

Phase 2 Concept Consolidation

P2015-08 CAT ODS Big-Data-Technologies CONCEPT

Global Workshops (Detroit)

October 23rd – 26th 2017

Introduction – Big Data with ODS

- ▶ Today's measurements volumes outscore existing ODS capabilities.
- ▶ **TB measurement data** sizes will emerge with a daily routine.
- ▶ Copying data to engage tools is no longer advised nor practically possible.
- ▶ Algorithms need to come to the data stored on a scalable platform.
- ▶ Big data technologies provide the demanded features:
 - Volume [~1 TB per drive recorder per day!]
 - Velocity [for upload, search, download, reporting etc.]
 - Variety [of data formats i.e. not only MDF]
 - Variability [of measurement data interpreted with regards to context data]
 - Veracity [supporting plausibility check and corrections]
 - Visualization [for the data scientists]
 - Value [retrieval i.e. data are the new oil]
- ▶ Combination of **ODS and big data technologies** will **enable** descriptive and prescriptive (predictive) **data analytics** to enrich **partnerships** between OEMs and Tier1s (more at the end of the presentation).
- ▶ ASAM has already taken this up with the Dec. 08 - 09, 2015 International Conference on BIG DATA and with **P2015-08 Big Data Technologies for ODS**

P2015-08 Overview

Goal: Allow big data technologies to support huge measurements within ODS

Title: ODS Big Data Technologies Concept

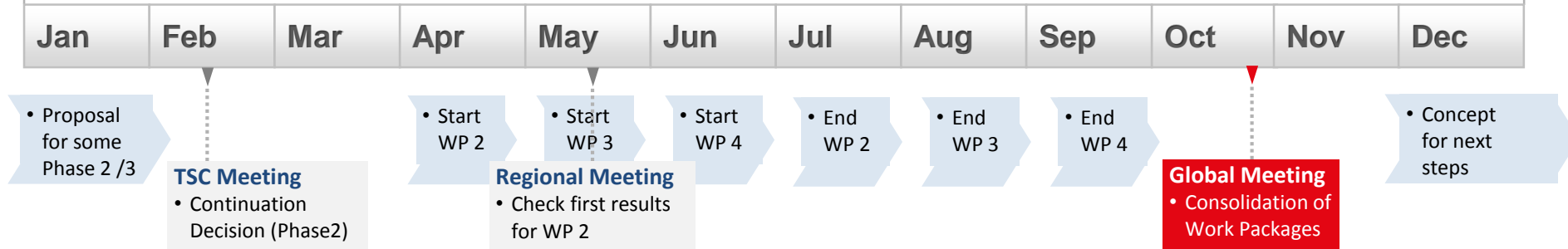
Release: Phase 2 – EO 2017

Features

- ✓ Describe Big Data best practices for automotive testing solution
- ✓ Investigate how to integrate data from development process and vehicle use (dealers, repair shops, end-users)
- ✓ Prepare automotive use cases, requirements, and test cases, and create a prototype
- ✓ Investigate on suitable big data technologies
 - ✓ Allow Hadoop or similar technologies to deploy an adapted ODS standard facilitating scalable storage distribution and computing platforms while keeping ODS largely free from specific tools' or technologies' demands
 - ✓ Define a suitable data ingest, search and data scientists access within big data ecosystems
- ✓ Identify and propose changes for ASAM and/or supporting standards (in the sense of a first minimal viable standardization “MVS”)

ODS Big-Data-Technologies CONCEPT – Plan

2017 – Meetings supplemented by WebEx conferences and networking



Phase 2 Concept Work Packages (RFQ) Validation based on Use Cases and Non-Functional Requirements

