



SYBASE IQ 15.4 OVERVIEW

REVOLUTIONIZING BIG DATA ANALYTICS

DIAL NUMBERS:

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SYBASE IQ 15.4 OVERVIEW

REVOLUTIONIZING BIG DATA ANALYTICS

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JANUARY 26, 2012

AGENDA

- Big Data Analytics - Market Drivers
- Sybase IQ 15 – Proven For Big Data
- Sybase IQ 15.4 – Revolutionizing Big Data Analytics
- Summary

BIG DATA ANALYTICS

MARKET DRIVERS



BIG DATA ANALYTICS ISSUES

DEALING WITH *VOLUME, VARIETY, VELOCITY, COSTS, SKILLS*

Volume

Managing and harnessing terabytes of data

Skills

Lack of adequate skills for non-standard platforms and APIs

Variety

Harmonizing silos of structured and unstructured data

BIG DATA ANALYTICS

Costs

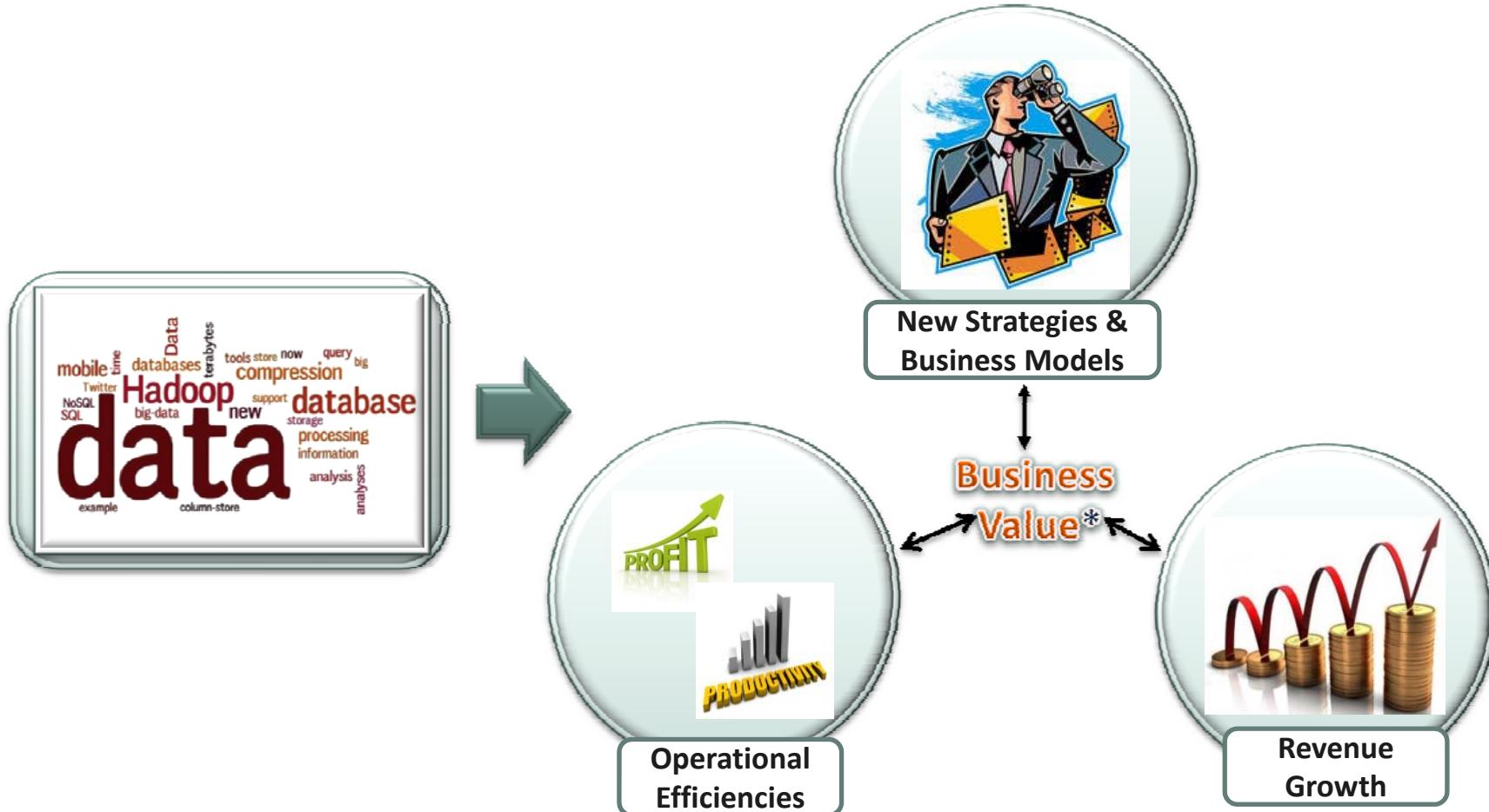
Too expensive to acquire, operate, and expand

Velocity

Keeping up with unpredictable data and query flows

BIG DATA ANALYTICS MATURITY

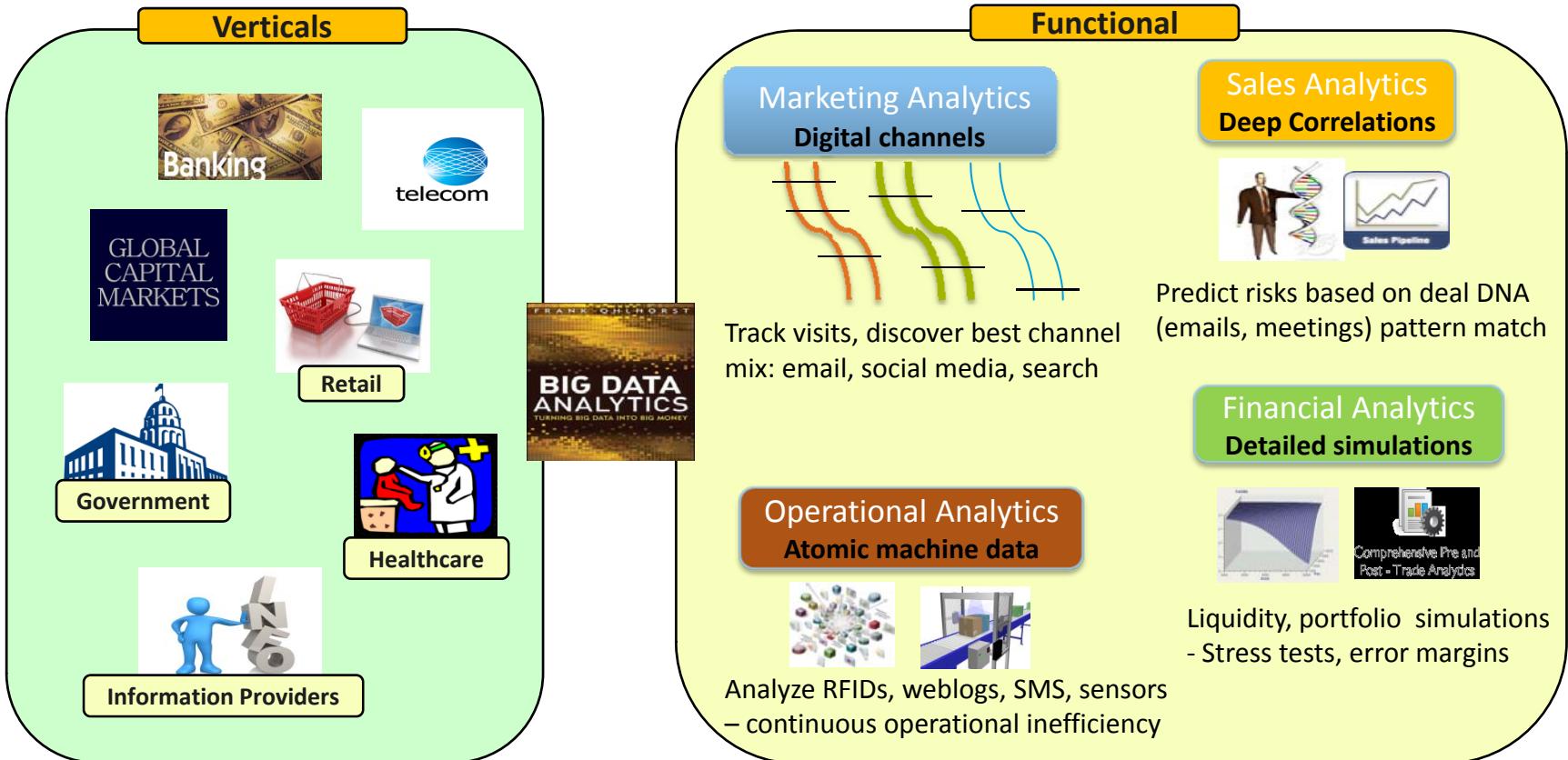
FROM JARGON TO TRANSFORMATIONAL BUSINESS VALUE*



