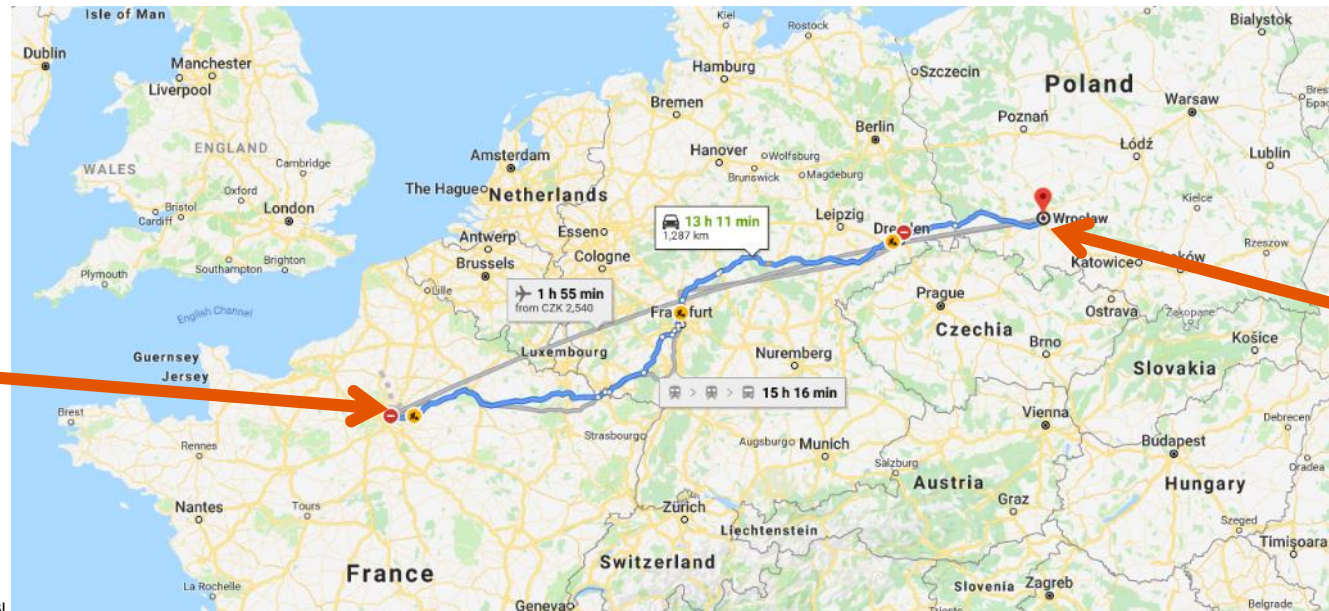# Let's start with your presenters today

Abdel(halim) Dadouche

- From: Paris, France
- Topics: Machine Learning and Data Engineering
- Hobbies: Hackathons and Home Improvement

Vitaliy Rudnytskiy (a.k.a. Witalij Rudnicki)

- From: Wrocław, Poland
- Topics: Analytics, Big Data & IoT
- Hobbies: Local organizer of SAP Community meetups & Beer tasting!

Ever heard about **SAP** ?

