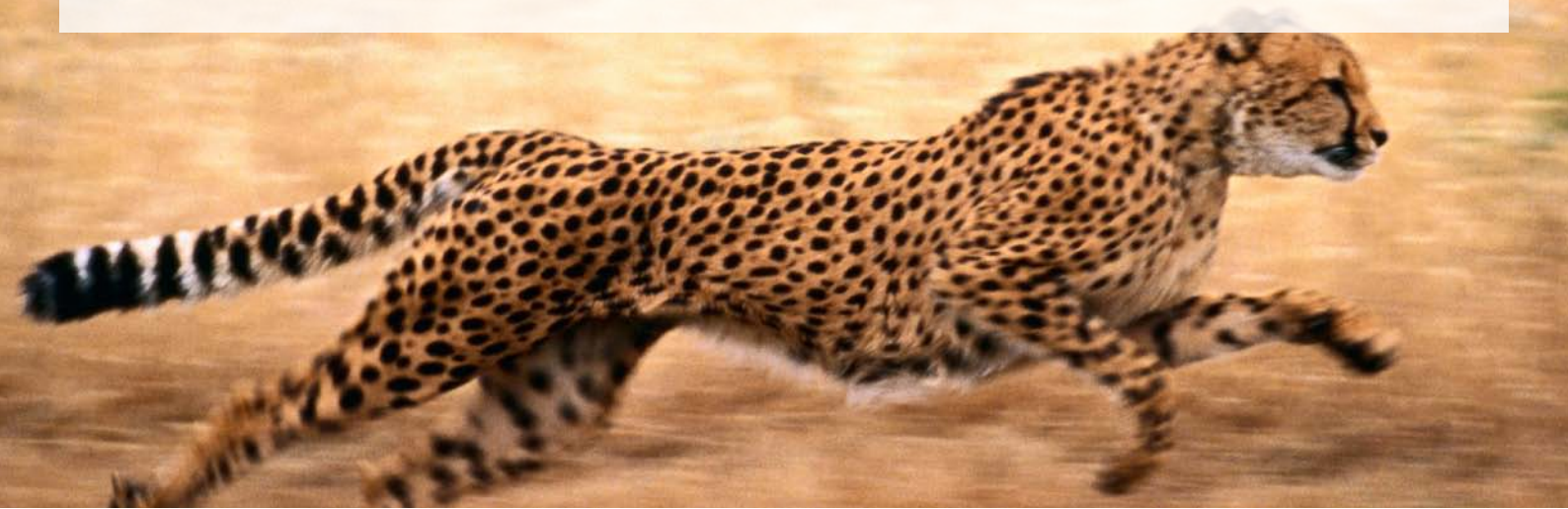


Advanced Analytics for “Big Data” with SAP® Sybase® IQ

Run Faster In-Database Analytic Workloads
and Leverage New Analytic Paradigms



In today's digital world, enterprises need simpler and more cost-effective ways to analyze an exploding volume of data and support expanding user communities. Users want fast answers to complex questions involving data, without having to rely on database administrators. The latest release of the SAP® Sybase® IQ server helps produce those answers. Designed for advanced analytics, data warehousing, and business intelligence environments, SAP Sybase IQ, version 15.4, works with large volumes of structured and unstructured data and is **ideally suited for user-driven analysis**.

MAXIMIZING PERFORMANCE, FLEXIBILITY, AND ECONOMY

SAP Sybase IQ is distinguished from conventional databases by its column-oriented, grid-based architecture; patented data compression; and advanced query optimizer. It offers a single database management system platform to analyze structured, semistructured, and unstructured data using a variety of algorithms.

SAP Sybase IQ 15.4 is revolutionizing Big Data analytics by breaking down silos of data analysis and integrating it into enterprise analytic processes. This version expands functionality with the following elements:

- A native MapReduce application programming interface (API)
- Comprehensive and flexible Hadoop integration
- Support for predictive model markup language (PMML)
- An expanded library of statistical and data mining algorithms that leverage the power of distributed query processing across a massively parallel processing (MPP) grid based on PlexQ™ technology

A new API enables application vendors and enterprise developers to quickly and safely implement proprietary algorithms that can run in-database, delivering performance acceleration 10 to 100 times greater than existing approaches. Additionally, significant improvements have been made for text data compression and bulk data loading interfaces.



