

A Platform for 2-Tier BI and Analytics

A Technical White Paper

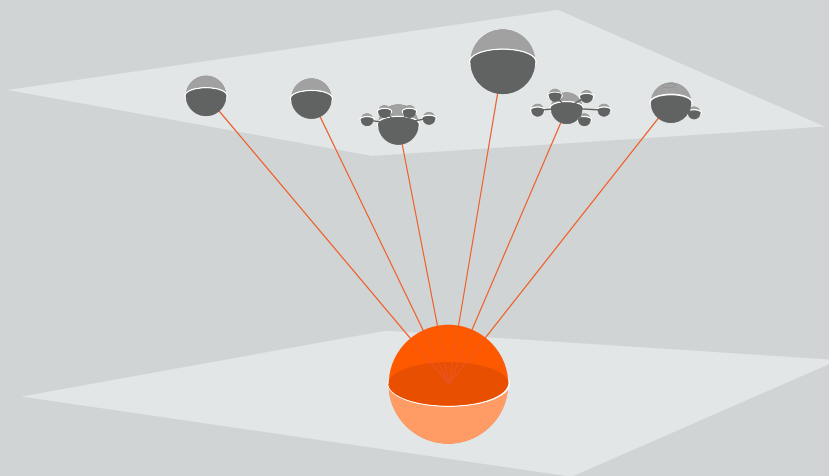


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INTRODUCTION—A World in Transition: BI and Analytics in the Enterprise

The analytics landscape is experiencing a significant transformation. With massive volumes of data, more data living outside the enterprise data warehouse, and increasing user demand for speed, autonomy, and agility, organizations are struggling with an increasing divide between end users and centralized IT/BI teams. The centralized teams, gatekeepers of mission-critical data, are burdened with legacy technologies, reporting requirements, and older processes, all of which prevent them from meeting the business's speed demands. End users, driven by a thirst for data-driven daily decisions, have kick-started their own analytic initiatives on decentralized data using desktop discovery tools. These "Shadow BI" initiatives have increased end-user autonomy, but have also created analytical silos and inconsistencies in data analysis, further hampering the desire for data-driven decisions.

Without the flexibility and speed the business demands or the consistency and governance IT/BI require, an organization cannot become data-driven. A recent Gartner report (*Create a Centralized and Decentralized Organizational Model for Business Intelligence*) states that successful companies need to navigate the complexities of these two separate worlds of analytics by implementing a 2-tier organizational approach. However, the lack of agility stemming from the use of legacy BI platforms results in high costs and long wait times, while mistrust in the data provided by discovery tools results in more arguments over numbers and less time spent making data-driven decisions. It's in this context that Birst provides a 2-tier analytics technology that enables centralized and decentralized teams to collaborate around a "Business-ready Data Tier."

Birst's unique 2-tier approach and technology enables IT/BI leaders to govern, support, and scale multiple integrated environments – while providing end users with autonomy, ease-of-use, and speed to work with noncurated and curated data. This approach allows independent teams to analyze user-generated data mashed up with governed enterprise data. It also enables the centralized team to better serve their end users by providing true self-service across a single view of all business data for not only the analyst but also for non-data-savvy business users. This fosters the confidence and trust in data that senior executives demand.

DESIGN PRINCIPLES

At Birst we believe that solving these dual-world analytics problems is something that goes beyond the user interface. While providing an intuitive experience is critical to analytic success, the thorniest challenge in analytics is unifying and refining data for business use – *making data “user ready.”* BI should not be the exclusive domain of data-savvy analysts. Day-to-day business users also need to interact with and analyze data to make smarter decisions. For everyone to make more confident decisions, it is critical to maintain consistency and trust in the data. Three primary design principles create that trust and guide the development of the Birst platform.

1. Unify: all data for a single view of business

Birst leverages intelligent unification technologies that can both map and model data from multiple different sources. Whether it is existing warehouses, data lakes, cloud applications, or custom databases, we ensure that we can capture and unify all data regardless of size, structure, or speed so that there is one consistent view into data. For example, Birst can combine multiple data sources that each have their own definition of “customer” and unify these disparate sources into a single version of “customer” for all users. Birst leverages our pre-built connectors, live access, a User-ready Data Store, query federation, intelligent data navigation, and a wide range of data mapping and extracting capabilities to accomplish data unification.

2. Refine: all data at business speed with automation

Birst believes that data needs to be refined for business decisions. That refinement can be as simple as turning 15 operational data tables into a representation of facts and dimensions or as complex as creating a business rule that leverages data from diverse and constantly changing data sources to create a common and reusable business metric. The historic challenge in data refinement is that it takes too much time and too many resources to refine the data for day-to-day use, and managing changes in underlying data structures prevents this refinement from keeping up with new business demands. To overcome the speed and data source changing challenges, Birst introduced patent-pending Automated Data Refinement (ADR), a complete transformation language (ETL), and smart data change detection to enable enterprises to create a Unified Business Model - or a “Business-ready Data Tier” - that moves at the speed of business today.