Enterprise software company founded in **1972** in **Germany**

96k+ employees across **140+** countries

400k customers WW

77% of the world's transaction revenue
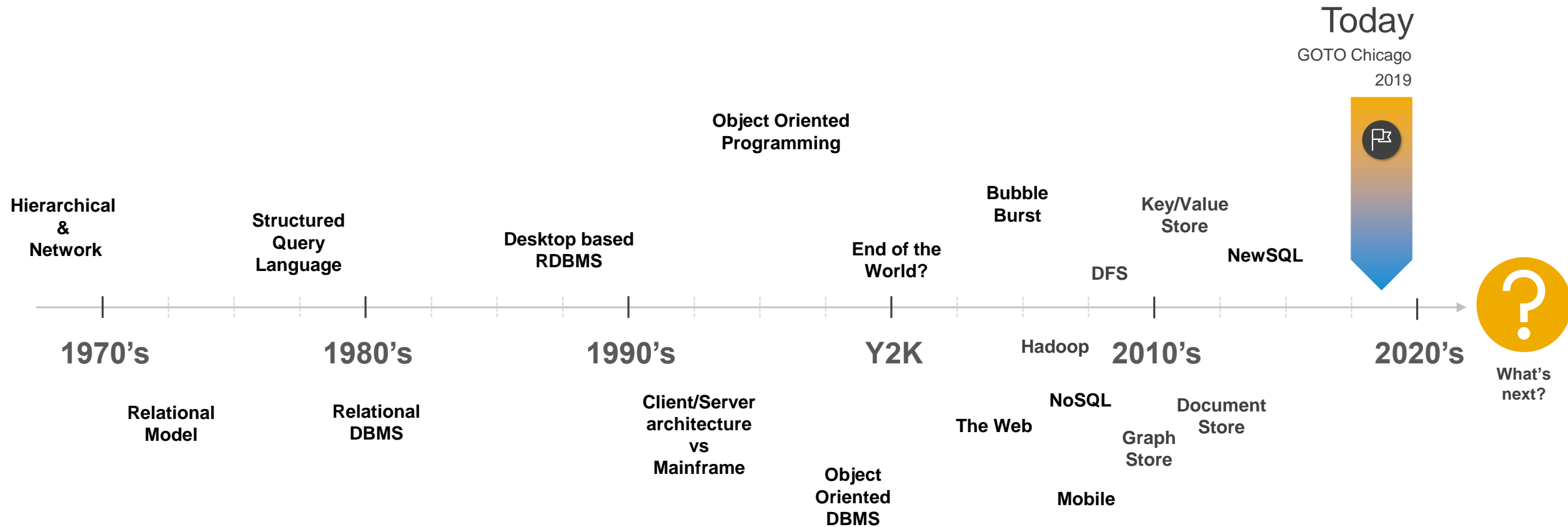
25 industries

12 lines of business
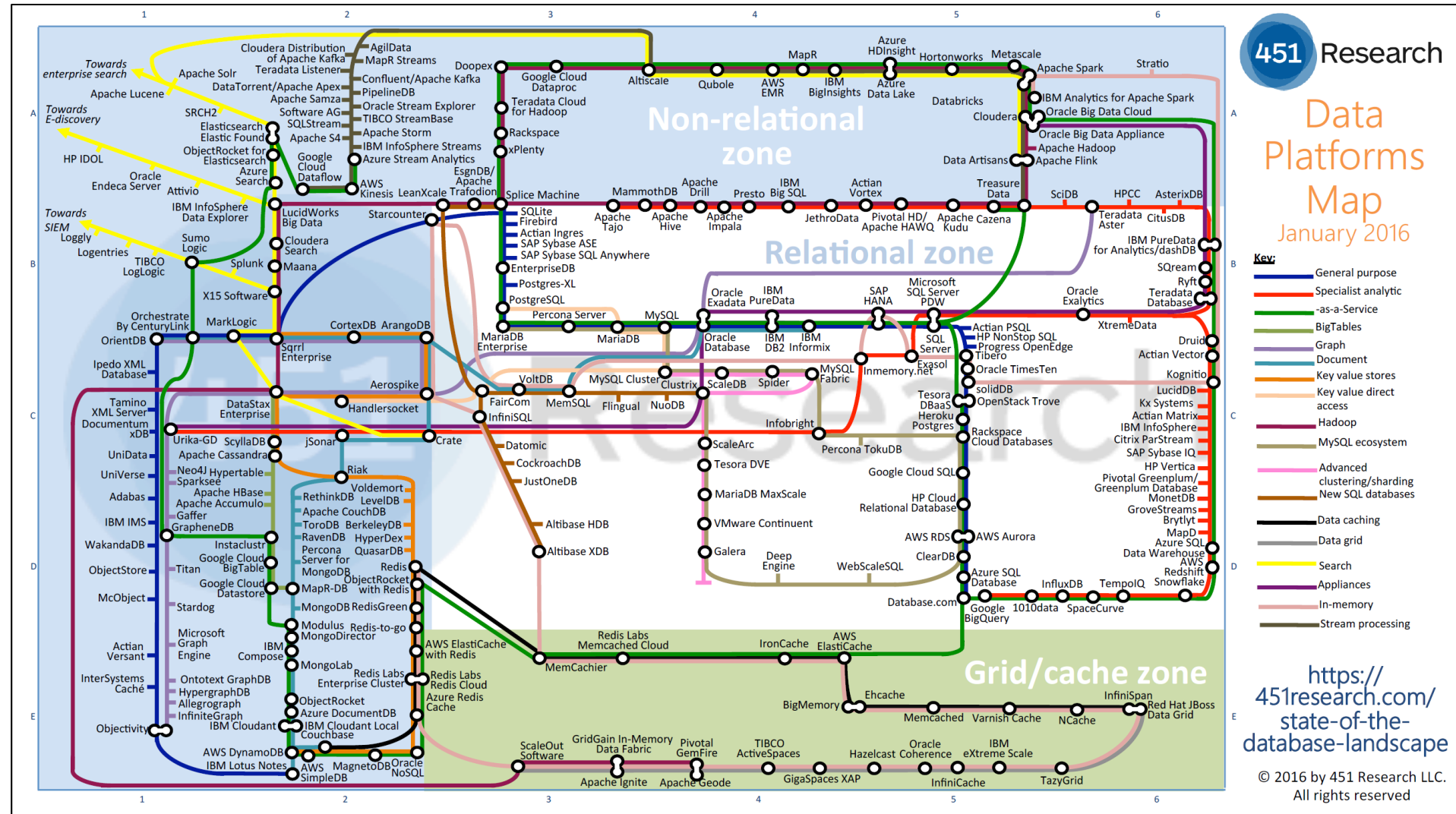
The world's largest business network