Turn Massive Data into Actionable Intelligence

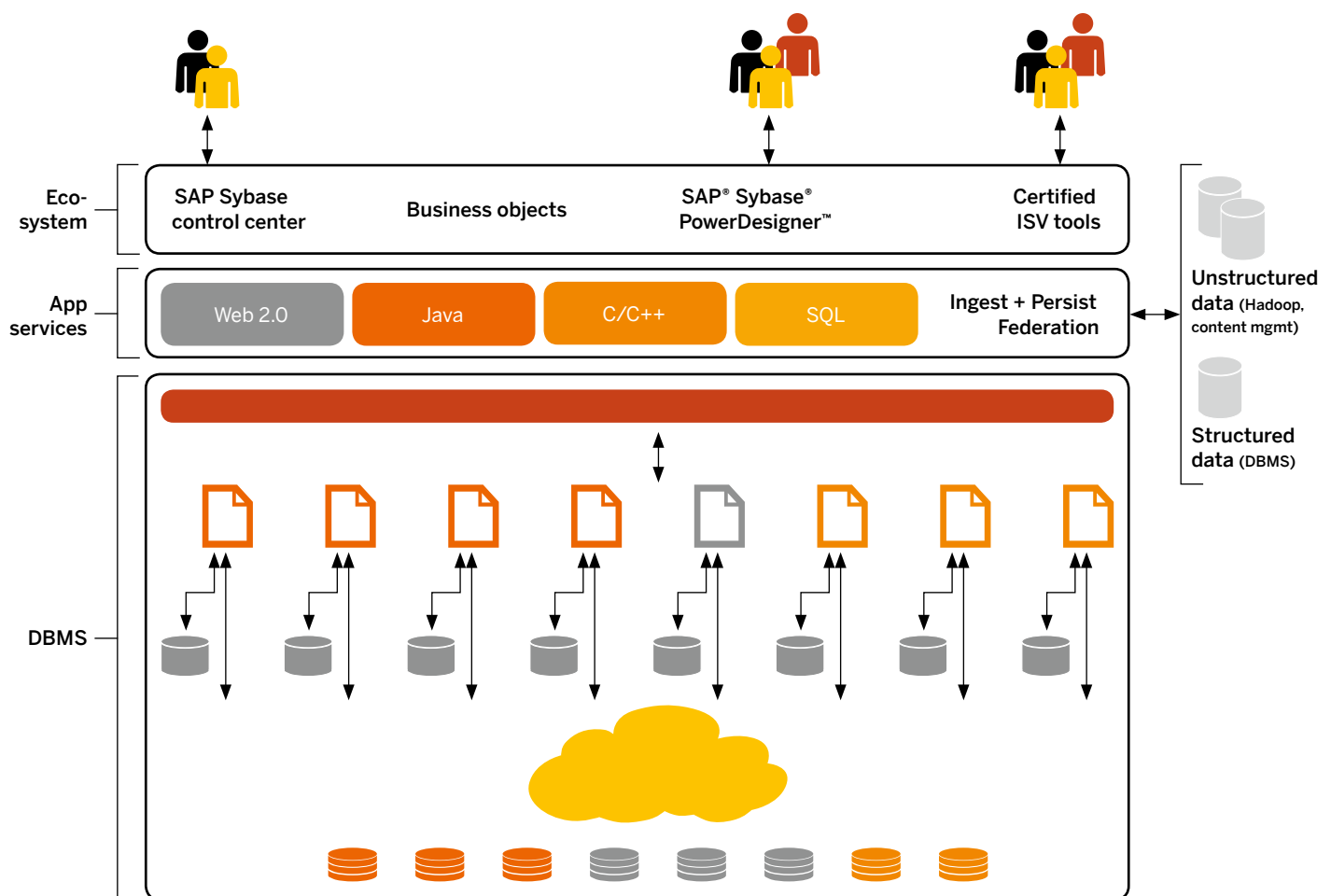
LEVERAGING AN INNOVATIVE ARCHITECTURE

Unlike other MPP solutions, SAP Sybase IQ PlexQ grid technology can dynamically manage analytics workloads across an expandable set of compute and storage resources dedicated to different groups and processes. These attributes make it simpler and more cost-effective to support escalating volumes of data and rapidly growing user communities.

The SAP® Sybase® IQ server is built on proven PlexQ™ technology and uses a three-tier architecture shown in the figure:

- **Base tier:** A massively parallel processing shared-everything analytic database management system (DBMS) engine that supports multiple styles of complex analytics involving massive data sets, massive numbers of concurrent users, and unique workflows
- **Second tier:** The analytics application services layer providing C++ and Java in-database application programming interfaces and enabling integration and federation with external data sources, including four methods of Hadoop integration
- **Top tier:** The SAP Sybase IQ ecosystem, which consists of our strong and diverse partners and certified applications developed by independent software vendors

Figure: SAP® Sybase® IQ Three-Tier Architecture Based on PlexQ™ Technology





SAP Sybase IQ 15.4 is **revolutionizing Big Data analytics** by breaking down silos of data analysis and integrating it into enterprise analytic processes.