* A McKinsey study titled "*Big Data: Next frontier for innovation, competition, and productivity*", May 2011, has found huge potential for Big Data Analytics with metrics as impressive as 60% improvements in Retail operating margins, 8% reduction in (US) national healthcare expenditures, and \$150M savings in operational efficiencies in European economies

BIG DATA ANALYTICS IN THE REAL WORLD

PREVALENT IN DATA INTENSIVE *VERTICALS* AND *FUNCTIONAL AREAS*



SYBASE IQ 15

PROVEN FOR BIG DATA



SYBASE IQ

MATURE, INDUSTRIAL STRENGTH ANALYTIC DBMS

Leadership

- Industry leading performance & scale benchmarks
- Recognized EDW market leader by Gartner, Forrester
- Pioneering Technology with 10+ patents

Adoption

- 4500+ installations in 2150+ accounts
- ~200 new customer wins per year (last 4 years)
- Consistently 96%+ customer satisfaction rates

Momentum

- 2 x DW market growth rate (last 4 years)
- Fast paced product releases
- v15, v15.1 (2009), v15.2 (2010), v15.3, v15.4 (2011)



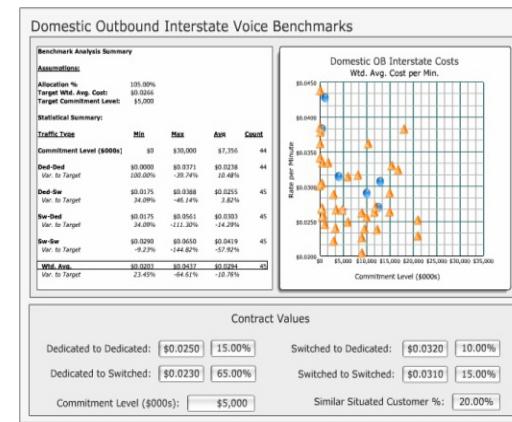
SYBASE IQ BIG DATA ANALYTICS IN TELCO

SCALING WITH OPERATIONAL DEMANDS

Reducing the complexity of the legacy systems in one of Europe's largest Telco operator - integrate 11 disparate and independent operating systems and handle rapid increase in **data volume totaling more than 70 TB and 15000 queries per day from more than 1000 active users.**

"The model saved between four and six times storage volume required compared to others in the market, with attendant reduction in hardware, support, administration".

- Pedro Romera, Systems Engineering Manager, Telefonica, Spain



SYBASE IQ BIG DATA ANALYTICS

PERVASIVE ACROSS DATA INTENSIVE INDUSTRIES WORLDWIDE



Manage and analyze statistical measures for the entire nation of Canada

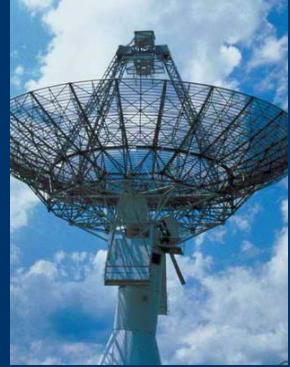


Analyze ALL Federal tax returns in the US

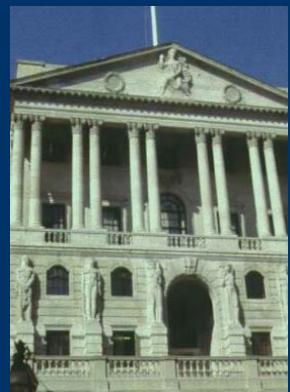


Analyze complex models in more than 200 financial institutions worldwide

Stands out as the leading enterprise data warehouse amongst the largest banks, insurance agencies, and telecom operators worldwide

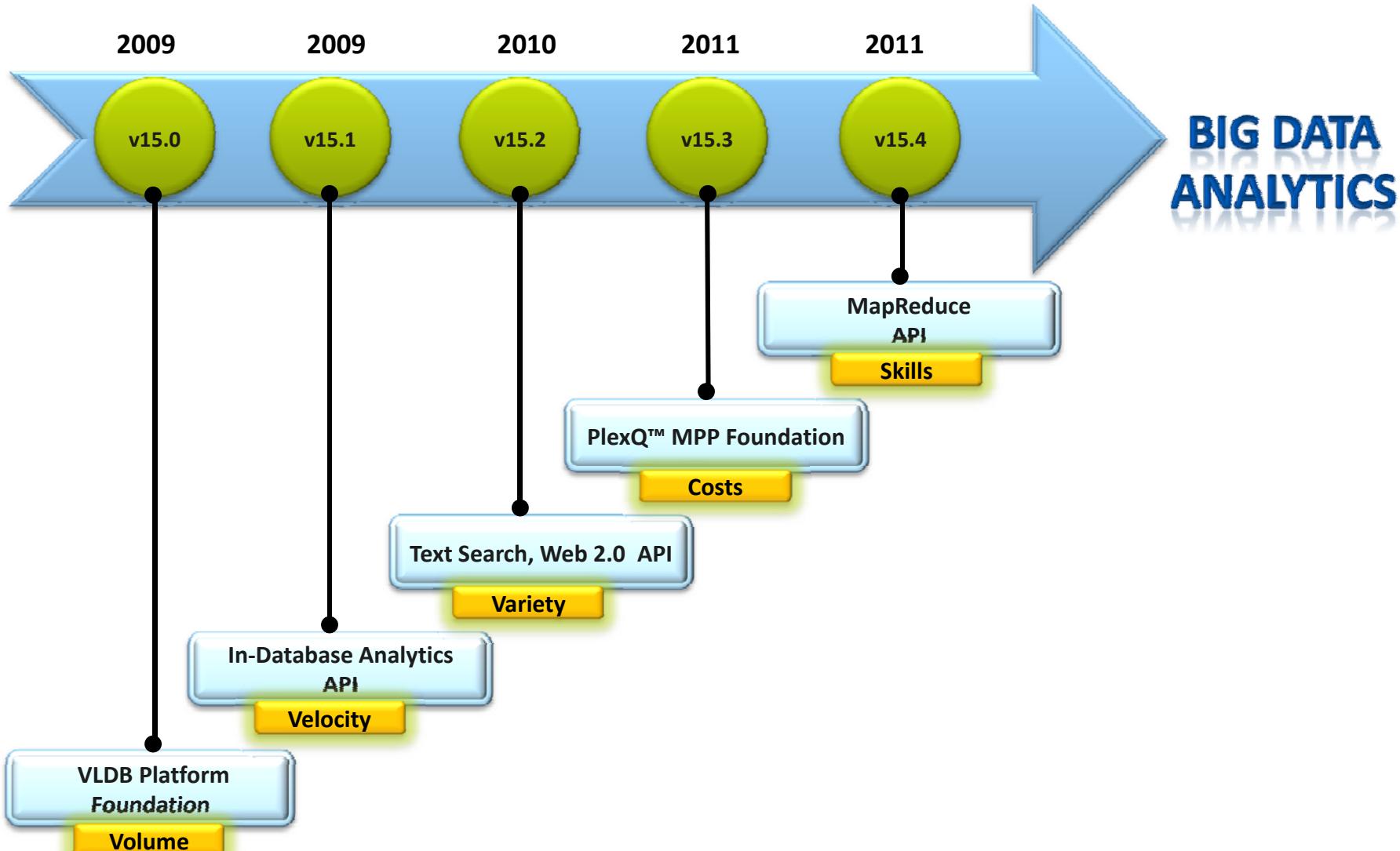


Store and Analyze massive amounts of industry segment data in 30 of the largest information providers in the world, including Transunion, Nielsen and Axiom