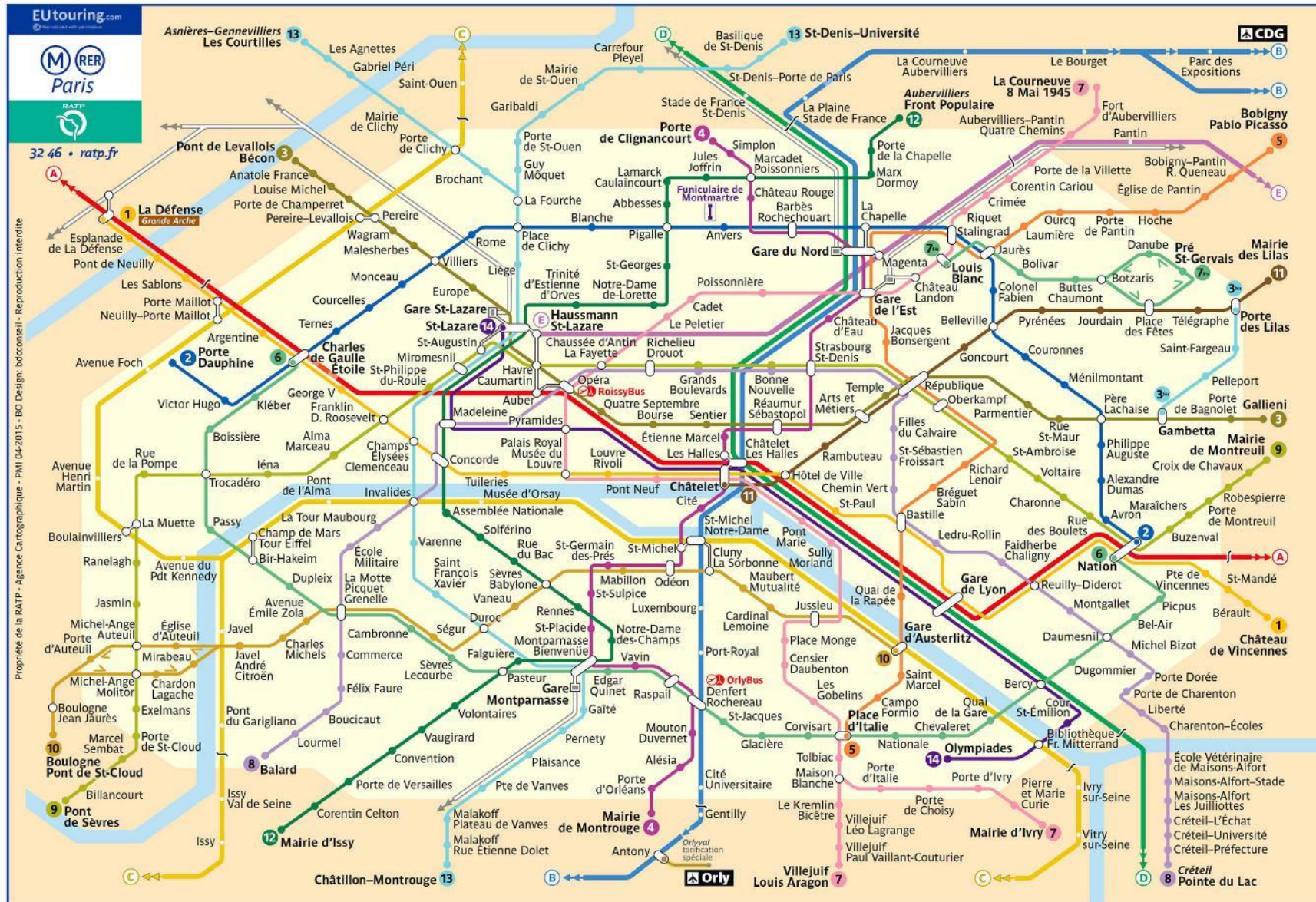SAP customers produce about **77%** of the world's beer, burgers and deep dish pizzas!

