BUSINESS unINTELLIGENCE

DATA VIRTUALIZATION – GATEWAY TO A DIGITAL BUSINESS

NEXT-GENERATION DATA MANAGEMENT AFTERNOON WITH INFOROAD AND DENODO

Data Warehouse 30th Birthday

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Antwerp, Belgium

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Dr. Barry Devlin is a founder of the data warehousing industry, defining its first architecture in 1985. A foremost authority on business intelligence (BI), big data and beyond, he is respected worldwide as a visionary and thought-leader in the evolving industry. Barry has authored two ground-breaking books: the classic "Data Warehouse--from Architecture to Implementation" and "Business unIntelligence--Insight and Innovation Beyond Analytics and Big Data" (http://bit.ly/BunI_Book) in 2013.

Barry has over 30 years of experience in the IT industry, previously with IBM, as a consultant, manager and distinguished engineer. As founder and principal of 9sight in 2008, Barry provides strategic consulting and thought-leadership to buyers and vendors of BI and Big Data solutions. He is an associate editor of TDWI's Journal of Business Intelligence, and a regular keynote speaker, teacher and writer on all aspects of information creation and use.

Barry operates worldwide from Cape Town, South Africa.

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Digital business means...

A whole new world of
- Digital customers
- Digital channels
- Digital competitors

Reinvented operations
- Digital products
- Digital employees
- Digital business operations
- Digital insights

Digital Business built on Analytics

- Gartner – Digital Business

Analytics

Data and analytics are changing the basis of competition. Leading companies are using their capabilities not only to improve their core operations but to launch entirely new business models.

The network effects of digital platforms are creating a winner-take-most situation. The leading firms … are actively looking for ways to enter other industries… can take advantage of their scale and data insights to add new business lines… are blurring traditional sector boundaries.

"The Age of Analytics:
Competing in a data-driven world"
McKinsey Global Institute, Dec 2016

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WHAT TECHNOLOGY DRIVES DIGITAL BUSINESS?

Convergence of: **Real World**

- Fully instrumented and connected physical world
- Monitoring (and manipulation) of individual and mass reasoning, emotions, and behavior
- Augmentation and automation of business and society

Internal building blocks: **IT and BI**

- Pervasive data / information in multiple locations
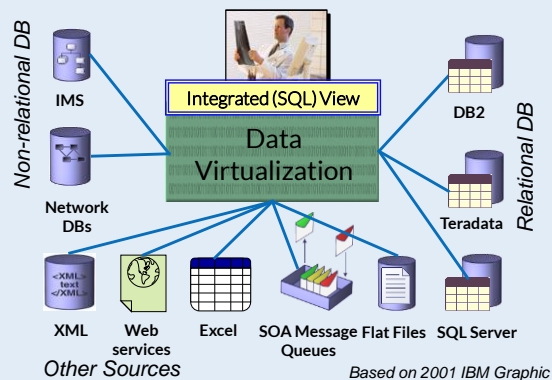- Extensive analytics and algorithms
- Access to and use of data where it sits

Fourth Industrial Revolution
(World Economic Forum, 2016)

DATA VIRTUALIZATION AT THE HEART OF DIGITAL BUSINESS

- Access to and integration of remote data through a common interface
  - Irrespective of data location and format

- Abstraction to business model for use by business people

- Agility for new and changed sources
  - Time & cost benefits
  - Cloud / Streaming

- Availability of data
  - Immediate visibility of events
  - Operational
  - Internet of Things

- Proven value and advancing technology

Non-relational DB

IMS

Network DBs

Integrated (SQL) View

Data Virtualization

DB2

Teradata

Relational DB

XML   **Web services**   **Excel**   **SOA Message Queues**   **Flat Files**   **SQL Server**

Other Sources

Based on 2001 IBM Graphic

Slide 7

- **Abstraction:** from technical view to business view

- **Delivery:** provide results to users or apps as needed exposed as data services