3. Visualize: all data with an adaptive user experience

Birst’s vision is for each and every individual within an organization to have business data at their fingertips to improve even the smallest decisions they make. Business people must have tools that provide flexibility and freedom to answer any question and mash-up their own user-generated data with enterprise data. In order to do this, Birst delivers a brilliant user experience that uniquely meets each individual’s needs by supporting all the different styles of analytics, including pixel-perfect reports, highly interactive and responsive dashboards, intuitive visual discovery, native and offline mobile, embedded predictive tools, and data mash-ups. Birst’s user experience blurs

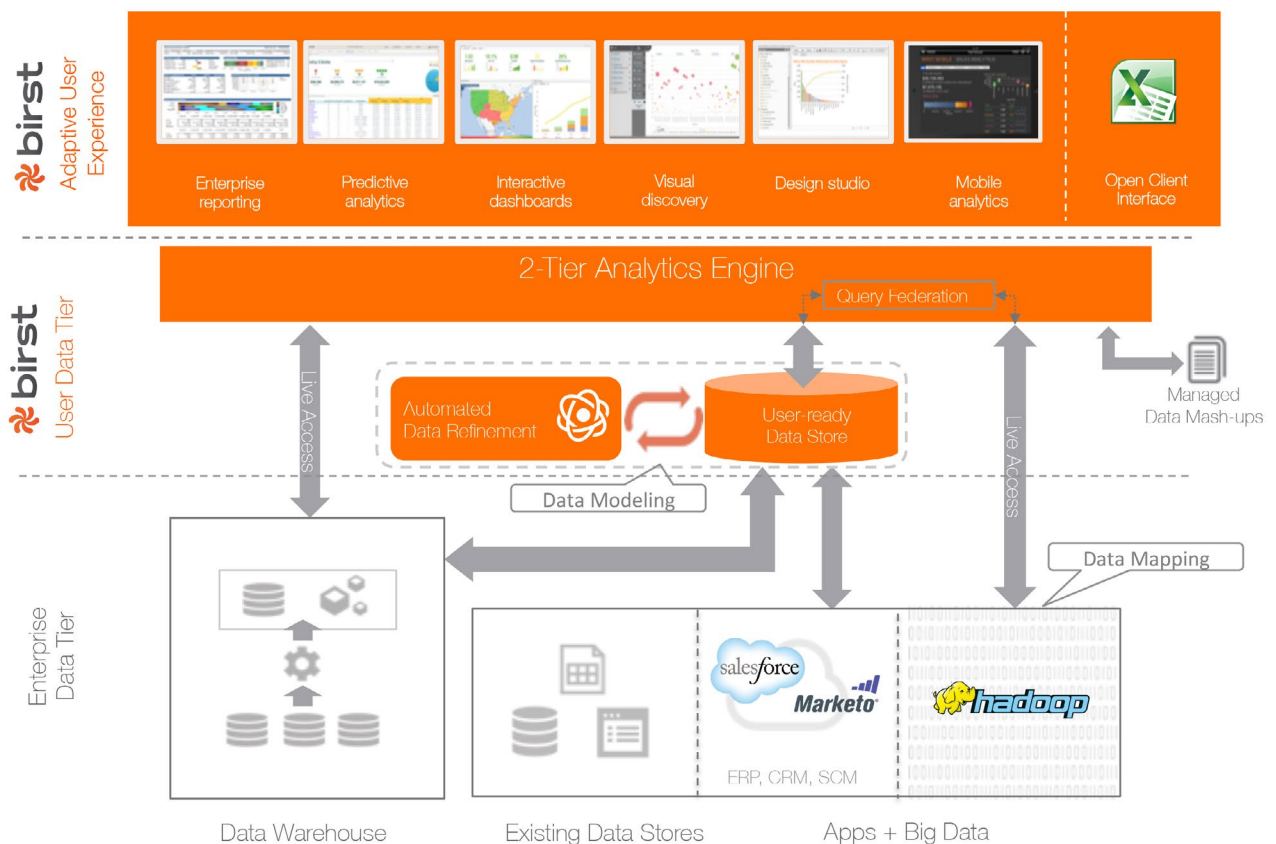
Birst 2-Tier

the traditional lines between dashboards, reporting, and discovery to create a single flowing interface where any user can interact with business data and make decisions. Equally important, these decisions can be made with full confidence because all analytic styles pull data from Birst's Unified Business Model, which delivers a layer of governance to ensure a single version of the truth

These design principles are supported by an **enterprise analytics architecture, born in the cloud**. Birst's cloud architecture provides a low total cost of ownership (TCO), rapid deployment, automated zero-cost, zero-pain upgrades, programmatic life cycle management, and standards-based, completely open integration. These capabilities enable IT/BI teams to build production-scale analytical applications that deliver business value on a daily basis and greatly reduce administrative costs. Furthermore, the benefits of the cloud extend to the business, where a single business analyst can administer an entire Birst deployment.

A 2-TIER APPROACH TO BI AND ANALYTICS

To execute on our design principles, Birst provides a complete 2-tier BI and Analytics platform from data acquisition, to transformation, modeling and analysis—all within a fully integrated, 100% cloud architecture.



The Business-ready Data Tier

Data Connectivity

Birst provides data extraction and connectivity options for a wide variety of databases, flat and structured files, analytic databases, and popular cloud and on-premises applications.

Birst supports the extraction of entire database tables or views, and the extraction of subsets of data using custom SQL queries. Birst Connect, a Java application sitting on-premises, can be used for both bulk data extraction and for connecting in real-time (see Live Access below.) Birst extraction tasks can be scheduled either using a built-in scheduler or an external OS scheduler. In addition to extraction of data from all relational and analytic databases (SQL Server, HP Vertica, Teradata, Amazon Redshift, etc.) and applications, Birst supports uploading delimited flat files, Microsoft Excel and Access database files. Structured data is extracted and uploaded in a tabular format of columns and rows per data sources. These extract and live query capabilities also extend to modern (unstructured) and big data sources such as Hadoop Hive, Cloudera Impala and Cassandra. In all cases, data is transferred securely to Birst using secure authentication and compression techniques.