SYBASE IQ 15

A POWERFUL BIG DATA ANALYTICS PLATFORM IN MAKING



SYBASE IQ 15

A COMPREHENSIVE THREE-TIER BIG DATA ANALYTICS PLATFORM

Eco-System

Business Intelligence Tools, Data Integration Tools, DBA Tools, Packaged Apps

Application Services

In-Database Analytics, Multi-lingual Client APIs, Federation, Web Enabled

Data Management

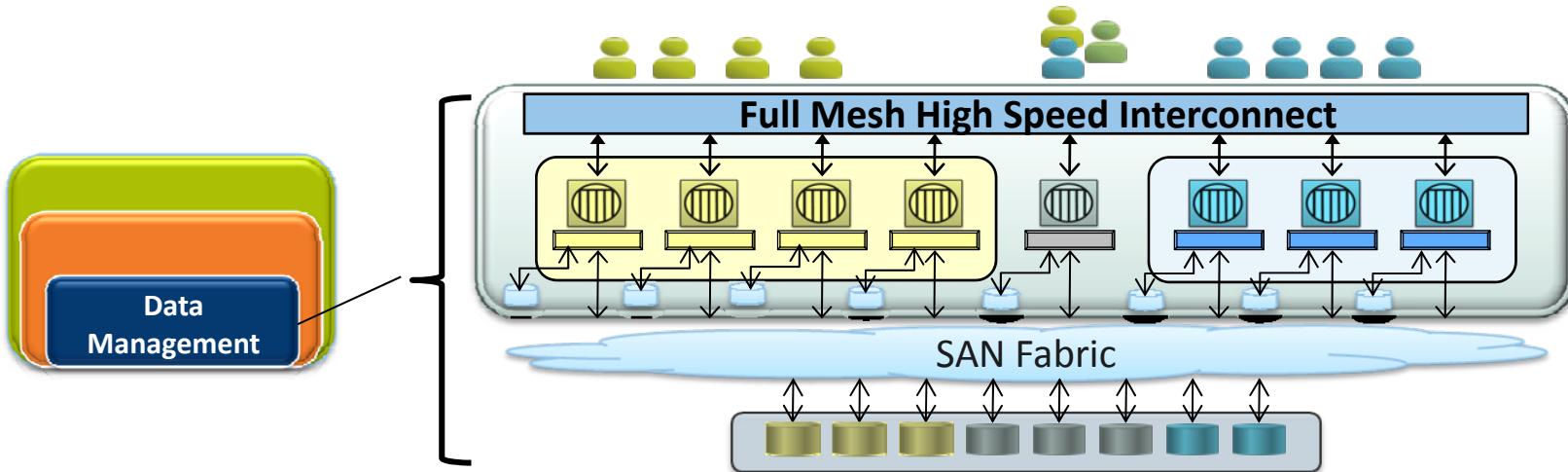
High Performance, Highly Scalable, Cloud Enabled

Sybase IQ

With PlexQ™
Technology

SYBASE IQ 15 PLATFORM

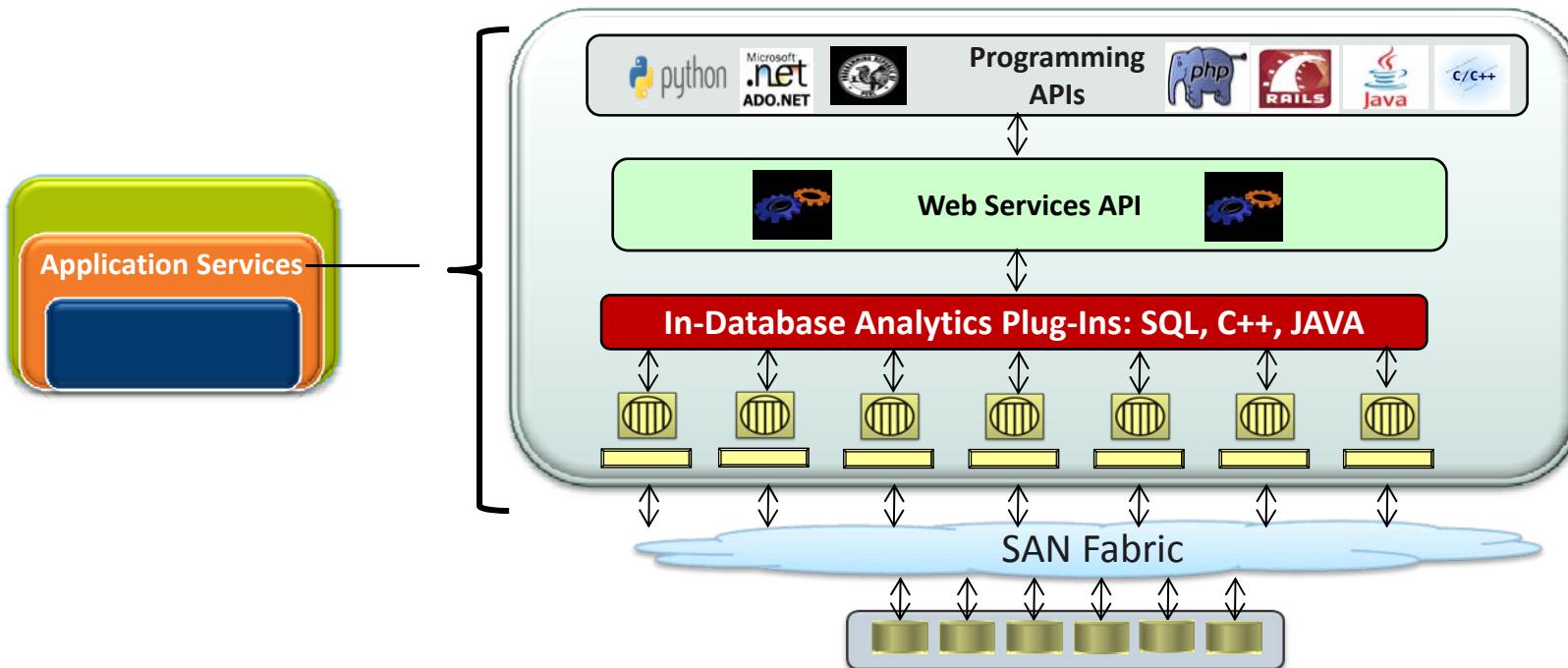
RELIABLE DATA MANAGEMENT FOR BIG DATA ANALYTICS



- Industry leading column store technology for speed, compression, ad-hoc analysis
- PlexQ™ framework
 - Massively parallel processing of complex queries
 - Cloud enabled Elastic Virtual Data Marts for user communities
- Logical and physical partitioning for information lifecycle management
- Productivity focused administration and monitoring

SYBASE IQ 15 PLATFORM

VERSATILE APPLICATION SERVICES FOR BIG DATA ANALYTICS



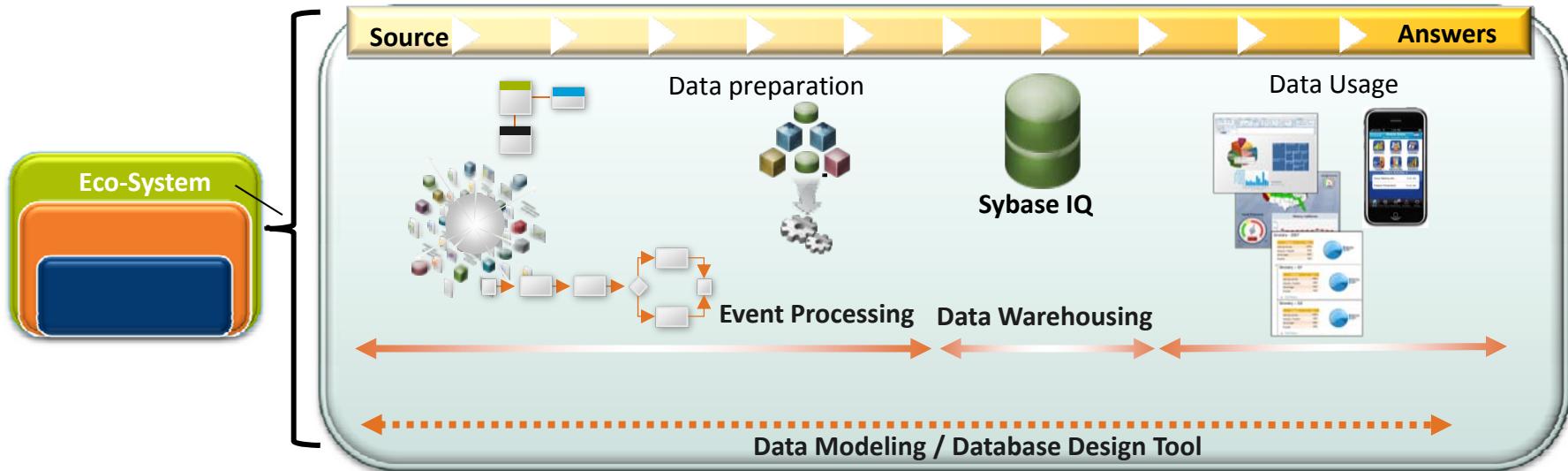
PlexQ™ framework

- Comprehensive ANSI SQL including ANSI 2008 specifications
- In-Database Analytics Plug-Ins: SQL, C++, JAVA for Data Mining, Statistical Analysis
- In-Database Web Services with SOAP API
- Query and data federation via SQL queries