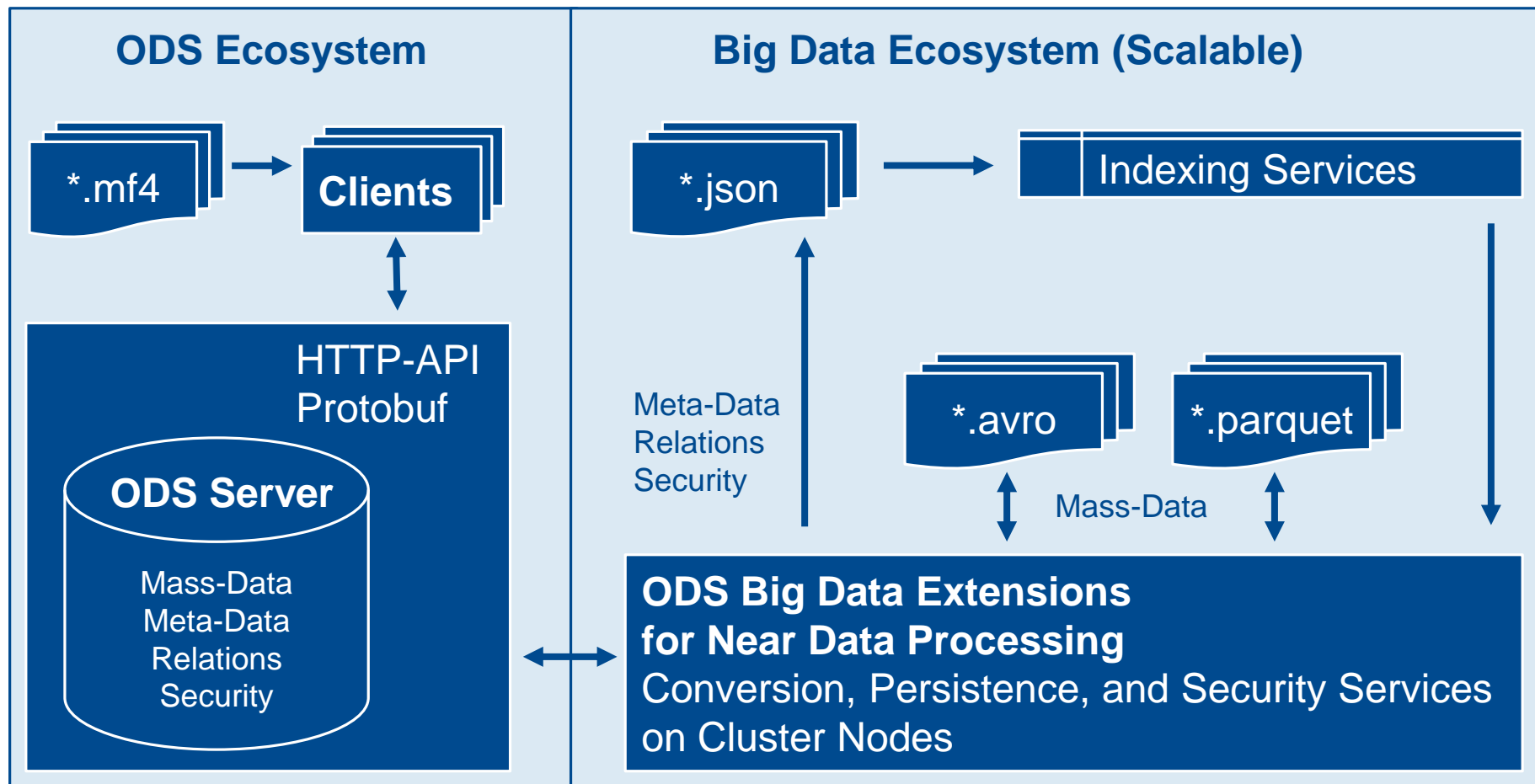
- WP 2 – Mass data storage in HDFS
- WP 3 – Definition of processing access layer
- WP 4 – Context data storage in HDFS
- WP 5 – Findings and preparation of next steps (parallel to other WPs)

Participants in 2017

- ▶ Audi
- ▶ AVL
- ▶ BMW
- ▶ Bosch
- ▶ Cummins
- ▶ ETAS
- ▶ Ford Motor Company
- ▶ HighQSoft
- ▶ IASYS
- ▶ Müller BBM
- ▶ National Instruments
- ▶ Peak Solution
- ▶ PSA
- ▶ RD Electronic
- ▶ Vector
- ▶ White Pine