For even faster deployments and zero connector maintenance, Birst offers a set of pre-built connectors to over 100 popular cloud and on-premises business applications like Salesforce, SAP, Eloqua, and others. These connectors (leveraging web-service APIs and/or JDBC) have been designed to extract standard and custom objects, or even specific columns, from the respective applications and are maintained over time to ensure connectors stay up to date with application changes.

Birst also offers *Live Access* (or real-time query) capabilities to directly query on-premises data sources, like XMLA cubes, existing enterprise data warehouses, data marts, applications, and data lakes. On-premises data stores or applications are queried in real-time without the need to first extract and load the data into the cloud. This helps to bridge the gap between centralized and decentralized teams, enabling enterprises to leverage their existing investments in data warehouses, data marts and XMLA cubes (their centralized BI assets) while still leveraging Birst for combining decentralized data and creating the essential Business-ready Data Tier. Live Access connects to on-premise data sources directly, in real-time, and transfers query results securely via the Transport Layer Security (TLS).

The Business-ready Data Tier

A radically different approach to data warehousing and data persistence

Birst automatically compiles a logical, dimensional model into a modern star schema design and generates a physical fully optimized star schema. Logical measures automatically turn into calculation grains and logical dimensions automatically turn into levels. Fact tables, dimension tables and joins are automatically generated and maintained as are all the required routines for loading data into the User-ready Data Store. Full and incremental data loading is available automatically. No additional scripting is required for an incremental load, and Birst also provides automatic management of historical data including snapshots. This approach flips traditional warehousing on its head by leveraging the logical model to create the physical model and is the reason Birst can deliver speed AND governance, because the physical data reflects the business definition of the data – not vice versa. This patent-pending technology is core to the 2-tier approach and brings together the agility of business with the governance of a logical dimensional model.

Automated Data Refinement (ADR)

Birst's cloud analytics engine delivers automated data integration capabilities for standard data integration needs, and a developer-friendly scripting (ETL) language for more complex needs. An example of this automated refinement is Birst's automated time-series measures, where all measures are automatically available by common time-series dimensions, like trailing 12 months, trailing 3 months, etc. Since Birst is a single platform, all data integration routines are developed, tested, and enabled in production from a single web browser, without any work in a different application or desktop-based tool.

User-ready Data Store

Birst's User-ready Data Store seamlessly combines different sources of data. It is designed and optimized for ROLAP-style analytics, providing a Kimball-style star schema with a multidimensional view of all data. In addition, Birst supports Type 1 and 2 slowly changing dimensions, conformed dimensions, and manages snapshots and time-based transformations automatically. Data loading and updates are done through incremental processes with built-in change detection.

The Business-ready Data Tier

Leveraging Birst with existing enterprise BI platforms

Birst 2-tier analytics technology also enables customers to leverage and extend investment in existing legacy BI solutions. With the ability to directly connect to Oracle Business Intelligence Enterprise Edition (OBIEE) semantic layer, via ODBC, Birst can map the existing logical schema directly into the Birst Logical Layer, enabling Birst to join this Enterprise Data Tier with other data in the Business-ready Data Tier. Birst can also map to existing Business Objects Universes via webservices and, Microsoft Analysis Services Cubes and Hyperion Essbase cubes via MDX and extend those schemas, enabling true self-service for all users in the enterprise.

2-Tier Analytics Engine

Birst's 2-Tier Analytics Server is comprised of three tightly integrated components: Unified Business Model, a ROLAP Engine, and a data navigator. The section below describes how these work together.

Unified Business Model

Birst's ADR combines and organizes data from multiple sources into a User-ready Data Store and overlays it with a Unified Business Model (in traditional BI terms, a common and reusable semantic layer). The Unified Business Model is a single set of business rules and definitions that enable data governance and ensure that every user, regardless of who they are or how they access their information, can trust the veracity of the data they're consuming. With a Unified Business Model, users can create their own custom measures and attributes while still delivering a single version of the truth to the entire organization. In addition, a Unified Business Model significantly eases administrative and development tasks by taking advantage of centralization and reusability, so any changes to underlying data structures are automatically propagated across the environment. This business model establishes how the physical User-ready Data Store is created – which enables Birst's unique 2-tier approach – providing end-user flexibility, while maintaining a single unified version of the business.

ROLAP Engine

The Birst ROLAP engine provides full ad-hoc analysis capabilities without the need for physical OLAP cubes, thereby offloading IT from the resource-intensive and time-consuming task of constantly having to maintain and optimize cube farms. Unlike other OLAP engines, Birst does not restrict dimensional access to the data. Birst constructs a dynamic logical cube of all data that it is mapped to, providing rich and in-depth analytics capabilities. The ROLAP engine uses Birst's logical query language (BQL) to enable administrators to query the Unified Business Model.