Multi-lingual Client APIs: C, JAVA, PHP, PERL, Python, Ruby-on-rails, ADO.NET

SYBASE IQ 15 PLATFORM

RICH ECO-SYSTEM FOR BIG DATA ANALYTICS



- Certified Business Intelligence Tools:** SAP BusinessObjects BIP 4.0, Cognos, Microstrategy,...
- Certified Data Integration Tools:** SAP Business Objects DS 4.0, Informatica, Syncsort,
- Certified Data Mining Tools:** KXEN, SAS, SPSS, Qyte, ...
- Certified Application Tools:** ZEND, Quest, Alteryx, BMMSof,
- Certified DBA Tools:** Sybase, Bradmark, Whitesands, Symantec, EMC,

SYBASE IQ 15.4

REVOLUTIONIZING BIG DATA ANALYTICS



INTRODUCING SYBASE IQ 15.4

A COMPREHENSIVE BIG DATA ANALYTICS PLATFORM

Eco-System

Business Intelligence Tools, Data Integration Tools, DBA Tools, Packaged Apps

Application Services

In-Database Analytics, Multi-lingual Client APIs, Federation, Web Enabled

Data Management

High Performance, Highly Scalable, Cloud Enabled

v15.4
Major
Focus

v15.4
Minor
Focus

INTRODUCING SYBASE IQ 15.4

FOCUS AREAS OVERVIEW

Eco-System

- **In-Database Analytics Tools:** C++ Data Mining Library, PMML Plug-In
- **DBA Tools:** Reference Architecture Recommender, Administration & Monitors
- **Application Tools:** SQL Developer, Business Intelligence, Express Edition
- **Packaged Applications:** ILM, Social Network Analysis

Application Services

- Enriched In-Database Analytics APIs
 - Table UDFs
 - MPP Table Parameterized UDFs for Native MapReduce
 - Fault Tolerant JAVA UDFs
- **In-Database Analytics Development :** Simulator for UDFs
- **Federation bridges:** Geo-Spatial, Hadoop, "R"

Data Management

- Enhanced Compression: Text, Binary
- High Performance Bulk Inserts: JDBC/ODBC Interface

v15.4
Major
Focus

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Focus

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DATA MANAGEMENT – COMPRESSION AND LOADING

Feature

1



Optimized Text and
Binary Data compression

Characteristics

Target Data Types

- CHAR/VARCHAR/BINARY/VARBINARY

3x to 16x better compression

- Fewer I/Os
- Less storage needs

Big Data Use Cases

- Compliance/Litigation eDiscovery
- Text Analytics for Fraud
- Digital catalog search



Feature

2



High Performance Bulk Inserts

Characteristics

Bulk Inserts - ODBC/JDBC Clients

100 Xs speed up

- Good alternative to native APIs

Big Data Use Cases

- Bulk data insert via ETL tools
- Bulk data insert via client apps e.g.
- Insert federated query results



SYBASE IQ 15.4 DECONSTRUCTED

APP SERVICES – NEW IN-DATABASE ANALYTICS API

3

Feature



UDFs

JAVA User Defined Function offers a new In-Database Analytics API

Characteristics

- External algorithms written as JAVA fns, plugged into Sybase IQ
- JAVA fns via SQL: runs In-Database, much faster than client side
- JAVA fns run protected/fault tolerant (in separate process)
- Supports Scalar and Table outputs
- Supports all data types

Big Data Use Cases

- Ideal for ISV or custom Data Mining libraries for **Healthcare, eCommerce, Public Sector**. Apps include:

- ISV partner **Zementis** built a plug-in for PMML (Predictive Modeling Markup Language) models
 - Validates PMML from SAS, R,..
 - Translates PMML to JAVA UDFs
 - JAVA UDFs called from SQL



SYBASE IQ 15.4 DECONSTRUCTED

APP SERVICES – NEW IN-DATABASE ANALYTICS API

4

Feature



Table UDF is an In-Database Analytics API where **output** of UDFs are relational tables

Characteristics

- UDF **inputs**: single value or set of values; **output** is table data type
- Table UDF can participate like relational table in SQL queries e.g.
 - *create procedure NewUDF() result set TabUDF (x char, y int)*
 - *select Name, ID from NewUDF()*
- Table UDF offered in two flavors: C++ and JAVA

Big Data Use Cases

- Ideal for bulk data exchange (production) in analytic workflows. Apps include:
- Statistical analysis that produce multi-values, multi-attributes - output matrix created as part of *Principal Component Analysis*
- Data import federation bridge for e.g. external files, mining tools
 - Fetch results from execution of “R” models (embedded in Table UDFs) in external “R” server



SYBASE IQ 15.4 DECONSTRUCTED

APP SERVICES – NEW IN-DATABASE ANALYTICS API

5a

Feature



Table Parameterized UDF (**TPF**) is an In-Database Analytics API where both the **input** and **output** of UDFs are relational tables

Characteristics

- TPF **input**: table data type and/or others; **output** table data type
- TPFs are tables in SQL queries e.g.
 - *create procedure NewTPF (arg1 Table(c1, c2), arg2 char) result set TabUDF(d1 char, d2 int)*
 - *select Name, ID from NewTPF (select Min, Max from SalTab where gradeID <= 10, "Name1")*
- TPFs parallelized in SMP and/or across a grid; disjoint data sets into TPFs partitioned and/or ordered
- TPFs flavor: In-process C++

Big Data Use Cases

- Ideal for bulk data exchanges (produce/consume) in parallel workflows. Apps include:
 - Native MapReduce: bulk data “mapped” and “Reduced” in TPFs
 - Statistical analysis: consume/produce complex outputs e.g. matrices
 - Library of statistical + data mining fns integrated with TPFs



SYBASE IQ 15.4 DECONSTRUCTED

APP SERVICES – NATIVE MAPREDUCE USING TPF API

5b

MapReduce Characteristics

- I. Map/Reduce fns consume/produce data sets in bulk
- II. Map/Reduce fns executed as parallel jobs i.e. n Map fns, m Reduce fns execute independently in parallel
- III. Map/Reduce fns work on disjoint data sets i.e. n Map fns consume n disjoint data sets producing m disjoint data sets consumed by m Reduce fns
- IV. Several levels of nested Map/Reduce fns possible - multi-level tree execution
- V. Map/Reduce fns triggered by master node but are fault tolerant for worker units i.e. if a worker unit for a fn fails - picked up, completed by another worker unit
- VI. Map/Reduce fn libraries written in many languages including popular C++

Sybase IQ TPF for MapReduce

- I. TPFs consume/produce data sets in bulk
- II. TPFs run in parallel based on n paths for Map, m paths for Reduce - decided by Sybase IQ optimizer
- III. TPFs are fed with n disjoint data sets (Map TPFs) that produce m disjoint data sets (Reduce TPFs) via data partitions specified as part of SQL query
- IV. TPFs can be arbitrarily nested to multiple levels via sub-queries
- V. TPFs are initiated as parallel work units by a leader node in Sybase IQ PlexQ™ are fault tolerant - if worker node fails, leader picks up, completes work unit
- VI. TPFs currently available in popular, performance efficient C++

SYBASE IQ 15.4 DECONSTRUCTED

APP SERVICES – EXAMPLE OF NATIVE MAPREDUCE USING TPF

5c

For stocks in enterprise software sector, find max relative strength of a stock for a trading day*

Key (k1)	Value (v1)		
30-min interval time	Ticker Symbol	TickValue Day 1	TickValue Day 2
9:30 am	SAP	51	52.4
9:30 am	ORCL	31	28.2
9:30 am	TDC	22	21.3
10:00 am	SAP	50.9	53.1
10:00 am	TDC	21.8	20.9
10:00 am	ORCL	29.4	27.1
.....	ORCL