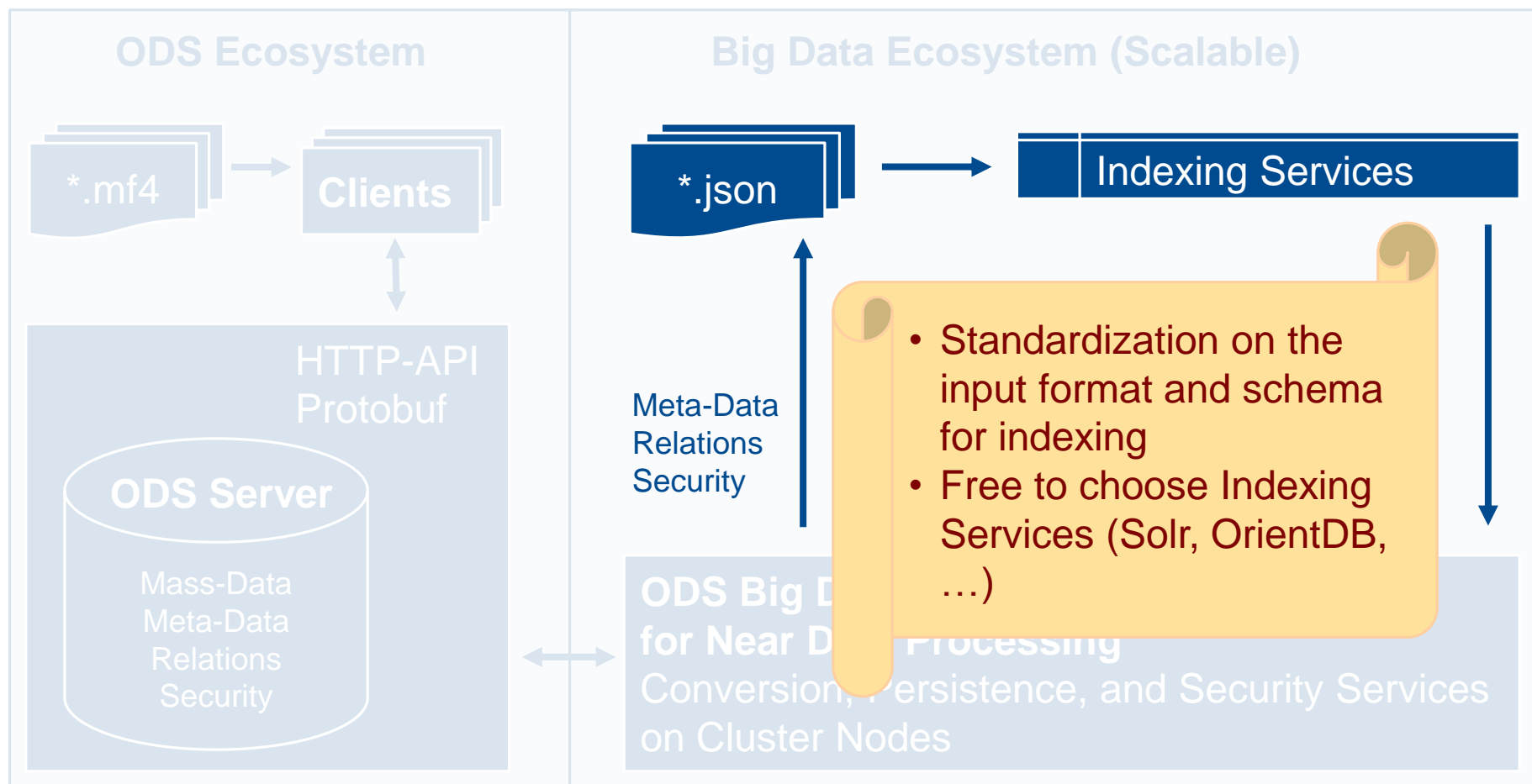
ODS Big-Data-Technologies CONCEPT

Architectural Overview – Information Flow (MVS)