Data Navigator *(Data Mapping)*

After attaching to a data source, Birst first maps the data stored there. Mapping ensures that Birst understands the form and structure of the data inside the database, but Birst only extracts data from the source if the user requires it. The Data Navigator decides when to access data in the User-ready Data Store or when to access data on-premises, and even when to access data in both places and combine it within the query itself (Query Federation.) All of this is managed by Birst, and the end-user does not need to know the specific data elements that create a business metric (like lead conversion rate). Instead, they can focused on analyzing the metrics and making a decision.

Query Federation

With the option to have Query Federation of Live Access data sources along with cloud data in Birst's User-Ready Data Store through a single, Unified Business Model, customers can quickly and easily boost the utility of existing on-premises and cloud-based data assets.

The Business-ready Data Tier

Managed Data Mash-ups

Birst's Managed Data Mash-ups enable trusted data discovery, bridging the gap between IT's charter to govern and maintain centralized data and the need for businesses to flexibly add new data for local analysis. Freeing IT from having to provide individual data feeds to departments and individuals, Managed Data Mash-ups provide business users with personal, analytic sandboxes while ensuring data security and compliance. This allows for independent development of separate subject areas, while logically connecting them to create a global data fabric that can blend at enterprise scale and preserve rapid independent development.

By leveraging Birst Spaces, administrators can provide a sandbox environment where business users can confidently add new data and conduct their own analysis in a self-sufficient manner. New data, reports and dashboards created by the business user can then be "promoted" to the enterprise environment, seamlessly incorporating them into the Unified Business Model to maintain data governance.

Summary

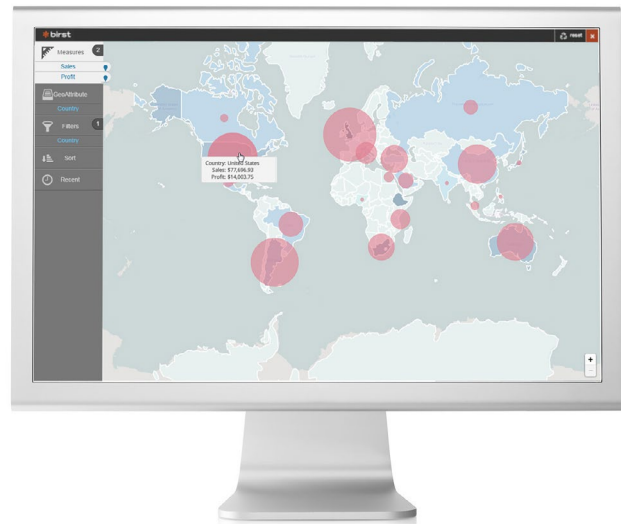
Throughout the development of the Business-ready Data Tier, Birst's goal has been to enable a 2-tier approach and increase BI developer productivity. We have streamlined as many tasks as possible in the development, deployment and ongoing maintenance of a BI solution. Our patent-patenting ADR technology promotes consistency (by avoiding user direction and control) and allows for the coexistence of all types of data. As a result, Birst allows developers, administrators and end users to focus on executing more valuable tasks and greatly reducing total time spent administering Birst (see *Gartner's Survey Analysis: Customers Rate Their BI Platform Ongoing Development and Administration Costs*), which shows Birst to have one of the lowest FTE numbers required to run the full BI platform compared to other vendors. This Business-ready Data Tier provides the foundation on which a complete BI suite can be layered, enabling decentralized autonomy and speed while providing the governance required by centralized IT and BI teams.

Adaptive user experience with all styles of BI and Analytics

On top of the Business-ready Data Tier, Birst provides an adaptive user experience, offering all styles of BI and Analytics. Birst's user experience includes: visual discovery, interactive and responsive dashboards, analytic views, enterprise pixel-perfect reporting, native and offline mobile, embedded predictive analytics and data mashups. However, each style is not a separate tool. Birst blurs the lines between traditional BI modules, enabling users to simply interact with data as they move from discovery to dashboards to reports, creating, collaborating, and publishing with a single click. Each of these styles pulls data directly from the Unified Business Model. This approach enables true self-service and speed, allowing users to do more with far fewer dependencies on IT while maintaining and analyzing user-generated data. Furthermore, Birst provides an Open Client Interface that allows enterprises to utilize other analytic clients like Excel or Tableau to access the Birst Unified Business Model.

Visual Discovery

Birst's visual discovery interface offers the ability to intuitively explore data by creating visualizations using a drag-and-drop and double-click approach. Our intelligent recommendation engine can take the user through the process of building a visualization using the chart-first approach and providing suggestions for selecting the best visualizations. Visual filtering, user created metrics, instant metrics (like percentage of value), and intelligent search functionality add to the self-service capabilities, and the messaging center keeps users updated throughout the visualization building process.



Available visualization formats include: column, bar, line, spline, area, area spline, points, scatter, bubble, pie, funnel, pyramid, list tables, crosstabs, and geo maps.

Adaptive user experience with all styles of BI and Analytics

Users can apply filters and sort data to meet their needs. Data formatting is available to accommodate currency symbols, dates (including locale-based dates), decimal precision, units, percentages, conditional formatting, and on individual visual elements (axes, tool tips, and display values). The Expression Editor provides the ability to create BQL (Birst Query Language)-based report expressions that can be used to create more insightful visualizations, and users can also choose to limit data to “Top N” data points.

Users can save visualizations as reports to be distributed via dashboards and embed visualizations in third-party applications. This true business-user discovery tool supports the need for non data-savvy users to perform ad-hoc analysis in a decentralized fashion, while accessing the Uniform Business Model.