How did we got where we are with data?

Today

GOTO Chicago 2019

Object Oriented Programming

Hierarchical & Network

Structured Query Language

Bubble Burst

Key/Value Store

Desktop based RDBMS

NewSQL

End of the World?

DFS

1970's   1980's   1990's   Y2K   Hadoop   2010's   2020's

Relational Model

Relational DBMS

Client/Server architecture vs Mainframe

NoSQL

Document Store

The Web

Graph Store

Object Oriented DBMS

Mobile

What's next?

The evolving database landscape map - The 451 Research Group

Data Platforms Map — January 2016 — 451 Research

Source : https://blogs.the451group.com

Hard to find your way - Just like the Metro in Paris

Hard to understand inheritance – Just like the Pokemon Tree of Life

Polyglot Persistence as in Polyglot Programming?

Scott Leberknight's Weblog some da...

Polyglot Persistence

Posted on October 15, 2008 by Scott Leberknight

In late 2006 Neal Ford wrote about Polyglot Programming
industry to use the right language for the specific job at ha
then warring over the many different available frameworks,
job rather than just the right framework(s). For a while now
polyglot programming, a relational database seems to be th
due to the fact that organizations have standardized on RD
simply what we're used to doing, and possibly we don't eve
Google Bigtable, Microsoft SQL Server Data Services (SSI
beginning of **Polyglot Persistence** in addition to polyglot programming.

PolyglotPersistence

Martin Fowler
16 November 2011

In 2006, my colleague Neal Ford coined the term Polyglot Programming,
to express the idea that applications should be written in a mix of
languages to take advantage of the fact that different languages are
suitable for tackling different problems. Complex applications combine
different types of problems, so picking the right language for the job may
be more productive than trying to fit all aspects into a single language.

Speculative Retailers Web Application

User sessions	Financial Data	Shopping Cart	Recommendations
Redis	RDBMS	Riak	Neo4J
Product Catalog	Reporting	Analytics	User activity logs
MongoDB	RDBMS	Cassandra	Cassandra

One of the interesting consequences of this is that we are gearing up for
a shift to polyglot persistence [1] - where any decent sized enterprise will
have a variety of different data storage technologies for different kinds of
data. There will still be large amounts of it managed in relational stores,
but increasingly we'll be first asking how we want to manipulate the data
and only then figuring out what technology is the best bet for it.

This chapter is from the book

NoSQL Distilled: A Brief Guide to the Emerging World of Polyglot Persistence

NoSQL Distilled   [Learn More]   [🛒 Buy]

13.2. Polyglot Data Store Usage

Let's take our e-commerce example and use the polyglot persistence approach to see how some of
these data stores can be applied (Figure 13.2). A key-value data store could be used to store the
shopping cart data before the order is confirmed by the customer and also store the session data so that

13fig03_alt.jpg (550×320) - Google Chrome
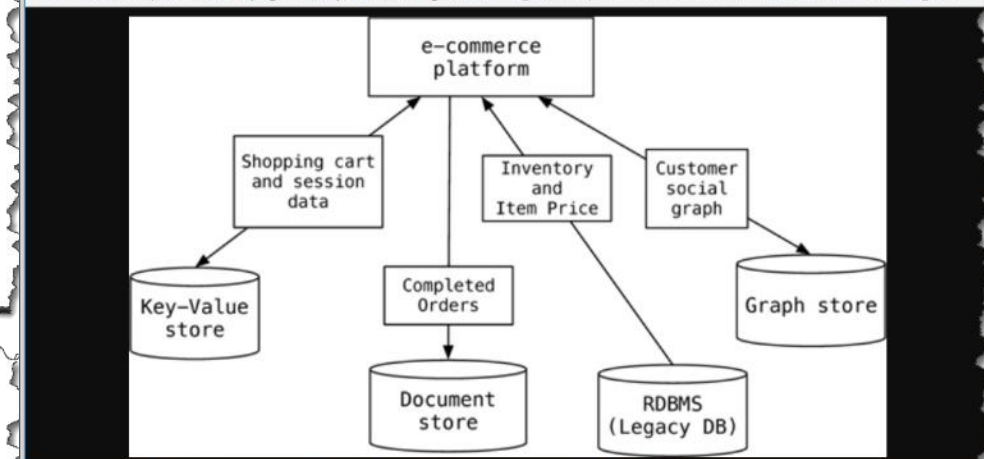Niezabezpieczona | ptgmedia.pearsoncmg.com/images/chap13_9780321826626/elementLinks/13fig0...