Key (k2)	Value (v2)	
Ticker Symbol	30-min interval time	Weighted variance = (A given stock's variance / Average Variance across All "N" stocks)
SAP	9:30 am	+1.4 / (Avg (+1.4-2.8-0.7....) / "N" stocks)
SAP	10:00 am	+2.2 / (Avg (+2.2-2.3-1.1) / "N" stocks)
SAP
ORCL	9:30 am	-2.8 / (Avg (+1.4-2.8-0.7....) / "N" stocks)
ORCL	10:00 am	-2.3 / (Avg (+2.2-2.3-1.1) / "N" stocks)
ORCL
TDC	9:30 am	-0.7 / (Avg (+1.4-2.8-0.7....) / "N" stocks)
TDC	10:00 am	-1.1 / (Avg (+2.2-2.3-1.1) / "N" stocks)
TDC



	Value (v3)
Ticker Symbol	Max Absolute Weighted Variance (v3)
SAP	Max (ABS(9:30 Wt Var), ABS(10:00 Wt Var),
ORCL	Max (ABS(9:30 Wt Var), ABS(10:00 Wt Var),
TDC	Max (ABS(9:30 Wt Var), ABS(10:00 Wt Var),

* Calculate max variance for the day by comparing each 30-min interval tick values across two days: the trading day & the day before, weighted by average variance of all stocks for each 30-min interval

SYBASE IQ 15.4 DECONSTRUCTED

APP SERVICES – EXAMPLE OF NATIVE MAPREDUCE USING TPF

5d

For stocks in enterprise software sector, find max relative strength of a stock for a trading day*

I. Write Map fn as C++ TPF: calculate variance for 30-min interval tick data b/w two trading days for a stock, weighted by average variance of all stocks* for the 30-min interval

- TPF Map Fn (**MapVarTPF**): Input Key-Value Pair (k1, v1) -> Output Key-Value Pair (k2, v2)
 - **Input:** List of (k1: 30-minute interval time, v1:{Ticker symbol, 2 Days Prior Tick Value, 1 Day Prior Tick Value}) from table TickDataTab
 - **Output:** List of (k2: Ticker symbol, v2:{30-minute interval time, variance b/w two previous trading days})
 - Each Map TPF gets disjoint set (k1, v1) partitioned on k1 time interval (in this case **15 partitions:** 15 30-min intervals in a trading day)

II. Write Reduce fn as C++ TPF: takes outputs of Map Fns as inputs, produces list of max weighted variance across all 30-minute intervals b/w two trading days

- TPF Reduce Fn (**RedMaxVarTPF**): Input Key-Value Pair (k2, v2) -> Value List (v3)
 - **Input:** List of (k2: Ticker Symbol, v2:{30-minute interval time, variance b/w two previous trading days})
 - **Output:** List of v3 (Ticker Symbol, maximum variance for the day across all 30-minute interval variances per Ticker Symbol)
 - Each Reduce TPF gets disjoint set (k2, v2) partitioned on k2 Ticker symbols (in this case **25 partitions:** 25 unique stock symbols)

III. Call **MapVarTPF** and **RedMaxVarTPF** from SQL query

- Map TPF partition (30-minute intervals) specified in query
- Reduce TPF partition (Ticker Symbol) specified in parameter k2

* Assume the enterprise software sector has 25 unique stock symbols

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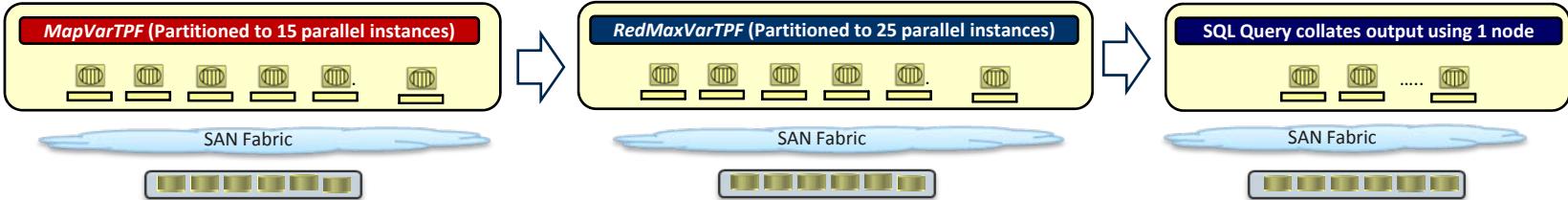
APP SERVICES – EXAMPLE OF NATIVE MAPREDUCE USING TPF

5e

For stocks in enterprise software sector, find max relative strength of a stock for a trading day

- Map TPF declaration: CREATE PROCEDURE **MapVarTPF** (IN XY TABLE (a1 char, a2 datetime, a3 float, a4 float)
RESULT SET YZ (b1 char, b2 datetime, b3 float))
- Reduce TPF declaration: CREATE PROCEDURE **RedMaxVarTPF** (IN XY TABLE (a1 char, a2 datetime, a3 float)
RESULT SET YZ (b1 char, b2 float))
- SQL Query: SELECT RedMaxVarTPF.TickSymb, RedMaxVarTPF.MaxVar,
FROM **RedMaxVarTPF** (TABLE (SELECT MapVarTPF.TickSymb, MapVarTPF.30MinIntTime, MapVarTPF.Var
FROM **MapVarTPF** (TABLE (SELECT TickDataTab.TickSymb, TickDataTab.30MinIntTime,
TickDataTab.30MinValDay1, TickDataTab.30MinValDay2)
OVER (PARTITION BY TickDataTab.30MinInt)))
OVER (PARTITION BY MapVarTPF.TickSymb))
ORDER BY RedMaxVarTPF.TickSymb

- Native MapReduce parallel execution workflow:



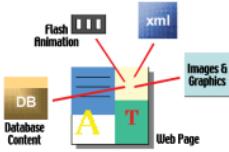
- Native MapReduce with unstructured data: MapReduce using Sybase IQ TPF can easily be applied to unstructured data also e.g. text, multi-media, ... stored in Sybase IQ column store or to unstructured data brought into Sybase IQ during execution time from external files

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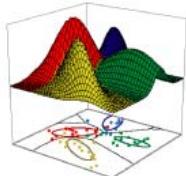
APP SERVICES – OTHER USE CASES FOR NATIVE MAPREDUCE USING TPF

5f

Wide applicability across many industries and Big Data Analytics use cases



Preprocess unstructured content (breadth analysis) for downstream depth analysis in **Intelligence agencies, Insurance** fraud patterns



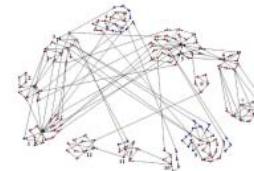
Run complex machine learning algorithms in parallel to discover and identify new patterns e.g. variance from known patterns for **insurance** claims, suspect behavior tracking by **intelligence agencies**



Native MapReduce



Genome sequence analysis in **Life sciences**



Graph analysis to uncover relationships between people, machines, events e.g. Social network analysis for marketing campaigns by **Banks**, Network fault analysis by **Telcos**

SYBASE IQ 15.4 DECONSTRUCTED

APP SERVICES – REVISIT CONTRASTING MAPREDUCE IN HADOOP VS SYBASE IQ

5g

MapReduce in Hadoop

- I. Map/Reduce fns via non-SQL procedural frameworks
 - Programmer needs to understand data placement
 - Special purpose access tools needed
 - Partially alleviated with immature HIVE (SQL) interface
- II. Data store is a Distributed File System
 - Batch jobs oriented – cumbersome slicing/dicing
 - No ACID compliance
 - Little to no security protection on data access
 - Complex joins cumbersome
 - Schema-less and requires no ETL
 - HBASE variant has column store, but not a RDBMS
- III. Requires a lot of HW for performance
 - Shared Nothing MPP mandatory
 - Runs only on x86/Linux platform
- IV. HA is robust, DR isn't
 - HA with worker-worker failover
 - HA load balancing not sophisticated
 - DR difficult with distributed files, too much replication
- V. Map/Reduce fns in several languages: C++, JAVA, PHP, ... called by multiple interfaces: Pig, HIVE,..