TRANSFORMING BIG DATA INTO ACTIONABLE INTELLIGENCE

SAP Sybase IQ builds upon its PlexQ technology to transform Big Data into actionable intelligence for everyone, putting the power of Big Data analytics easily within reach of users and business processes throughout the entire enterprise. SAP Sybase IQ introduces the following key attributes in the new version.

Data Management Enhancements

A number of enhancements improve the data management, deployment, and maintainability of an SAP Sybase IQ installation.

- **Faster bulk loading:** Bulk load data inserts into SAP Sybase IQ through open database connectivity (ODBC) and Java database connectivity (JDBC) interfaces, enabling more scalable applications, with orders-of-magnitude improvement in load performance.
- **Better text compression:** Better compression of data types such as variable character field (VARCHAR), variable binary (VARBINARY), single character (CHAR), and BINARY delivers a more efficient and cost-effective way to deploy high-performance text analytics applications, with significant improvements in compression rates.

Application Services

The latest version of SAP Sybase IQ provides a series of APIs and tools to build advanced analytic algorithms that run in-database and leverage MPP through a PlexQ grid.

Table parameterized user-defined function (UDF) API enabling native MapReduce: An API native to SAP Sybase IQ that allows application programmers to build and deploy C++ libraries inside an SAP Sybase IQ database server. Use these APIs to implement proprietary algorithms or a packaged library of algorithms securely inside SAP Sybase IQ to return results 10 times faster by executing close to data stored in an SAP Sybase IQ database server.

This framework allows development and deployment of MapReduce programs in SAP Sybase IQ to analyze very large data sets covering structured, semistructured, and unstructured data formats. The C++ map and reduce algorithms are called via standard Structured Query Language (SQL) and automatically distributed and parallelized across the PlexQ grid by the powerful query engine in SAP Sybase IQ.

Hadoop integration and federation: Integrate results from a Hadoop-based analysis with queries running in SAP Sybase IQ. You can use four different techniques to integrate Hadoop data and analysis within standard SQL queries (client-side federation; extract, transform, and load processing; data federation; and query federation) with an analytics database.