Interactive and Responsive Dashboards

Birst’s interactive dashboards provide a self-service and easy-to-use interface for business users of all types. Unlike other dashboards, Birst provides an interface for creating dashboards that any user can leverage – with simple WYSIWYG, drag-and-drop creation – blurring the lines between dashboards and discovery. Birst dashboards and widgets are rendered in HTML5, so they automatically resize for a responsive, optimized experience wherever you use them, on your laptop, desktop, or tablet. With Birst, users can directly interact with the dashboard—or even build new ones—without any formal training or specialized BI expertise. Even filtering has been made intuitive, incorporating filter results via prompts or lasso filters with results seamlessly cascading across filters and dashboard pages. Birst dashboards support flexible, drill-anywhere capabilities. Both charts and tables can drill across any desired target report, dashboard or external URL. Lastly, users can incorporate external visualizations into Birst dashboards, or take any dashlet and expose it externally.



Adaptive user experience with all styles of BI and Analytics

Enterprise Pixel-Perfect Reporting

Birst also includes a report designer for advanced pixel-perfect report creation, enabling highly formatted report creation typically used in production-delivered reports. Examples of rich formatting include: conditional formatting, conditional display, duplicate suppression, and null value replacement. Embedded images and sub-reports in various bands are supported. Reports are compiled into Java byte code for fast and direct execution. No interpretation at runtime is required, and server-side report caching enhances performance.

Birst reports can be exported to a variety of formats, including PDF, Excel, PowerPoint and CSV. Both business users and administrators can schedule reports for delivery by email, as attachments and in-line content. For alerts and exception reporting, you can schedule trigger reports that evaluate specific conditions. When the condition is met, for example when a KPI falls below a certain threshold, the alert email will go out. Birst also provides sophisticated report bursting, where a single database pass can be used to serve hundreds to thousands of reports, allowing high-volume report distribution without taxing the database. Birst also supports parameterization of reports based on user roles and data visibility rules.



Adaptive user experience with all styles of BI and Analytics

Open Client Interface

The Open Client Interface connector enables desktop-based client tools to interact with the Birst Unified Business Model via the Open Database Connectivity protocol (ODBC.) The Birst Interface translates SQL generated by the client tool into BQL (Birst Query Language). Desktop-based analytics clients generally lack important enterprise BI capabilities (for example, a common, reusable semantic layer) and, as a result, lead to inconsistent data and information silos. The benefit of the Open Client Interface is that it enhances the capabilities of these client tools by allowing them to leverage the Birst Unified Business Model, ensuring a single version of truth throughout an organization. End-user experience is seamless: end users continue to interact with analytics within their client tools, while Birst executes queries in the background.

Native and Offline Mobile

The Birst 100% HTML5 interface enables users of any mobile device to view and interact with Birst in their browsers.

For users looking to leverage the rich interactivity of native applications—like swiping, pinch to zoom, GPS and camera integration. Birst provides a native application for both Android and iOS. These native applications leverage the exact same HTML5 interface used in Birst on desktop, laptop or any other device. This means users develop a Birst dashboard once, and it can be viewed on any device, either natively through an app or on browser. Birst employs responsive design, ensuring reports and dashboards rotate and size to match the device on which they are viewed.

Birst also offers “true offline” capability on mobile devices, so users can interact with their data instead of only looking at the static offline images many other vendors provide. This offline capability enables users in remote areas or in buildings where WiFi is not available (hospitals, oil fields, etc...) to completely interact with their data. To support highest levels of security, Birst encrypts data on the device and provides remote data wipe capabilities.



Adaptive user experience with all styles BI and Analytics

Predictive Analytics

The Birst platform includes a predictive analytics engine. In contrast to conventional data-mining environments, data does not have to be moved; instead datasets for model training and scoring are generated directly from the Birst Unified Business Model.

Birst's advanced analytics capabilities leverage the ROLAP engine for data preparation. The modeling engine makes full use of aggregates and derived measures. Sophisticated new measures are defined and calculated on the fly as inputs into the modeling process. Share, time-series and dimensional breakout metrics are used to enrich the information. The use of OLAP-style measures for modeling enables the addition of complex and highly predictive behavioral calculations. For each modeling task, Birst automatically evaluates a comprehensive set of algorithms. Supported algorithms include linear and logistic regression, decision trees, feed-forward neural networks, support vector machines and rules/regression trees. Modeling scores are written directly back to the User-ready Data Store, ready to be used in ad hoc queries and dashboards or to be fed into additional processing (for example, list generation). Both rules-based and model-based recommendations can be combined into complex decisions. Birst also delivers tight integration with the R statistics package, making it easy to deploy R-based measures to any number of users. Birst measures can make calls to the R server, submit data for processing, and retrieve the results to present to users. By leveraging our integration with R, users can greatly augment the already robust advanced analytics capabilities available in Birst out of the box.

Custom Expressions and OLAP-style analysis

Birst enables users to create powerful custom expressions without the need to get IT involved. Birst's logical query language (BQL) allows users to define and save both OLAP-style and Excel-style calculations. This includes advanced functions, lookups, transformations and linear regressions. For OLAP-style analysis, Birst supports aggregations, cell-based calculations, slicers and filters. Positional calculations allow users to compare how a data point relates to values elsewhere. All analytic functions—including inheritance, business rules, multi-pass calculations, and virtual measures—are available via a point-and-click interface.