Is Polyglot Persistence the only option? What about multi-model database?

Multi-model database

From Wikipedia, the free encyclopedia

Most database management systems are organized around a single data model that determines how data can be organized, stored, and manipulated. In contrast, a **multi-model database** is designed to support multiple data models against a single, integrated backend.[1] Document, graph, relational, and key-value models are examples of data models that may be supported by a multi-model database.

ArangoDB · Couchbase · redis · SAP HANA · EDB POSTGRES · Azure Cosmos DB · MarkLogic™ · DATASTAX · OrientDB®

Source : https://en.wikipedia.org/wiki/Multi-model_database

Multi-model database: „Neither fish nor fowl…"

Matthew Aslett - The 451 Group

One of the most complicated aspects of putting together our database landscape map was dealing with the growing number of (particularly NoSQL) databases that refuse to be pigeon-holed in any of the primary databases categories.

I have begun to refer to these as "multi-model databases" in recognition of the fact that they are able to take on the characteristics of multiple databases. In truth though there are probably two different groups of products that could be considered "multi-model":

True multi-model databases that have been designed specifically to serve multiple data models and use-cases

General-purpose databases with multi-model options

Source : https://blogs.the451group.com/information_management/2013/02/08/neither-fish-nor-fowl

OrientDB Community Edition

github.com/orientechnologies/orientdb

From Wikipedia, the free encyclopedia

OrientDB is an open source NoSQL database management system written in Java. It is a Multi-model database, supporting graph, document, key/value, and object models,[2] but the relationships are managed as in graph databases with direct connections between records. It supports schema-less, schema-full and schema-mixed modes. It has a strong security profiling system based on users and roles and supports querying with Gremlin along with SQL extended for graph traversal. OrientDB uses several indexing mechanisms based on B-tree and Extendible hashing, the last one is known as "hash index", there are plans to implement LSM-tree and Fractal tree index based indexes. Each record has Surrogate key which indicates position of record inside of Array list , links between records are stored either as single value of record's position stored inside of referrer or as B-tree of record positions (so-called record IDs or RIDs) which allows fast traversal (with O(1) complexity) of one-to-many relationships and fast addition/removal of new links. OrientDB is the third most popular graph database according to the DB-Engines graph database ranking[3], as of September 2017.

The development of OrientDB still relies on an open source community led by OrientDB LTD company created by its original author Luca Garulli. The project uses GitHub[4] to manage the sources, contributors and versioning, Google Group[5] and Stack Overflow[6] to provide free support to the worldwide users. OrientDB also offers a free Udemy course[7] for those hoping to learn the basics and get started with OrientDB.

Feature Matrix

	Community
License	Apache 2 license
Embedded, Remote and In-Memory Storage	✔
Studio Visual Tool and Console Tool	✔
High Availability Replication, Sharding and Fail-over	✔
Standards: SQL, Blueprints, Gremlin, Pipes, SparQl	✔
Teleporter – synchronization mode	
Metric Analysis (Monitor and tune your servers), Query Profiler (Locate 80% of the bottlenecks in your application), Configurable Alerts (Email alerts or executing HTTP requests), Scheduler for Full and Incremental Non-Stop Backups, Auditing to track all the access to your data	
10/5 & 24/7 Production Support Available	
Price	FREE for any use, even Commercial. No hidden restrictions.

DOWNLOAD

orientechnologies / orientdb

Watch ▼ 304 | ★ Star 3,824 | Fork 785

<> Code | Issues 1,319 | Pull requests 40 | Projects 1 | Wiki | Insights

OrientDB is the most versatile DBMS supporting Graph, Document, Reactive, Full-Text, Geospatial and Key-Value models in one Multi-Model product. OrientDB can run distributed (Multi-Master), supports SQL, ACID Transactions, Full-Text indexing and Reactive Queries. OrientDB Community Edition is Open Source using a liberal Apache 2 license. http://orientdb.com

orientdb | graph-database | document-database | dbms | nosql | graph-store | multi-master | multi-model-dbms | database | performance | fast | sql