- **Transformation:** to common schema, address quality

- **Combination:** join/combine data returned from sources

- **Access:** interfaces to all required data sources – even unstructured and web
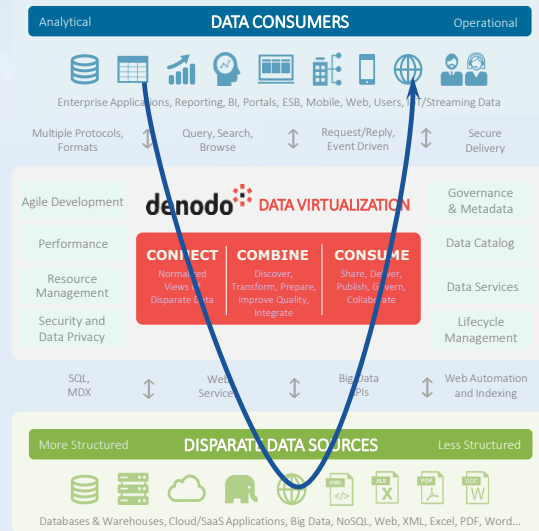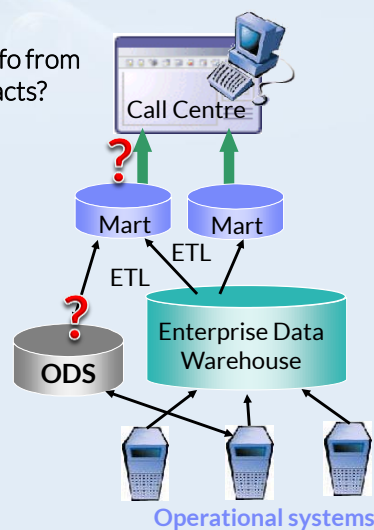

Graphic courtesy Denodo Technologies Inc.

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DATA VIRTUALISATION FOR REAL-TIME DATA ACCESS
E.G. CALL CENTRES AND CUSTOMER SUPPORT AGENTS

- How to combine historical info from DW with current real-time facts?

- Traditional approach: ODS
  - ☒ Volumes?
  - ☒ Timeliness?
  - ☑ Pre-defined schema

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Data virtualisation for real-time data access
E.g. Call centres and customer support agents

- How to combine historical info from DW with current real-time facts?

- Traditional approach: ODS
  - ☒ Volumes?
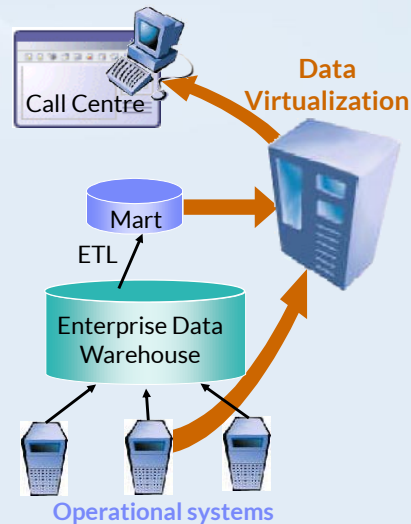 - ☒ Timeliness?
  - ☑ Pre-defined schema

- Data Virtualization
  - ☑ Only the data needed
  - ☑ Real-time
  - ☑ Agile
  - ☒ Consistency?

Call Centre

Data Virtualization

Mart

ETL

Enterprise Data Warehouse
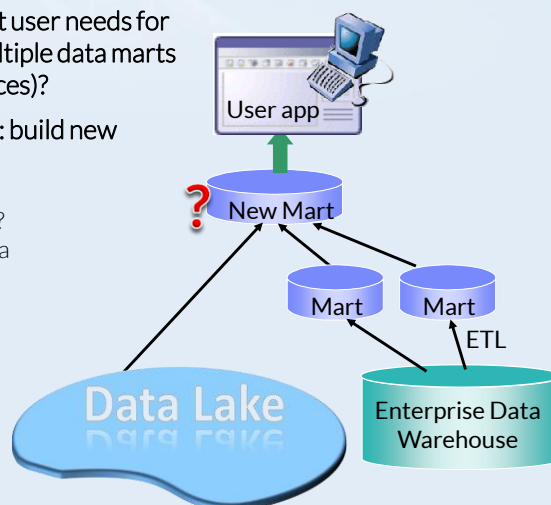
Operational systems

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Data virtualisation for agile development
E.g. Combining data warehouse and lake

- How to satisfy urgent user needs for information from multiple data marts (from disparate sources)?