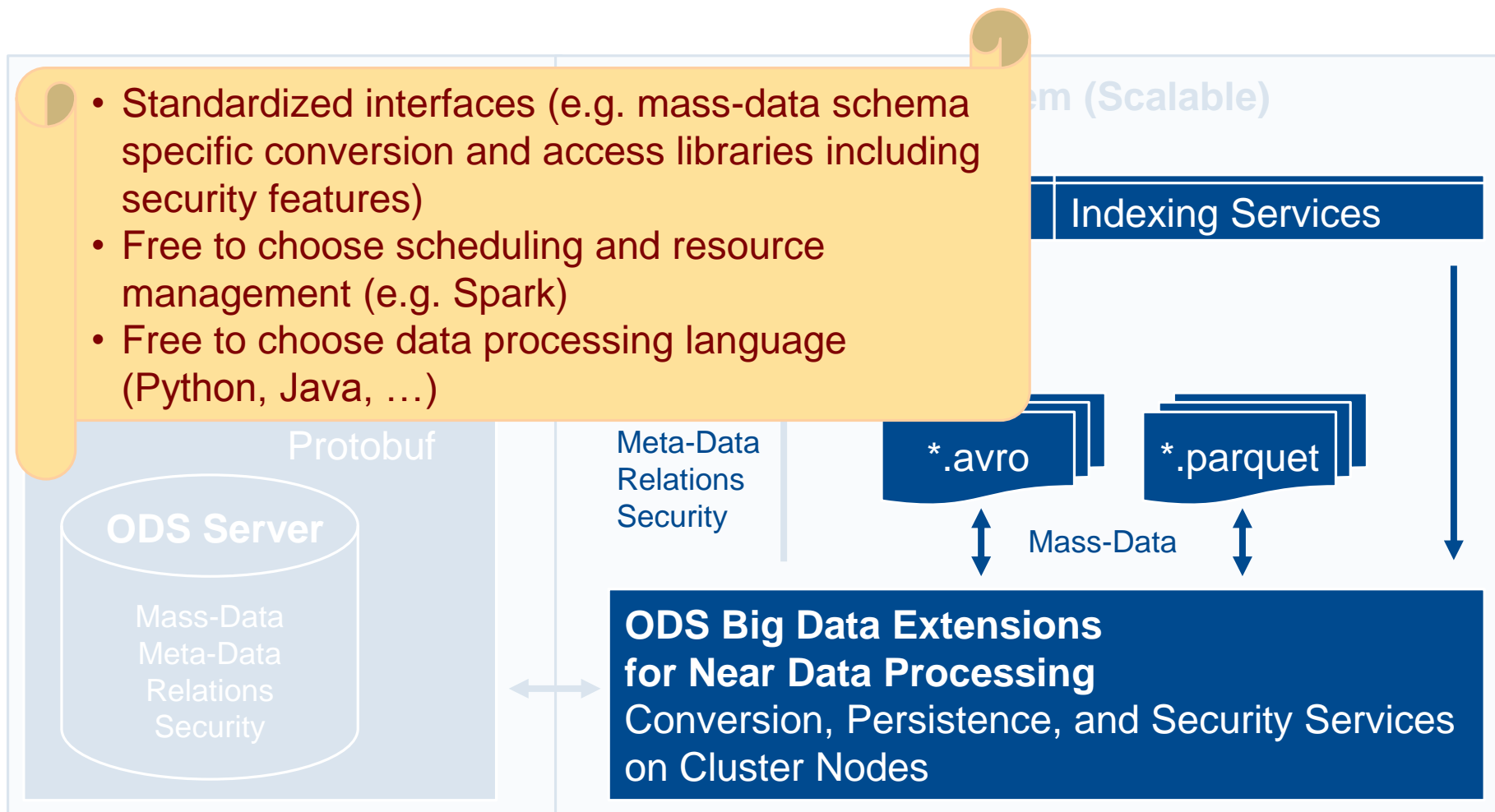
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Architectural Overview – Information Flow (MVS)