17,808 commits | 71 branches | 142 releases | 121 contributors | Apache-2.0

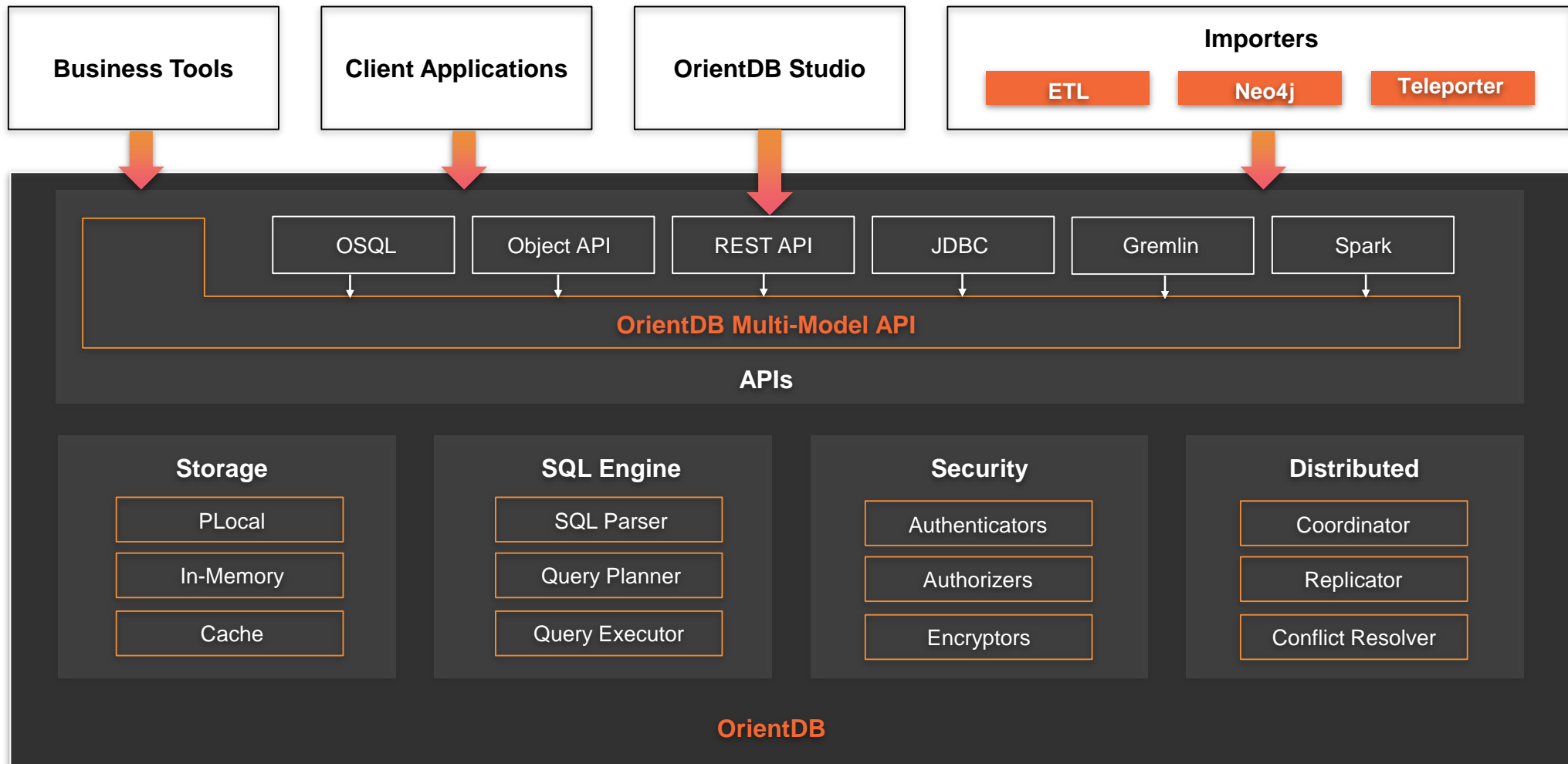Branch: develop ▼ | New pull request | Create new file | Upload files | Find File | Clone or download ▼

luigidellaquila Enhance quorum failure logging (distributed) | Latest commit 2491a38 3 days ago

OrientDB Community Edition

Business Tools

Client Applications

OrientDB Studio

Importers

ETL   Neo4j   Teleporter

OSQL   Object API   REST API   JDBC   Gremlin   Spark

OrientDB Multi-Model API

APIs

Storage
- PLocal
- In-Memory
- Cache

SQL Engine
- SQL Parser
- Query Planner
- Query Executor

Security
- Authenticators
- Authorizers
- Encryptors

Distributed
- Coordinator
- Replicator
- Conflict Resolver

OrientDB

Learn More: OrientDB at Udemy

14

Source : https://www.udemy.com/courses/search/?src=ukw&q=orientDB

SAP HANA
Not Only Multi-Model!