Sybase IQ Native MapReduce

- I. Map/Reduce fns via ANSI compliant declarative SQL
 - Eliminates programmer intervention in query plans
 - Standard BI tool access for broad consumption
- II. Data store is a Column Store DBMS
 - Allows ad-hoc query jobs for at-will slicing/dicing
 - Provides full ACID compliance of a DBMS
 - Enterprise security protection on data access
 - Complex joins easy
 - Requires schema and at least some ETL
- III. Requires less HW footprint for good performance
 - SMP or MPP to deliver good response
 - Can run on any HW/OS platform
- IV. HA-DR is robust
 - HA with leader-worker workload balance
 - HA with worker node failover
 - DR with robust SAN/storage protection
- V. Map/Reduce fns in C++ only; called by SQL only

SYBASE IQ 15.4 DECONSTRUCTED

APP SERVICES – INTEGRATING SYBASE IQ + HADOOP: AT CLIENT SIDE

Feature

6a



Client Side Federation: Join data from Sybase IQ AND Hadoop at a client application level

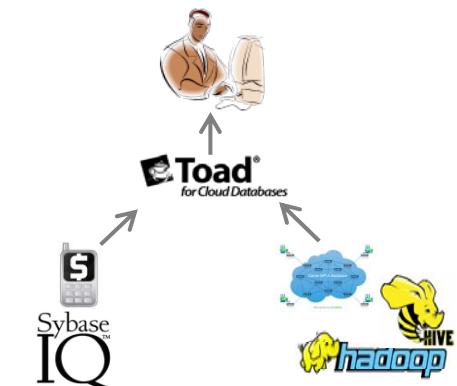
Characteristics

- Client tool capable of querying Sybase IQ and Hadoop
- Currently certified Client tool is Quest Toad for Cloud
- Better performance when results from sources are pre-computed/pre-aggregated

Big Data Use Cases



- Ideal for bringing together Big Data Analytics pre-computations from different domains
- Example – In **Telecommunication**: Sybase IQ with aggregated customer loyalty data & Hadoop with aggregated network utilization data; Quest Toad for Cloud can bring data from both sources, linking customer loyalty to network utilization or network faults (e.g. dropped calls)



SYBASE IQ 15.4 DECONSTRUCTED

APP SERVICES – INTEGRATING SYBASE IQ + HADOOP: USING ETL

Feature

6b



Load Hadoop Data into Sybase IQ column store: Extract, Transform, Load data from HDFS (Hadoop Distributed File System) into Sybase IQ schemas

Characteristics

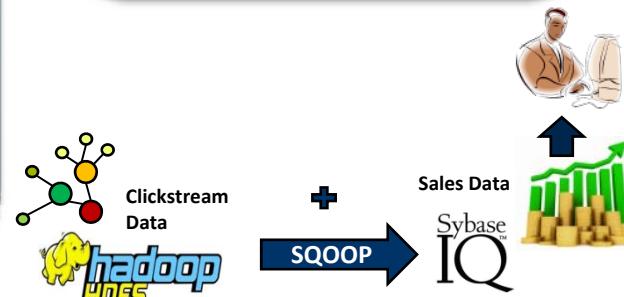
- Extract & load subsets of HDFS data into Sybase IQ column store
 - Raw data from HDFS
 - Results of Hadoop MR jobs
- HDFS Data stored in Sybase IQ is treated like other Sybase IQ data
 - Gets ACID properties of a DBMS
 - Can be indexed, joined, parallelized
 - Can be queried in an ad-hoc way
- Visible to BI and other client tools via Sybase IQ ANSI SQL API only
- Currently, the Apache bulk data transfer utility SQOOP (built by Cloudera) is certified to provide this ETL capability

Big Data Use Cases



- Ideal for combining subsets of HDFS unstructured data or summary of HDFS data into Sybase IQ for **mid to long term** usage in business reports

• Example – In **eCommerce**: clickstream data from weblogs stored in HDFS and outputs of MR jobs on that data (to study browsing behavior) ETL'd into Sybase IQ. The transactional sales data in Sybase IQ joined with clickstream data to understand and predict customer browsing to buying behavior

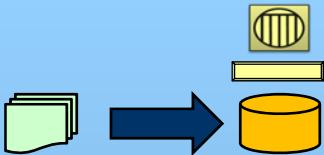


SYBASE IQ 15.4 DECONSTRUCTED

APP SERVICES – INTEGRATING SYBASE IQ + HADOOP: USING DATA FEDERATION

Feature

6c



Join HDFS data with Sybase IQ data on the fly: Fetch and join subsets of HDFS data on-demand using SQL queries from Sybase IQ (**Data Federation** technique)

Characteristics

- Scan and fetch specified data subsets from HDFS via table UDF
 - Can read and fetch HDFS data subsets
 - Called as part of Sybase IQ SQL query
 - Output joinable with Sybase IQ data
 - Multiple, simultaneous UDF calls possible
 - Sample UDFs provided in JAVA, C++
- HDFS data not stored in Sybase IQ
 - Fetched into Sybase IQ In-memory tables
 - ACID properties not applicable
 - Repeated use: put fetched data in tables
- Visible to BI/other client tools via Sybase IQ ANSI SQL API only

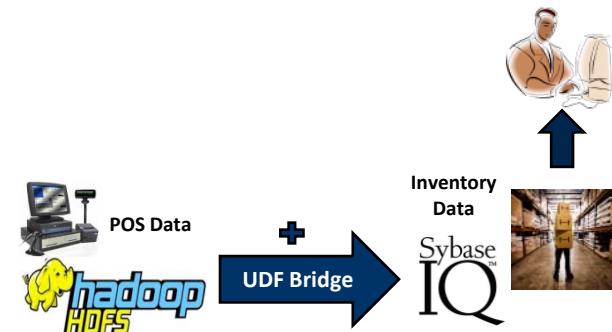
Big Data Use Cases



RETAIL

- Ideal for combining subsets of HDFS data with Sybase IQ data for ***operational*** (transient) business reports

- Example – In **Retail**: Point Of Sale (POS) detailed data stored in HDFS. Sybase IQ EDW fetches POS data at fixed intervals from HDFS of specific hot selling SKUs, combines with inventory data in Sybase IQ to predict and prevent inventory “stockouts”.

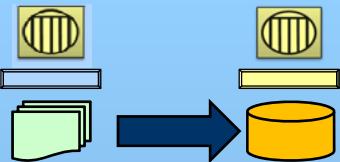


SYBASE IQ 15.4 DECONSTRUCTED

APP SERVICES – INTEGRATING SYBASE IQ + HADOOP: USING QUERY FEDERATION

Feature

6d



Combine results of Hadoop MR jobs with Sybase IQ data on the fly:
Initiate and Join results of Hadoop MR jobs on-demand using SQL queries from Sybase IQ data (**Query Federation** technique)

Characteristics

- Trigger and fetch Hadoop MR job results via table UDF
 - Can trigger Hadoop MR jobs
 - Called as part of Sybase IQ SQL query
 - Output joinable with Sybase IQ data
 - No multiple, simultaneous UDF calls
 - Sample UDFs provided in JAVA only
- HDFS data not stored in Sybase IQ
 - Fetched into Sybase IQ In-memory tables
 - ACID properties not applicable
 - Repeated use: put fetched data in tables
- Visible to BI and other client tools via Sybase IQ ANSI SQL API only

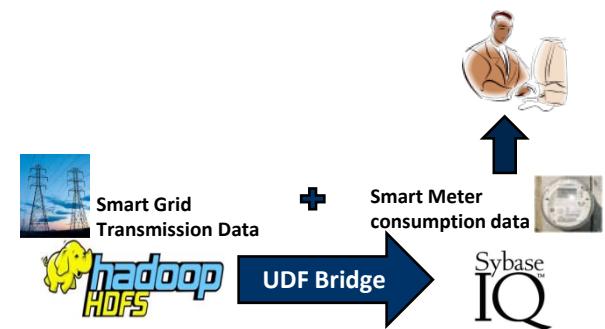
Big Data Use Cases



UTILITIES

- Ideal for combining results of Hadoop MR job results with Sybase IQ data for ***operational*** (transient) business reports

- Example – In **Utilities**: Smart meter and smart grid data can be combined for load monitoring and demand forecast. Smart grid transmission quality data (multi-attribute time series data) stored in HDFS can be computed via Hadoop MR jobs triggered from Sybase IQ and combined with Smart meter data stored in Sybase IQ to analyze demand and workload.