ODS Big-Data-Technologies CONCEPT

Architectural Overview – Information Flow (MVS)



ODS Big-Data-Technologies CONCEPT

Architectural Overview – Prescriptions

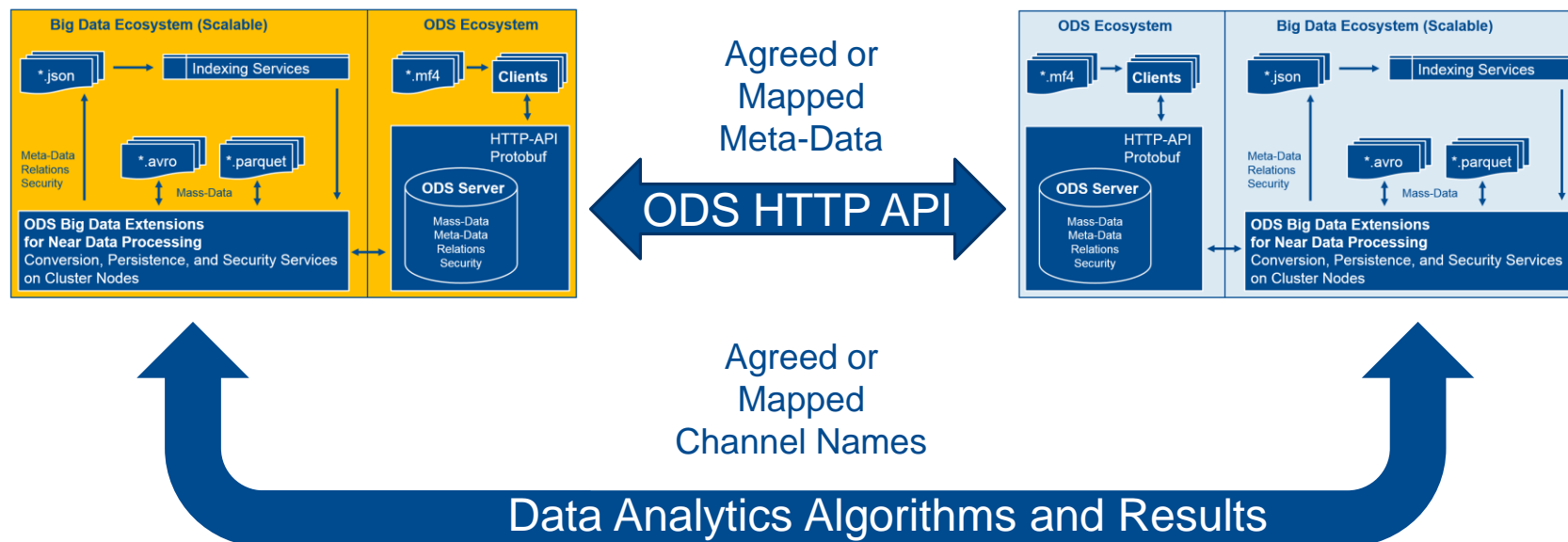
For kick start towards a big data related ODS minimal viable standard version these decisions have been made in the draft concept:

- ▶ ODS server remains master for meta-data
- ▶ Single ODS server connect one big data cluster
- ▶ Minimal standardization within the big data ecosystem
- ▶ Security (governance) remains largely with system administration
- ▶ Streaming and message queues standardization has been postponed
- ▶ Setup / migration performance optimizations shall be provided by tool vendors

ODS Big-Data-Technologies CONCEPT

Data Analytics – More Value for Partnerships with IP Protection

- ▶ ODS already allows to exchange data between partner
- ▶ The future combined ODS big data ecosystem will also allow to exchange even advanced data analytics algorithms (machine learning, deep learning) and their results without sharing measurements (the treasury of validation departments) in an agreed programming language
- ▶ Improved test coverage with reduced costs (understand and avoid double work)





Questions?

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