Embedded Analytics

Embedded Analytics

EMBEDDING ANALYTICS – Advantages of a 2-Tier Approach

Birst empowers software providers to quickly and seamlessly embed business analytics into their applications and leverage Birst to differentiate from their competitors, deliver more value to their customers, and create new revenue streams. Birst web services enable programmatic administration of a Birst solution and tight integration into other applications or portals.

User-Level Integration

Birst works within the larger enterprise applications ecosystem and provides the ability to embed reports and dashboards in the cloud or other applications. The SSO framework supports session parameters to dynamically control access privileges and data visibility to those logged in to the application. For authentication, Birst also supports OpenID and SAML 2.0.

White labeling

Birst allows you to match your application's branding and look and feel. Using standards such as iFrame, Birst provides integration capabilities to place charts and visualizations into your application. You can use Birst to customize and match your application's fonts, colors, images, logos and other design elements.

Multi-Tenant

Birst offers a multi-tenant Software-as-a-Service (SaaS) application that elastically increases in capacity as your data or user base grows. Birst also offers a fully multi-tenant virtual appliance for cases where you need to deploy analytics behind your firewall and on your hardware.

Web Service APIs

Birst's web services APIs extend Birst as an open platform for embedding into any SaaS or web application. Birst supports all methods of web services to receive data whether it's REST or SOAP. The outbound Birst web services API is SOAP-based and can work with any programming language that supports web services. Web services range from calls to managed users and metadata to services for running queries.

Enterprise BI & Analytics Architecture—Born in the Cloud

ENTERPRISE BI & ANALYTICS ARCHITECTURE – BORN IN THE CLOUD

Enterprise Architecture

Birst's 2-tier Analytics Technology is a true cloud architecture that provides many benefits to businesses, speeding time to value (TTV), reducing total cost of ownership and increasing agility. Birst's architecture currently supports centralized IT/BI teams and decentralized lines of business within large enterprises supporting the flexible demands of thousands of users and terabytes of data. The Birst cloud holds over a petabyte of data today and serves over 10,000 organizations. The table below highlights the major areas of Birst's architecture and how it differs from a traditional legacy architecture.

Enterprise Analytics - Born in the Cloud	Birst	On-Prem Tools
Automatic Upgrades		
"Always On" Data Loading		
Programmatic Dev Lifecycle		
Blend Cloud & On-Prem Data		
Live Access to Data		
Pre-Built Cloud Connectors		
Expertise Required	Low	High
Admin FTEs Required*	1 - 3.5	6 - 40
Data Integration		
OS Independence		
Vertical and Horizontal Scaling		

* Source: Gartner - Customers Rate Their BI Platform Ongoing Development and Administration Costs - Sep 2012

Always On

One of the key challenges with most BI and Analytics platforms, is that end-users are unable to interact with data while the underlying data is being processed or loaded from other systems. Birst has created a unique capability (Always On) that enables users to continuously view dashboards or visualize data while data is being processed or loaded into Birst. This ensures global organizations, or organizations frequently processing data, can interact with data and make smarter decisions at all times.

Enterprise BI and Analytics Architecture—Born in the Cloud

2-Tier BI in 78 Countries

A global CPG company faced the challenge of rolling out a uniform approach to the sell-in/sell-through analytic challenge across 78 developing countries. While each country maintained unique data and methods of calculating different business metrics, the centralized BI team still needed to provide a single view of revenue, inventory, and demand across the different channels in each country. Leveraging Birst's "space virtualization" they were able to create a single template space and copy that space across all the countries, then allowing each country to customize that space to each country's unique needs - while maintaining a centralized single version of key business metrics.

Global Deployment Capabilities

Birst is a global cloud solution, with hosting centers in North America, Europe, and Asia Pacific. Capabilities that support our global customers include multi-lingual support (translate once across multiple reports and languages), multi-currency support, multi-time zone support and multiple calendar support. These capabilities are built into the Birst platform and combined with unique template and copy features to speed the process of rolling out Birst into new countries, by creating a single template "space" and copying it across multiple countries.

Enterprise-Grade Performance and Scalability

Birst is a fully multi-tenant solution from both a data-processing and data-storage perspective. Birst's web and application server ties are multi-tenant meaning that users are spread across an infinitely scalable pool of computing resources, leveraging its shared-nothing architecture. Birst is the only BI solution to provide this level of scalability.

This multi-tenant infrastructure is key to enabling Birst to provide higher levels of service at lower cost to customers, while maintaining zero cost, instant upgrades every 2 weeks, and industry leading levels of up-time. It also allows customer to create different logical BI instances, all with same physical infrastructure drastically improving time for iterating on BI development. Lastly, multi-tenancy also enables Birst to provide the highly unique managed data mash-ups capabilities, which truly enables a decentralized user to collaborate with centralized data. *See Managed Data Mash-ups earlier in document.*

Birst leverages aggregates, dynamic "indexed" cubes and intelligent multi-tiered caching. Aggregates are automatically generated from semantic layer queries and used by the query optimizer, and they are updated automatically as part of the ETL process. These capabilities can shave 90+% load off of an expensive underlying DB infrastructure and therefore save development time and money, beyond traditional legacy BI approaches.

User Experience Performance

The Birst cloud serves up over 100,000 dashboard views per day. Data visualizations in these dashboards are built for end-user performance and to remove additional steps in the load process. Multiple queries are sent simultaneously from dashboards, whereas most other products send queries sequentially.