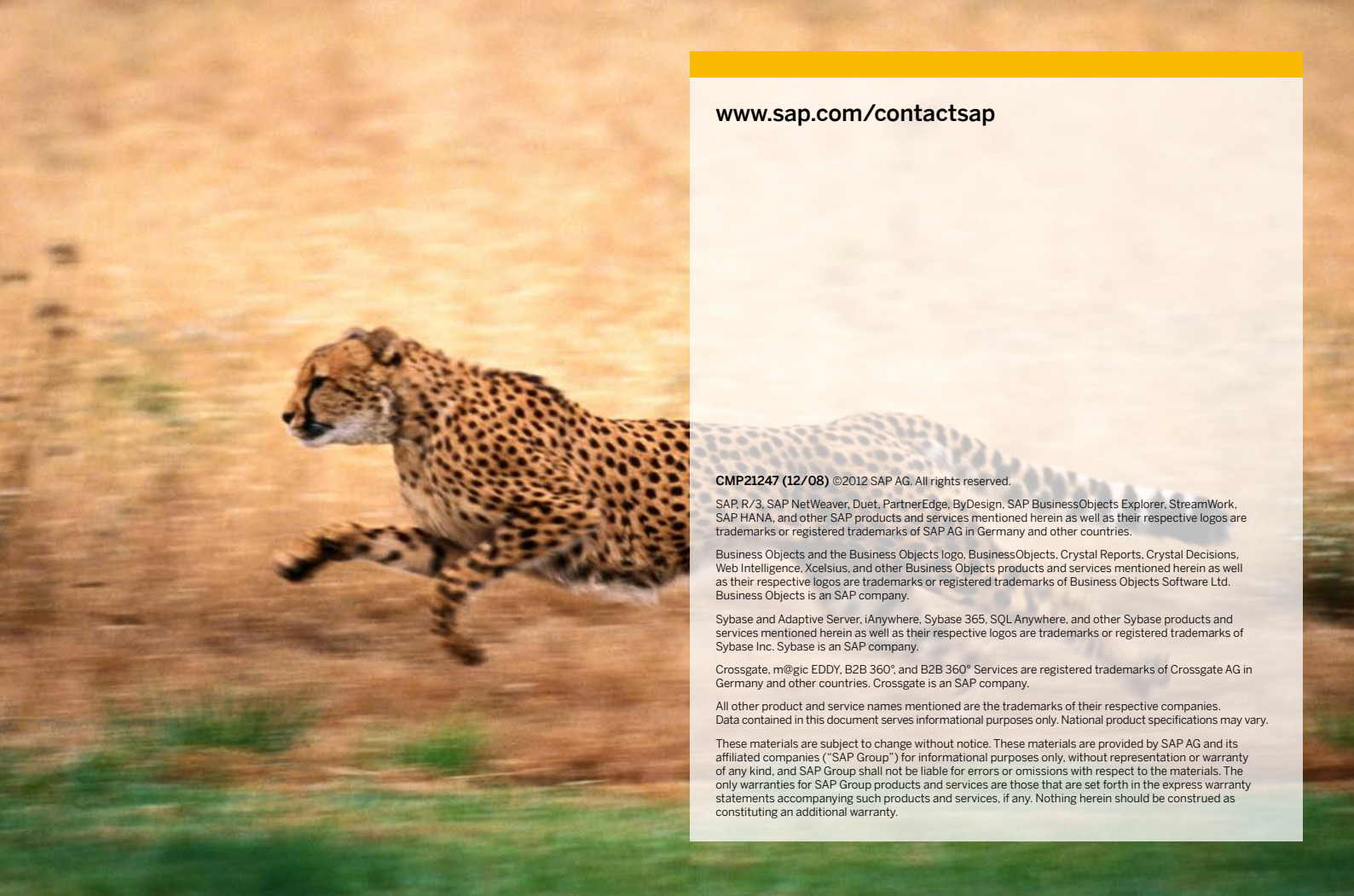
Leverage Hadoop to identify relevant data points from massive sets of structured and unstructured data, and then integrate those relevant data points from Hadoop into SAP Sybase IQ for analysis with transactional data and result sets from other data sources.

PMML support: Through a certified plug-in from Zementis, automate the execution of analytic models defined using industry-standard language that are created in tools like SAS, SPSS, “R,” and other popular predictive workbench products. Leverage popular analytic tools to build predictive models, automate execution of predictive models deployed in SAP Sybase IQ, and use industry-standard language to avoid vendor lock-in.

“R” integration: Use “R,” the popular open source statistical tool, to query SAP Sybase IQ databases using an RJDBC interface. You can also execute “R” libraries from SAP Sybase IQ as a function call within SQL queries and return result sets.

In-Database Analytics Library

A library of advanced analytic, statistical, and data mining algorithms run inside SAP Sybase IQ. The latest version provides an updated in-database statistical and data mining library (DBLytx from Fuzzy Logix). The updates enable the library to leverage the MapReduce API in some data mining algorithms for MPP, and also include several new functions such as support vector machines, neural networks, and adaptive boosting.



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Expanded Ecosystem

SAP Sybase IQ also fits well into a comprehensive solution for Big Data analytics. Important tooling and complementary partner products help with this including:

- **SAP Sybase PowerDesigner™ software:** This reference architecture generator enables quick time to value by generating optimized hardware configurations when implementing an SAP Sybase IQ data warehouse or data mart.
- **SAP Sybase control center:** Improvements encompass a number of administration features, such as procedure, function, universal disk format (UDF) including virtual allocation table, table parameterized function (TPF), Java Enterprise Edition (JEE), and text index. These enhancements ease the administration of heavily used features in the control center, and improve the deployment of built-in, external, and text in-database analytics. A new SQL execution window is also included that allows for simplified testing of ad hoc SQL routines.

• SAP BusinessObjects™ business intelligence solutions:

SAP Sybase IQ, version 15.4, is compatible with the SAP BusinessObjects Business Intelligence platform and SAP Data Services software to create a comprehensive business analytics framework.

- **Partner-based solutions:** Several add-on solutions are available based on partnerships with Solix Technologies Inc., KXEN Inc., Quest Software Inc., BMMSOft Inc., Zementis Inc., and Fuzzy Logix LLC, meeting a wide range of needs.

FIND OUT MORE

To learn more about how the latest version of SAP Sybase IQ can help you unlock the value of Big Data, contact your SAP representative or visit us online at www.sap.com/solutions/technology/database/big-data-management/index.epx.



The Best-Run Businesses Run SAP™