- Traditional approach: build new combined mart
  - ☒ Size / Volumes?
  - ☒ Development time?
  - ☑ Pre-defined schema

User app

New Mart

Mart   Mart

ETL

Data Lake

Enterprise Data Warehouse

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Slide 11:

DATA VIRTUALISATION FOR AGILE DEVELOPMENT
E.G. COMBINING DATA WAREHOUSE AND LAKE

- How to satisfy urgent user needs for information from multiple data marts (from disparate sources)?

- Traditional approach: build new combined mart
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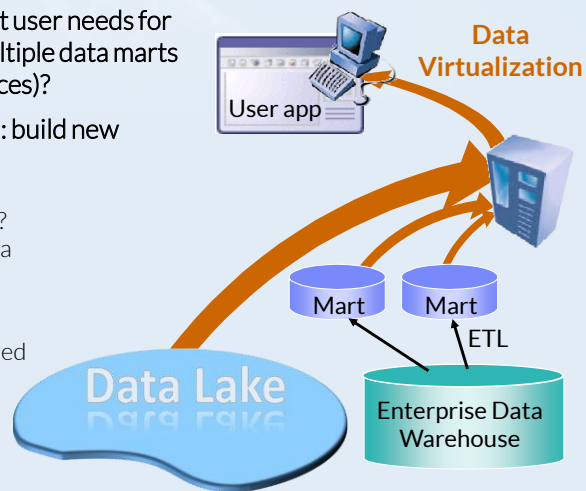 - ☑ Pre-defined schema

- Data Virtualization
  - ☑ Only the data needed
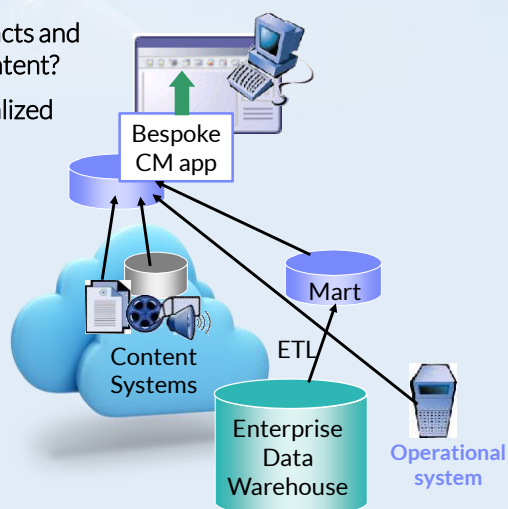 - ☑ Agile development
  - ☒ Consistency?

Data Virtualization

User app

Mart   Mart
ETL
Enterprise Data Warehouse

Data Lake

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Slide 12:

VIRTUALISATION FOR CLOUD AND ON-PREMISES DATA
E.G. CAMPAIGN MANAGEMENT

- How to combine real-time facts and historical info with cloud content?

- Traditional approach: Specialized bespoke application
  - ☒ Yet another copy of data?
  - ☒ Real-time data capture?
  - ☒ Development cost & time?

Bespoke CM app

Content Systems

Mart
ETL

Enterprise Data Warehouse

Operational system

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Virtualisation for cloud and on-premises data
E.g. Campaign management