Data Load Performance

Today, Birst Cloud loads data from over 50,000 data sources. Birst can load data daily, hourly, or even every few minutes. Birst leverages incremental loads and change detection to ensure rapid data loading and extraction. Furthermore, with Birst "Always-on" users are still able to interact with dashboards and visualizations while data is being loaded and processed.

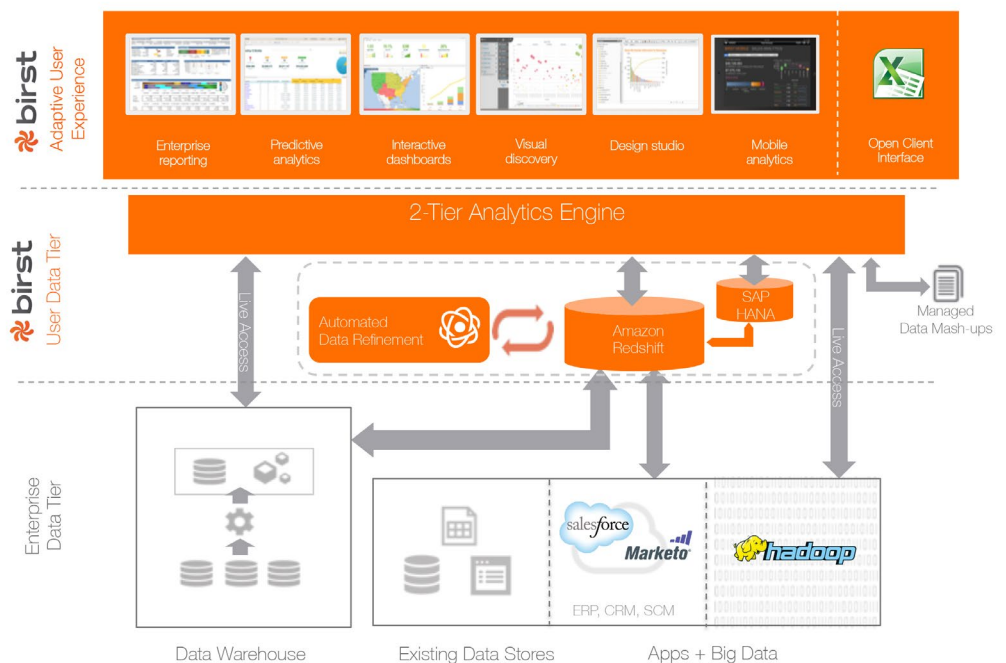
Enterprise BI and Analytics Architecture—Born in the Cloud

Multi-Tier Caching

Birst provides exact and fuzzy cache matching, as well as dynamic cube-like cache structures to help with performance. These indexed data structures provide far better reuse and generate lower database load than traditional caching approaches. The dynamic cache is partitioned amongst servers to minimize I/O contention and to allow better memory caching, ultimately resulting in a far more scalable solution. The Birst ROLAP engine in combination with this unique caching layer provides a significant performance improvement over traditional OLAP solutions.

User-ready Data Store Choices

Birst provides ultimate flexibility for customers. For those who require the fastest possible end-user performance on large data sets, they can choose SAP HANA as their User-ready Data Store, ensuring that query response times on billions of rows are still sub-second. For those customers who wish to store terabytes of data economically, they can leverage Amazon Redshift as their User-ready Data Store and get the lowest cost/terabyte storage fees available in the cloud. For customers with standard data sizes, Birst provides a column store analytic database that performs like a consumer web application. Lastly, for advanced customers who want to leverage both the low-cost storage of Amazon Redshift and the split-second query performance on SAP HANA, Birst can offer a unique solution that stores detailed data in Redshift, while storing more critical and aggregate data in SAP HANA—ensuring instant query response times but limiting the size (and cost) of data stored in SAP HANA. Birst's automated data refinement engine aggregates and manages this data flow automatically. By using consumer-ready databases, you save money and make choices based on what meets your needs.



Enterprise BI and Analytics Architecture—Born in the Cloud

Flexible Deployment Options

Birst is the industry's only BI solution that can be deployed on premise (private cloud) or in the Birst public cloud with the exact same code base, upgrade path, and level of support. Users can move from one deployment model to another to meet their strategic and operational goals.

Birst Cloud

Birst Cloud is a multi-tenant, fully integrated SaaS solution. Users get everything required for advanced business analytics in a subscription-based package delivered in the cloud. With Birst Cloud, organizations remain agile while reaping the benefits of SaaS: fast deployment, lower costs and rapid time to value. As usage grows, Birst seamlessly expands server capacity to accommodate anywhere from dozens, to hundreds, or even thousands of users. Hosted in its SOC 2 Type II audited data center, Birst Cloud requires no installation of hardware and software and is pre-configured for automatic failover and 24/7 availability and support. It also includes software upgrades, available every 2 weeks or as infrequently as every 24 weeks—the customer chooses the frequency.

Accelerators for specific use cases

Birst delivers a set of pre-packaged applications called Accelerators, which can be delivered with Birst's cloud platform and come bundled with a rich set of pre-built metadata, data transformations, measures, out-of-the-box reports and dashboards to quickly equip end users with a flexible business analytics solution. Birst currently supports solution accelerators for Sales, Marketing, & Operations – unifying and refining data from Salesforce.com, Marketo, NetSuite, and Google Analytics.