SYBASE IQ 15.4 DECONSTRUCTED

APP SERVICES – SYBASE FAMILY OF PRODUCTS INTEGRATION

Feature

7



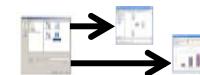
Data warehouse reference configuration builder

Characteristics

- Input DW/DM workload into Sybase PowerDesigner
 - Estimates + prints reference architecture
 - Prints detailed Bill Of Materials (BOM)
 - Can simulate with alternative BOM

Big Data Use Cases

- Template reference DW/DM
- Auto DW/DM capacity planning
 - Avoid expensive manual planning
 - Higher DBA/SI productivity



Feature

8



GeoSpatial Analysis

Characteristics

- GeoSpatial data in embedded row store (SQL Anywhere); supports GEOMETRY data type
- GeoSpatial data from row store joined with other data in column store via federation techniques

Big Data Use Cases

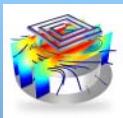


- Add Geospatial attributes
 - Example – In *Real Estate*: Housing data analysis in Sybase IQ column store combined with Zip code data from row store



Feature

9



UDF Simulation Tool

Characteristics

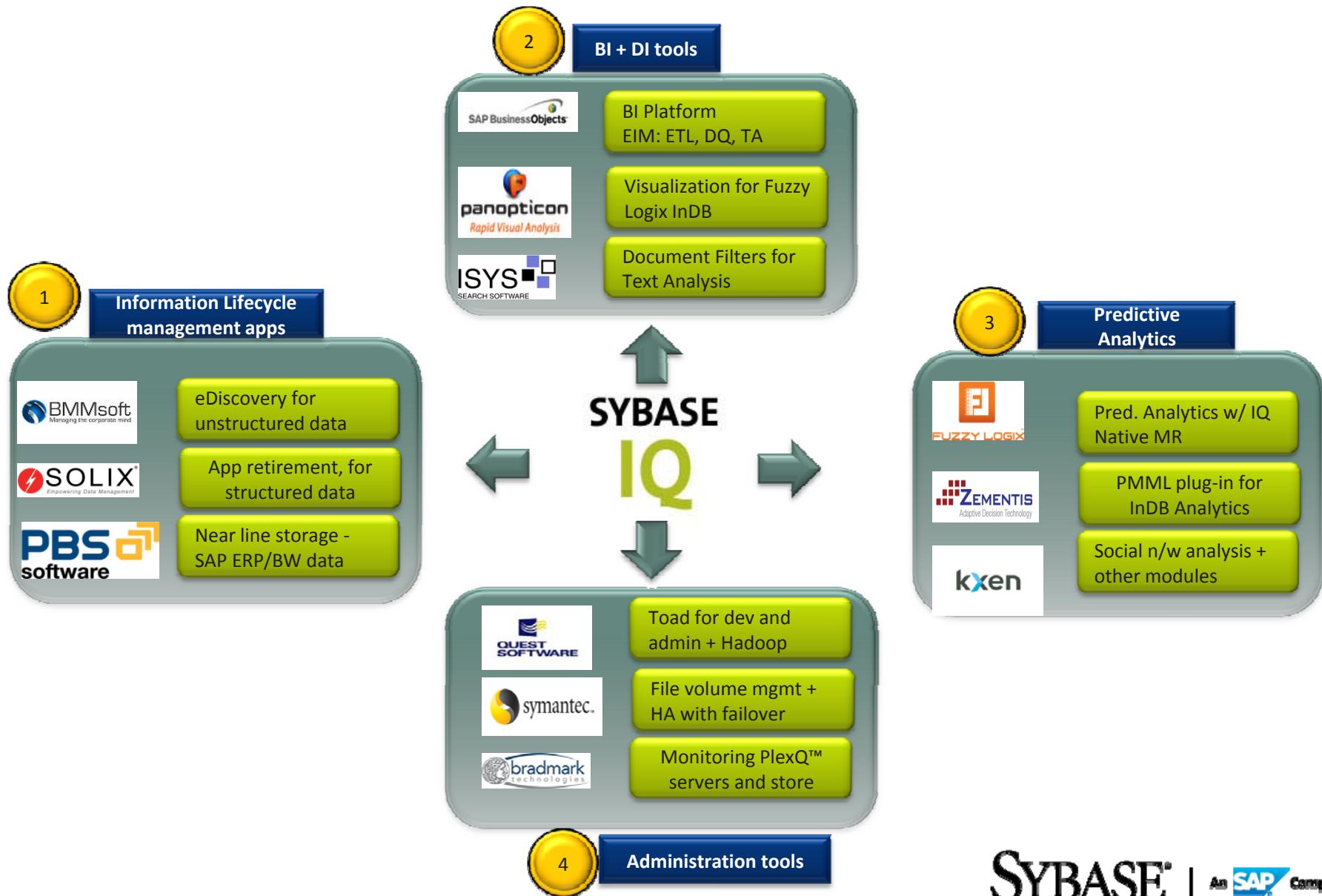
- Test UDF - simulate Sybase IQ data sets
 - Inputs: configFile, executionFile
 - Outputs: resultsFile