- How to combine real-time facts and historical info with cloud content?
- Traditional approach: Specialized bespoke application
  - ☒ Yet another copy of data?
  - ☒ Real-time data capture?
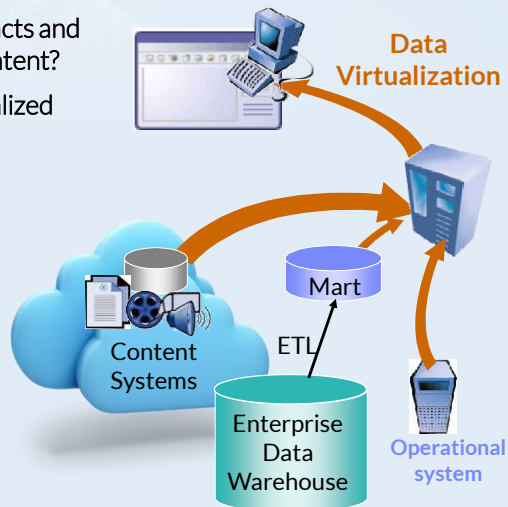 - ☒ Development cost & time?

- Data Virtualization
  - ☑ Reuse existing data & content
  - ☑ Real-time data access
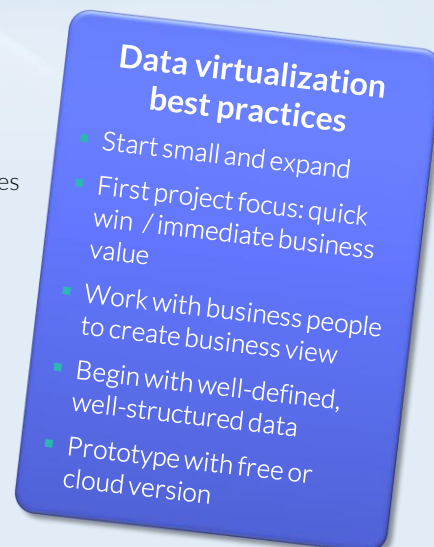 - ☑ Agile
  - ☒ Specific CM needs?

Data Virtualization

Content Systems

Mart

ETL

Enterprise Data Warehouse

Operational system

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Making it happen

- Use case **logitech®**

- Denodo Platform solution
  - Consistent business layer in AWS removes direct access to data sources
  - Integrates data across Amazon Redshift and on-premises sources
  - Feeds Tableau, Pentaho BA, etc
  - Central security layer securing access across multiple tools

- Needs and benefits
  - Efficiency and reliability
  - Innovation and agility
  - Consistent security
  - Agility

Data virtualization best practices
- Start small and expand
- First project focus: quick win / immediate business value
- Work with business people to create business view
- Begin with well-defined, well-structured data
- Prototype with free or cloud version

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Data virtualisation – considerations / trade-offs

- Can *your* data be integrated on the fly?
  - Meaning – are definitions consistent?
  - Timing – data referring to the same time period?

- Performance characteristics
  - Query optimization supporting mixed / distributed data volumes in most efficient manner?
  - Sufficient network bandwidth?
  - Impact on source systems response time?
  - Use of massively parallel processing in DV system?
  - Is response time predictable? If not, is that acceptable?

- Security and privacy concerns
  - How can access and visibility be controlled and managed?

- Data sources
 - Is there connectivity to the required sources (especially non-relational)?

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Data virtualization plays a key role in the future REAL Business unIntelligence architecture

- Reification *(making the abstract real)*
  - Consistent, cross-pillar information view via overarching model
  - Access to information in real-time
  - *Data virtualization*

- Assimilation
  - Creation of reconciled & consistent information sets prior to business use
  - *ETL, ELT and data virtualization*

- Instantiation
  - Tools by which measures, events and messages are represented as information instances
  - *File access, ETL, DWA, change capture, streaming…*

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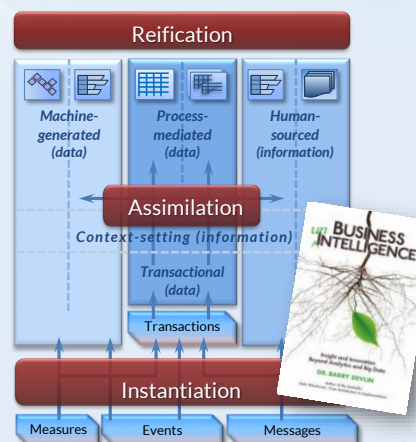
BUSINESS *un*INTELLIGENCE

FURTHER QUESTIONS?

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