Total Cost of Ownership and faster Time to Value

Birst's cloud architecture is predicated on automation and pre-integration, directly targeting the largest areas of cost for BI solutions. Cloud architectures completely alter how software is provisioned, configured and deployed and offer significantly greater TCO advantages. With Birst's cloud technology, customers can deploy BI applications in days or weeks, not months. Birst provides for a lower TCO through reduced resources, zero hardware, zero upgrade costs, and rapid deployments. With a cloud BI model, organizations get the benefits of SaaS—rapid TTV and upgrades in place.

Birst automates IT-centric tasks allowing customers to spend 25-35% more of their time on activities that produce new reports, dashboards and rich analytics. Since the lion's share of costs in a BI deployment relate to human capital and integration costs, Birst's pre-integrated and consolidated solution drives significant TCO advantages over traditional vendors. A Gartner study (*Customers Rate Their BI Platform Ongoing Development and Administration Costs*) showed that a staff of 3.5 full-time employees is, on average, sufficient to support Birst deployments above 1,000 users. Using Birst eliminates many of the costs in a BI deployment, and the Birst 2-tier solution creates opportunities for self-service, contributing to a 70% reduction in TCO and a 65% reduction in TTV.

SECURITY AND RELIABILITY FOR THE ENTERPRISE

Physical Security

A key aspect of security is the physical security of hardware containing customer data. Birst operates data centers around the world to ensure enterprise performance, redundancy, security, disaster recovery and business continuity. Birst's data center access is limited to data center technicians and the Birst Operations team only. Entry to the data centers is regulated by biometric scans (for example, hand geometry or iris scan) and man traps. Physical security audits are performed by an outside firm.

Operational Security

It is not enough to have a secure physical and network environment; data centers must be operated in a secure manner as well. Birst data center operational security includes policies and procedures that are SOC 2 Type 2 and ISO-27001:2005 certified. In accordance with these policies, Birst provides rich operational security across data centers and corporate processes including strict background checks and authorized-only access to confidential information, document destruction policies, change management procedures, independently reviewed Disaster Recovery (DR) and Business Continuity (BC) plans, and frequent all-employee training for information security and privacy procedures.

Application and Data Security

A secure infrastructure cannot protect your data if the applications providing access to your data are not secure. Birst solutions have been designed from the ground up to protect the security of your information. There are two components that make up Birst application security: Authentication and Authorization (Permissions). For authentication, customers authenticate themselves to the Birst application via forms-based authentication, OpenID (www.openid.net) or SAML2. Passwords are hashed using PBKDF2 or BCrypt to defend against offline attacks. For authorization, Birst gives system administrators comprehensive security controls including, row-level data visibility, column-level security and feature accessibility. Session variables and security filters allow users to share the same reports and dashboards, while ensuring that each user sees only their own slice of the data. Administrators can also manage access to attributes and measures in subject areas that are controlled via user groups.

For communication security, Birst employs a number of capabilities including Secure Socket Layer (SSL3 / TLS) connections for all communications. Birst also documents all login (successful and failed), logout, administrative and database events for auditing. Furthermore, Birst automatically locks account access after a number of failed login attempts. Security is built into our documented software development life cycle, based upon guidelines from the Open Source Web Application Security Project (www.owasp.org) and the SANS Institute (www.sans.org). Birst runs automated security tests on each build, does dynamic Web Application Vulnerability analysis on a continual basis, and static Web Application Vulnerability analysis.

At the Data Security level, Birst employs deletion tools that meet or exceed United States Department of Defense and National Security Agency requirements for secure deletion. Once a customer cancels their account with Birst, their information will be securely maintained for the period of time specified in their terms of service contract. During this period, the customer can access their information only if they re-activate their account. After this period is concluded, the account data is permanently deleted from the Birst data center and is no longer accessible. Birst can fully encrypt your data at rest or in transit (using industry-standard strong encryption methods like TLS).

SUMMARY

Summary

The landscape of BI and analytics has changed. Companies today are struggling to bridge the divide between centralized BI teams supporting enterprise requirements and user-led decentralized teams demanding greater agility. Closing this gap is the key to ensuring BI and analytics success.

Birst's unique approach empowers business users with the speed, autonomy and agility they demand while giving IT leaders the governance mechanisms they need to deliver a complete and consistent view of the business.

Born in the cloud, Birst's patented 2-tier analytics technology plugs into centrally managed data sources and seamlessly unifies them with data generated by decentralized teams throughout the organization. Birst then automatically refines this data and prepares it for analysis by overlaying a consistent set of business rules and definitions – creating that elusive Business-ready Data Tier – to deliver a single version of the truth through an adaptive user experience that includes reporting, dashboards, visual discovery and mobile.

We are living in a new age of analytics. It's the age of 2-tier. It's the age of Birst.

SOURCES

Sources

Create a Centralized and Decentralized Organizational Model for Business Intelligence

Gartner's Survey Analysis: Customers Rate Their BI Platform Ongoing Development and Administration Costs



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About Birst

Birst is the global leader in Cloud BI and Analytics. The company helps organizations make thousands of decisions better, every day, for every person. Birst's patented 2-tier data architecture and comprehensive BI platform sits on top of all of your data, to unify, refine and embed data consistently into every individual decision—up and down the org chart. Thousands of the most demanding businesses trust Birst Cloud BI to make metric-driven business execution a reality. Learn more at www.birst.com and join the conversation @birstbi.