Big Data Use Case

- Improves developer productivity by pre-testing UDF logic w/o real Big Data

SYBASE IQ 15.4 DECONSTRUCTED

ECO-SYSTEM – RICH MULTI-PRODUCT SUPPORT



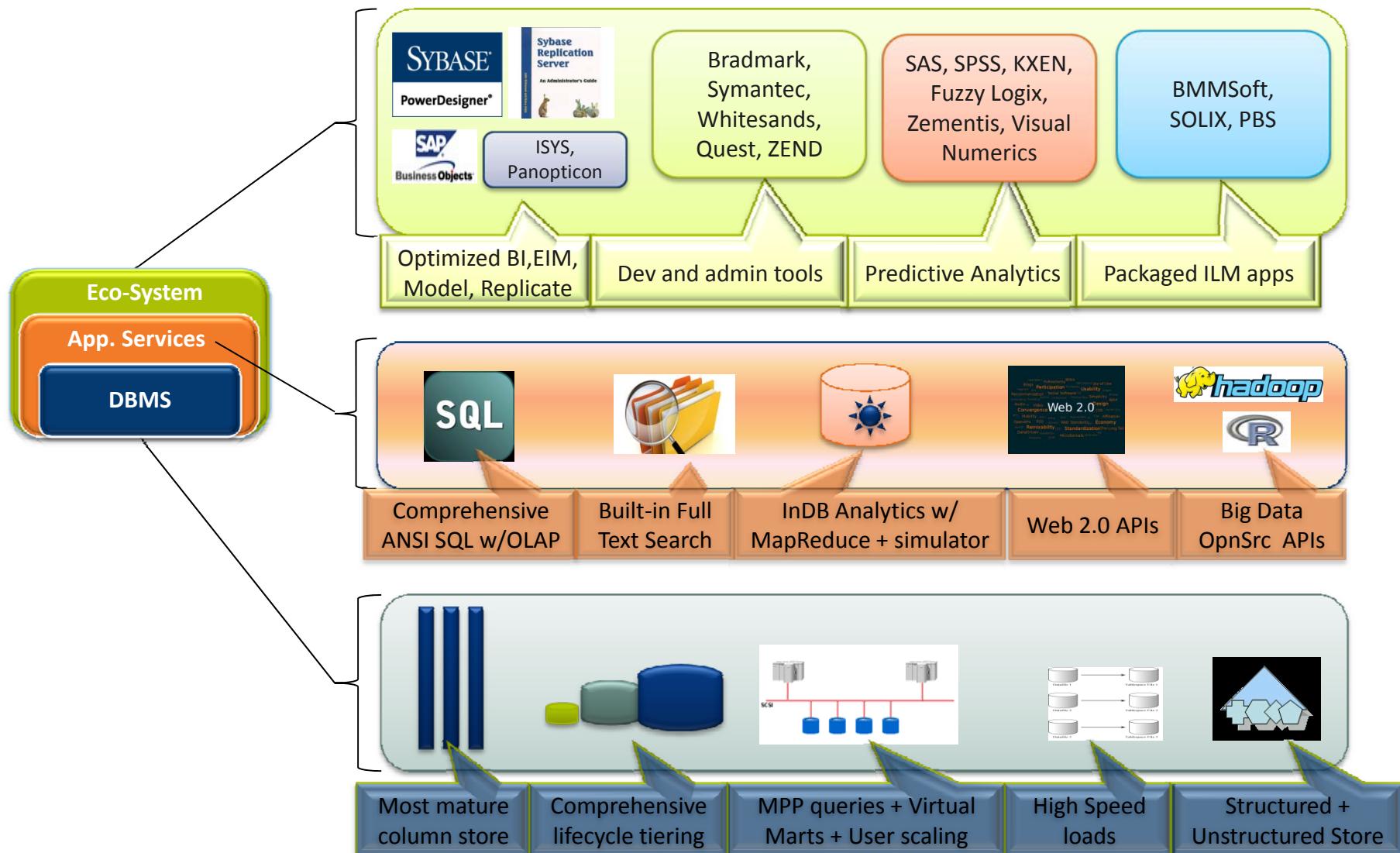
BIG DATA ANALYTICS

WITH SYBASE IQ 15.4



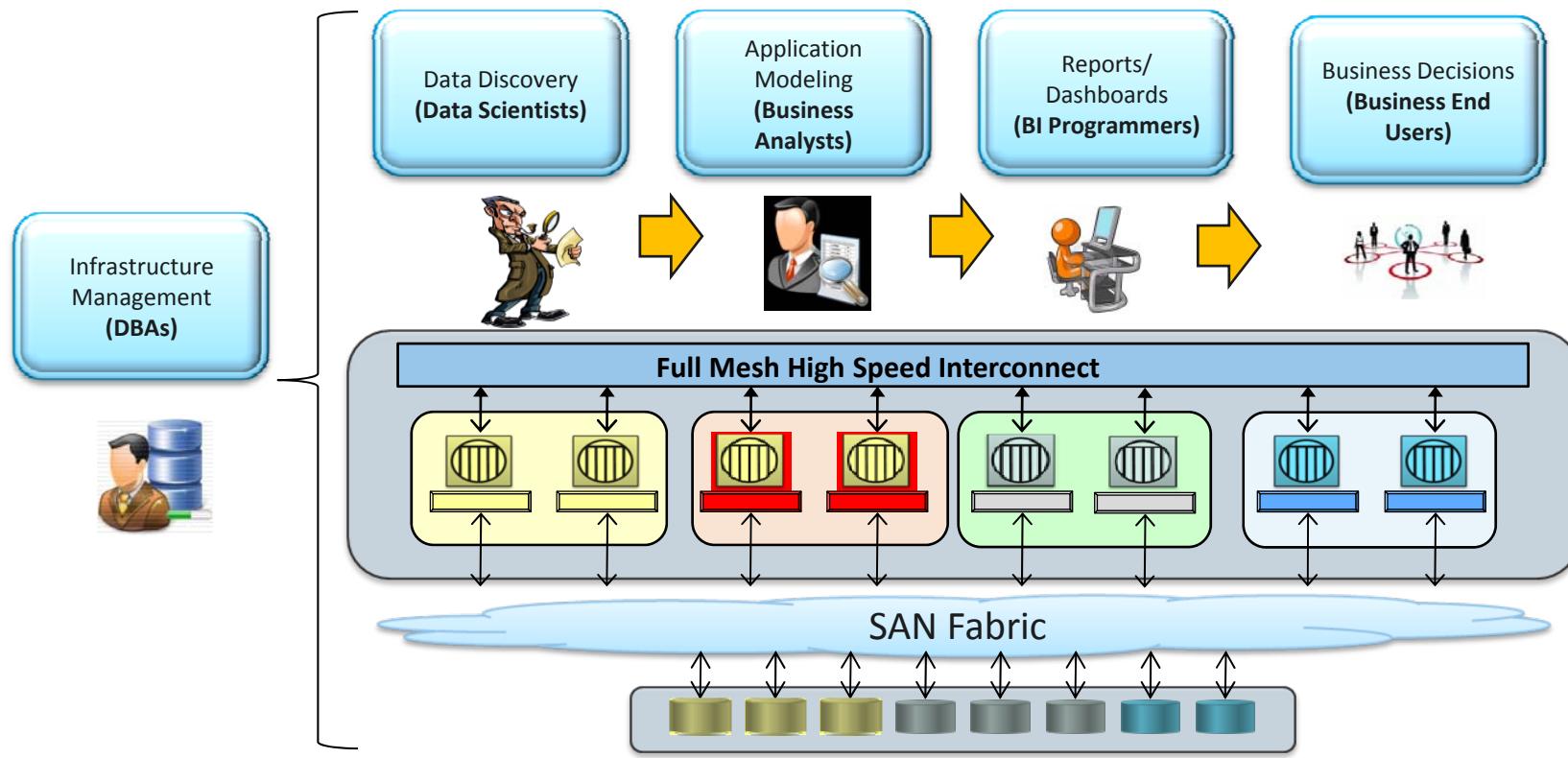
SYBASE IQ 15.4

A COMPLETE PLATFORM FOR DATA ANALYTICS USE CASES



SYBASE IQ 15.4

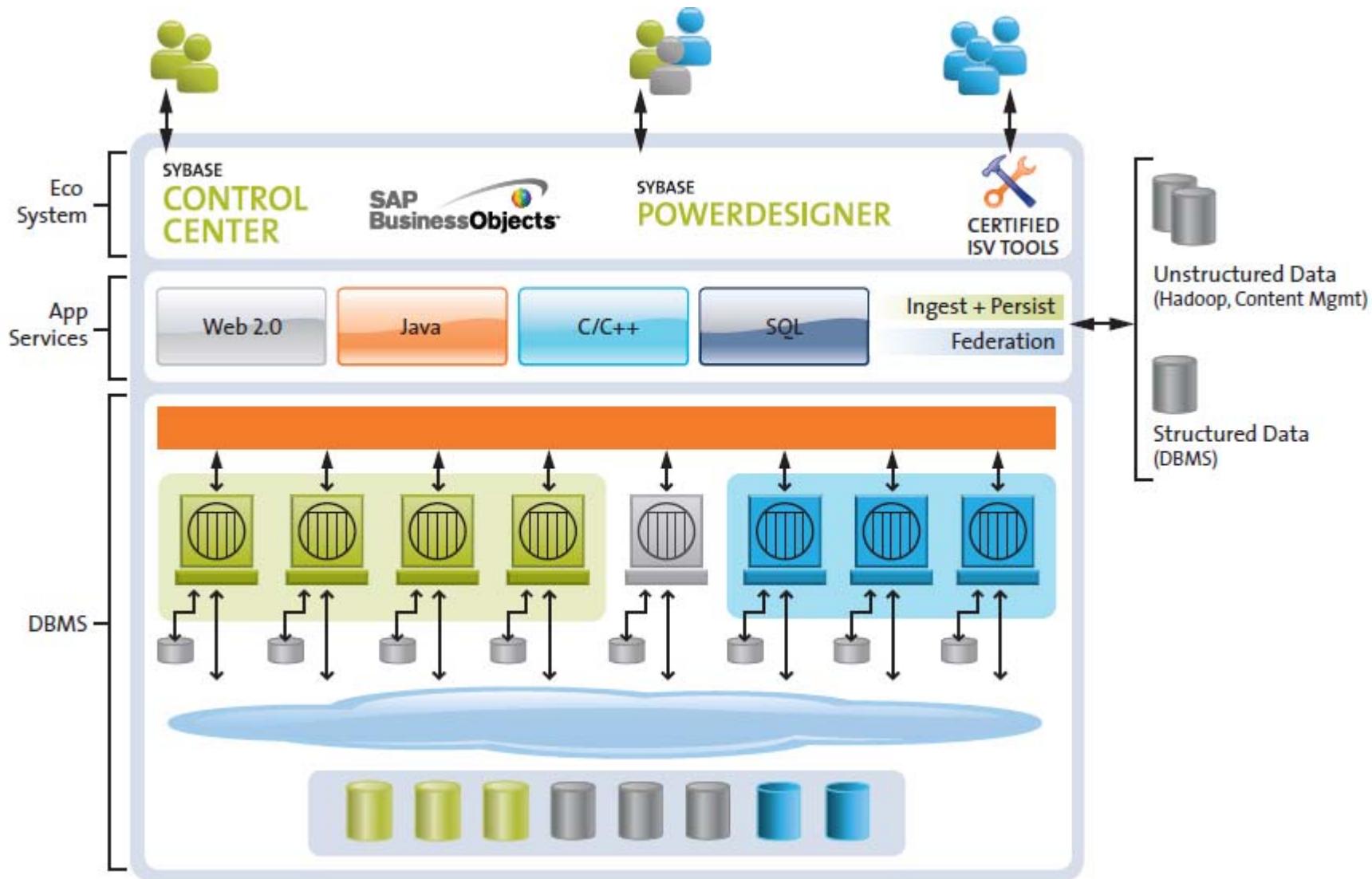
UNIQUE, USER COMMUNITY FOCUSED PLATFORM FOR BIG DATA ANALYTICS



- **Dynamic, Elastic PlexQ™ MPP grid**
 - Grow, shrink, provision on-demand
 - Heavy Parallelization
- **Load, Prepare, Mine, Report in a workflow**
 - Privacy through isolation of resources
 - Collaboration through sharing of results/data via sharing of resources

SYBASE IQ 15.4

A COMPREHENSIVE PLATFORM FOR BIG DATA ANALYTICS



THANK YOU
FOR MORE INFORMATION

<http://www.sybase.com/sybaseiqbigdata>

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