B102: Creating a Data Architecture for Business Intelligence and Analytics

May 12, 2015
Creating a Data Architecture for BI & Analytics

Topics

• The Data Deluge
• Accidental Architectures
• Data & BI Variety
• Data Architecture
Creating a Data Architecture for BI & Analytics

My Background

• **Experience**
  
  ✔ 25+ years of DW & BI experience
  ✔ 30 years relational database experience
  ✔ Consulting, IT and Software Engineering

• **Consulting**
  
  ✔ Business & IT Groups
  ✔ Software Vendors

• **Instructor**
  
  ✔ Northeastern University, Graduate School of Engineering
  ✔ Onsite BI Courses; BI, Data & DW Conferences

• **Writer, Columnist, Blogger**
  
  ✔ Book & 200+ Published Articles
  ✔ White papers, Webinars, Podcasts & Seminars
  ✔ DataDoghouse.com Blog on BI/DW industry

• **Thought Leadership:**
  
  ✔ TDWI – Boston User Group Officer
  ✔ Boulder BI Brain Trust
Creating a Data Architecture for BI & Analytics

The Data Deluge

- Creating ever increasing amounts of data
  - **Society**
    - CNN.com, Google, LinkedIn, The New York Times, YouTube
  - **Business**
    - Business-to-Business (B2B)
    - Business-to-Consumer (B2C)
- Businesses historically focused on enterprise application data
  - Managed it
  - Exchanged it with others who managed it
Creating a Data Architecture for BI & Analytics

The Data Deluge – Hype & Myths

• **Big Data & Data Scientist Hype**
  ✓ Everything is big data & big data analytics
  ✓ Technology is too tightly associated with it

• **Technology myths**
  ✓ Technology solves all
  ✓ Silver bullet solution
  ✓ The One
    ▪ Technology – One Size Fits All
    ▪ Architecture – One Way to Do Something
    ▪ Vendor – One Neck to Choke
  ✓ Stereotypes

• **Key Differences from Past:**
  ✓ Unstructured Data - Big & Small
  ✓ External Sources
  ✓ Unmanaged
Creating a Data Architecture for BI & Analytics
Accidental Architectures

Data, Integration & Application Silos Litter Enterprises

More of the same – new silos with new technology

- **Business & Operational Applications**
  - Focused on transactional & business processes
  - Business organizations

- **BI**
  - Departmentally based
  - DW vs Applications
  - Goldilocks Syndrome: Reports vs Self-Service
  - Data Shadow Systems & Spreadsheets

- **Integration**
  - DW too ETL oriented
  - Much of BI is custom coding, i.e. SQL
  - Data vs Application Integration (Silos)

- **Cloud applications**
  - Higher productivity & lower TCO for processes
  - Data & application silos
Accidental Architectures

- **Cost of delivery too high (overlapping & redundant)**
  - Creating application
  - Support & training for business users
  - IT resources & skills for each tool
    - Most substantial cost over life of application
  - Licensing, maintenance, integration & infrastructure

- **Inconsistency in information & analytics across BI silos**
  - Data, transformations, performance metrics defined differently
  - Each BI project & tool implement differently
  - Business needs to reconcile differences or guess
Creating a Data Architecture for BI & Analytics

Variety – Data Sources

Differences in origin, management & use of data

**DATA SOURCES**
- Data Capture
- Transactional or Operational

**INTEGRATED DATA**
- Data Warehousing
- Analytical Datasstores
Creating a Data Architecture for BI & Analytics

Variety - Databases Alternatives

- **Alternatives to relational databases**
  - Different database structures
  - Leverage specialized hardware & software with database
  - Shift from disk to memory

- **Alternatives target BI & Analytics not EDW**
Requirements vary based on perspective:

**Business:**
- Industry & size of enterprise
- Business function or processes & person’s role
- Operational versus “Managerial”

**Analytical Skills: Consumers vs Producers**
- Information consumers – wide range of analytical needs
- Business analysts, “domain” analysts, BI “power users”
- Data scientists – real versus vendor hype

**Data:**
- Data Sources & Types
- “As Is” versus 5 C’s (consistent, clean, conformed, comprehensive & current)
Creating a Data Architecture for BI & Analytics

Variety - BI Platforms for Business Analysis Types

**BI & Analytical Platforms**

- Descriptive Analytics
- Diagnostic Analytics
- Predictive Analytics
- Prescriptive Analytics

**Business Value**

- BI Portal
- Analytical Sandbox
- Data Science Hub
- Data Scientists
- Business Processes

**Level of Skills - Analytical Producers**

---

Copyright © 2015 Athena IT Solutions  All rights reserved.
Creating a Data Architecture for BI & Analytics

Variety - BI Portfolio & BI Tool Styles

Traditional BI

Self-Service BI & Data Discovery

Advanced Analytics

Business Intelligence
Creating a Data Architecture for BI & Analytics

4 Architecture Layers

Classic DW-Oriented Architecture

Data Warehouse & BI Data

Data Integration

Data Sources

Analytical Data Architecture (ADA)

Data Warehouse & BI Data

Data Integration

Data Sources
Creating a Data Architecture for BI & Analytics

Analytical Data Architecture (ADA) – Not Just...
Creating a Data Architecture for BI & Analytics

ADA – Logical Data Warehouse (LDW)

**Logical Data Warehouse**

**LDW may be split by:**
- Business function, group or processes
- Geographic locations
- Data sources
- Data structures
- Database technologies used

**LDW may have derivative layers:**
- Staging
- Integration Schema
- Distribution Schema
- BI & Analytical Schemas
Creating a Data Architecture for BI & Analytics

Analytical Data Architecture (ADA) – Hub & Spoke

**Systems of Record (SOR) & Data Capture**

- Enterprise Applications
- CRM
- Web Services
- Cloud Applications & Databases
- Business Processes
- Data Services
- Social Media
- Unstructured Data
- Big Data Databases
- Internet of Things (IoT)

**System of Integration (SOI)**

**Systems of Analytics (SOA)**

**Business Intelligence & Analytics**

Data Lake for Structured Data

- BI Schema
  - OLAP Cubes
  - Data Marts
  - OLAP Cubes
  - Data Marts
  - In-Memory Columnar
  - OLAP Cubes

- Reports
  - Dashboards
  - Data Visualization & Discovery
  - Spreadsheets
  - Big Data Analytics
  - Mobile BI
  - Predictive Analytics

Copyright © 2015 Athena IT Solutions All rights reserved.
Creating a Data Architecture for BI & Analytics

Analytical Data Architecture (ADA) – Data Stores & Workflow

Systems of Record (SOR) & Data Capture

System of Integration (SOI)

Systems of Analytics (SOA)

Business Intelligence & Analytics

Copyright © 2015 Athena IT Solutions  All rights reserved.
Creating a Data Architecture for BI & Analytics

Data Virtualization

Expanding analytics without physical data integration
Creating a Data Architecture for BI & Analytics