SAP HANA

From Wikipedia, the free encyclopedia

Hybrid transaction/analytical processing (HTAP) is an emerging application architecture that "breaks the wall" between transaction processing and analytics. It enables more informed and "in business real time" decision making.[1][2]

From Wikipedia, the free encyclopedia

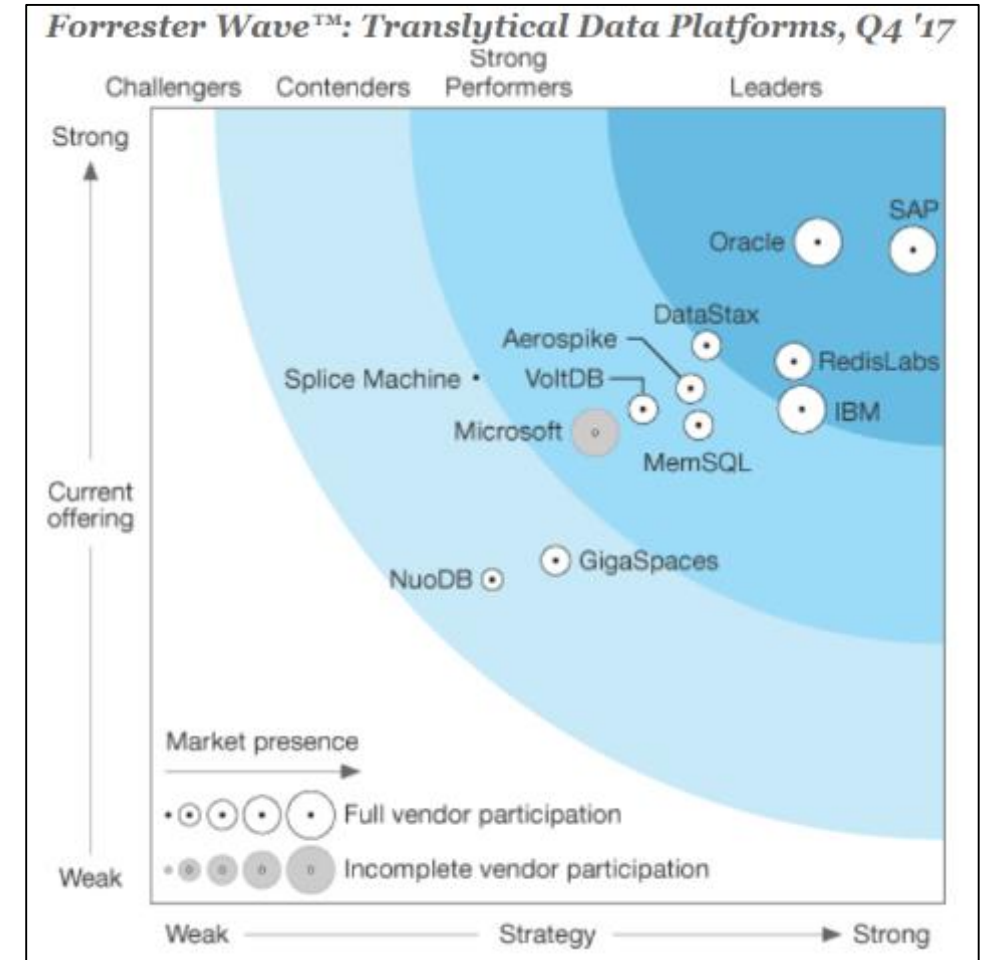**SAP HANA** is an in-memory, column-oriented, relational database management system developed and marketed by SAP SE.[2][3] Its primary function as a database server is to store and retrieve data as requested by the applications. In addition, it performs advanced analytics (predictive analytics, spatial data processing, text analytics, text search, streaming analytics, graph data processing) and includes extract, transform, load (ETL) capabilities as well as an application server.

