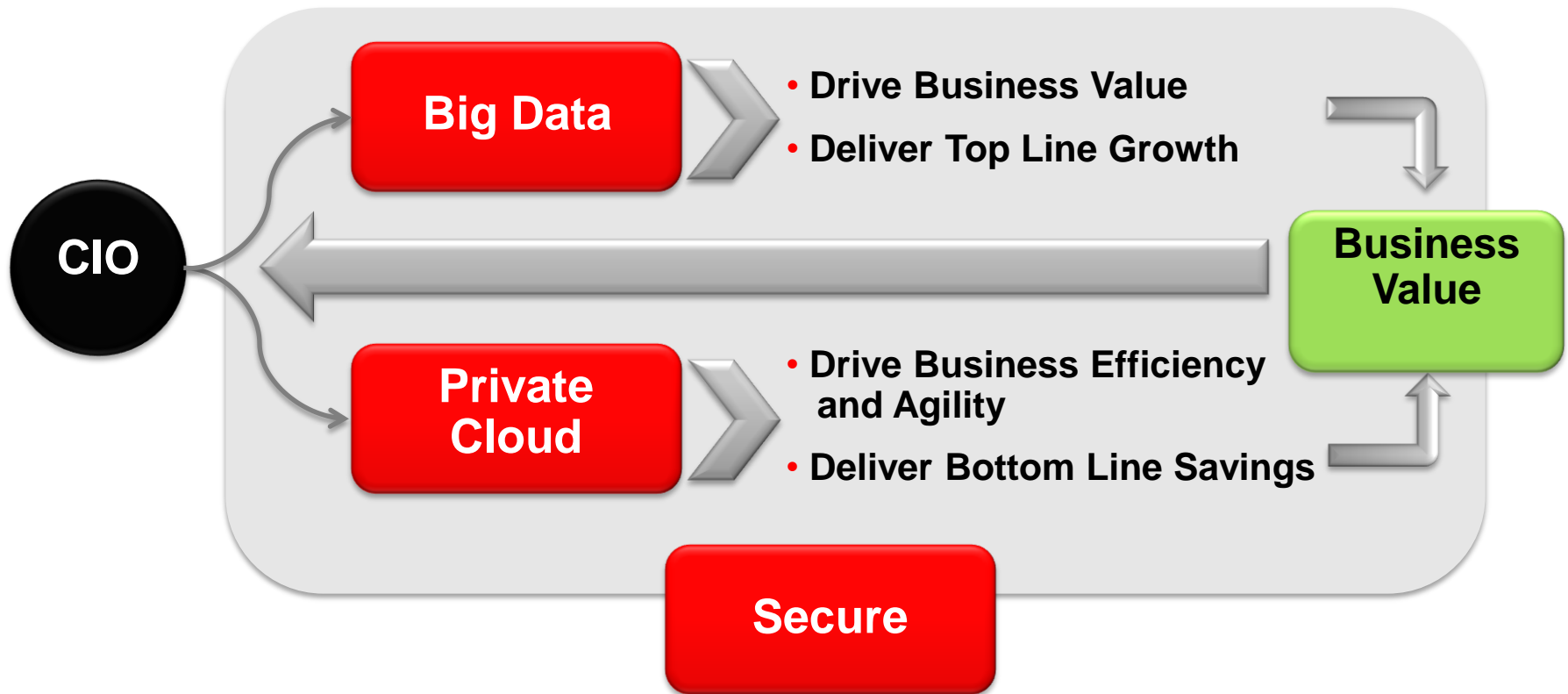
Semantic Aggregation & Navigation of Data



* Bentley

Big Data and Cloud Computing

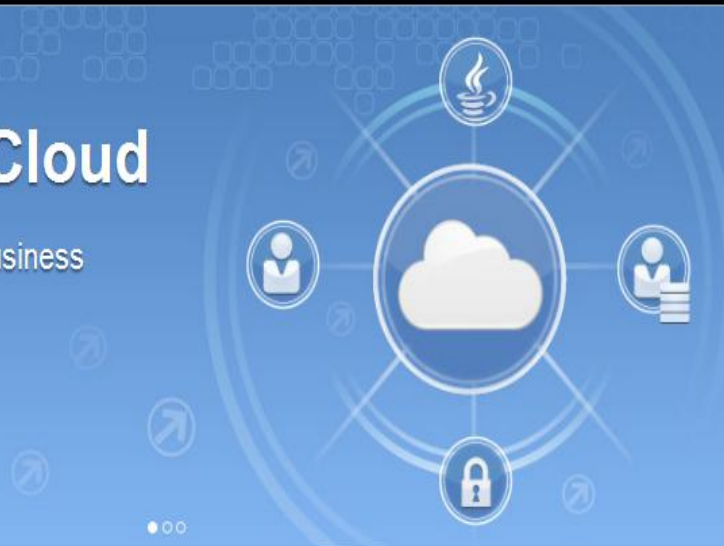
Next Generation Enterprise Data Platform



Welcome to the Oracle Public Cloud

An Enterprise Cloud for your Business

Notify Me of Updates >



Application Services



Fusion CRM

Sell smarter with Fusion CRM in the cloud.