"…**Translytical data platforms**, an emerging technology, deliver faster access to business data to support various workloads and use cases. EA pros can use them to drive new business initiatives…"

"SAP HANA is a shared-nothing, in-memory data platform, the core of SAP's translytical platform, which supports many use cases, including real-time applications, analytics, translytical apps, systems of insight, and advanced analytics…"
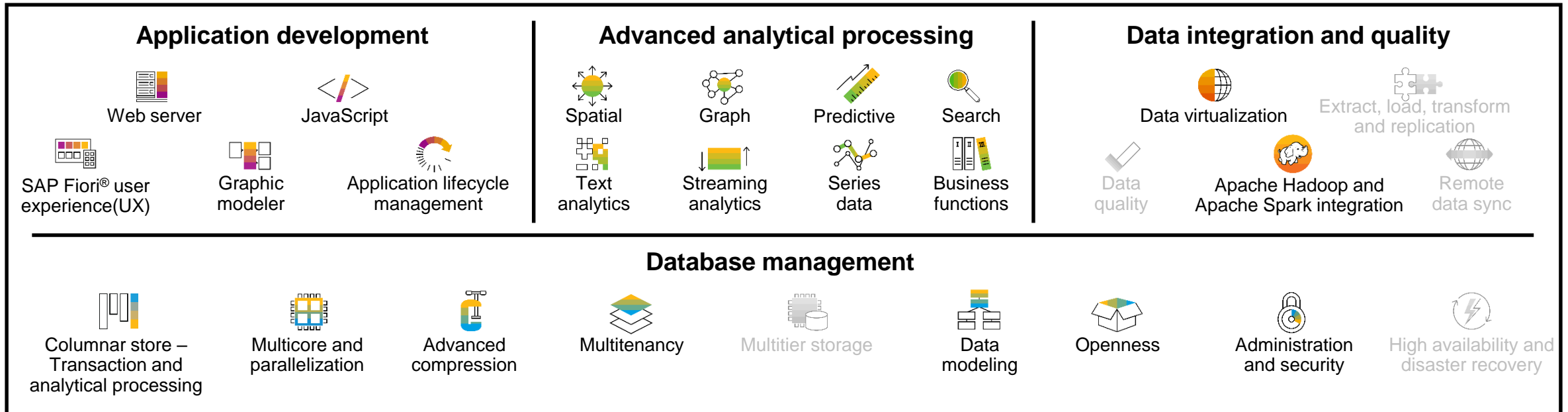

Forrester Wave™: Translytical Data Platforms, Q4 '17

Source : https://reprints.forrester.com/#/assets/2/308/'RES134282'/reports

SAP HANA, express edition

SAP HANA

- Free pre-packaged and self learning tutorials, use cases, and sample code available from SAP Developer Center

- Enable fast application development and deployment with essential SAP HANA features

- Free productive use up to 32 GB of RAM

- Comes as a binary installer, as a pre-configured virtual machine image (ova file), as a docker or cloud image (with launchers) - No certified HW needed

- Flexible access from laptop, personal computer, server, or cloud

Application development		**Advanced analytical processing**				**Data integration and quality**		
Web server	JavaScript	Spatial	Graph	Predictive	Search	Data virtualization		Extract, load, transform and replication
SAP Fiori® user experience(UX)	Graphic modeler	Application lifecycle management					Apache Hadoop and Apache Spark integration	Remote data sync
		Text analytics	Streaming analytics	Series data	Business functions	Data quality		

Database management

Columnar store – Transaction and analytical processing	Multicore and parallelization	Advanced compression	Multitenancy	Multitier storage	Data modeling	Openness	Administration and security	High availability and disaster recovery

Learn More: SAP HANA at openSAP

Full-Text Search with SAP HANA

- The Basics: Full-Text Indexing

- Matching: Fuzzy Search and Search Rules

- Search Models

- API and Query Language

- SAPUI5 Search User Interface

- SAP HANA Enterprise Search

https://open.sap.com/courses/hsesh1

Analyzing Connected Data with SAP HANA Graph

- Connected Data and SAP HANA Graph

- The Basics: Nodes, Edges, and Workspaces

- Pattern Matching

- Built-In Algorithms

- GraphScript

- SAP HANA Hierarchies

https://open.sap.com/courses/hsgra1

Spatial Analysis with SAP HANA

- Introduction to SAP HANA Spatial

- Spatial Analysis

- Development of Spatial Applications

https://open.sap.com/courses/hsgs1

And many more!

Source : https://open.sap.com/courses?topic=SAP%20HANA

Thank you!
Merci! Dzięki!

Visit the SAP Developer Center for free tools and resources:

SAP developers.sap.com

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SAP Developers on YouTube

sap.github.io on GitHub

Abdel Dadouche

Vitaliy Rudnytskiy

THE BEST RUN **SAP**