Fusion HCM

Bring power to your people with Fusion HCM.



Social Network

A secure collaboration tool for everyone you work with.

Platform Services



Java

All the productivity of Java, without the IT.



Database

The Oracle database you love, now in the cloud.



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[Architecture](#)

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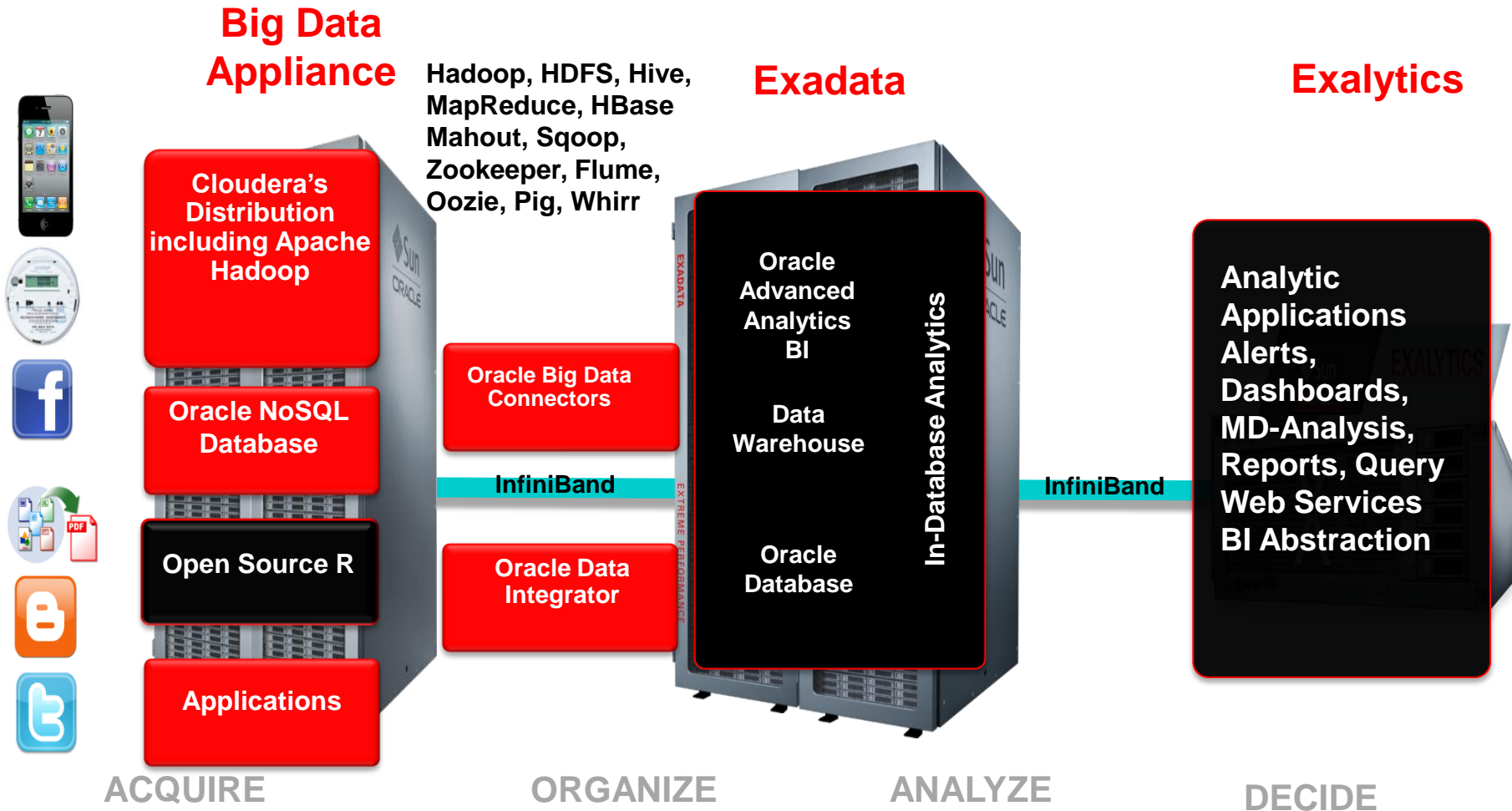
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Oracle Big Data, Cloud, Spatial Complete Platform



Oracle NoSQL is based on Berkeley DB

Cloud Computing

Oracle Engineered Systems



Cloud Sessions this Conference

- **ORACLE**
- **THURSDAY 2:00 PM**
- **FRIDAY 9:00 AM**



QUESTIONS
ANSWERS

<http://otn.oracle.com>