Gartner Research

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Business Intelligence Platform Capability Matrix

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The BI platform capability matrix outlines the technical details of the 12 BI platform capabilities, as defined by Gartner, and evaluates the leading BI platform products based on those technical capabilities. The matrix serves as a high-level guide to understanding the technical capabilities of each vendor's shipping products. Beyond vendor selection, the capability matrix should primarily be used as an architectural guide to what should be included in a comprehensive and well-balanced BI platform. Organizations must decide which capabilities they need based on their requirements.

Key Findings

- While the core functionality of offerings in this market — such as reporting, ad hoc query and online analytical processing (OLAP) — is reaching parity, there are still some major differences in each vendor’s strategy in optimizing query performance. There are three dominant approaches: the traditional pre-calculated multidimensional OLAP (MOLAP) architecture; loading detailed data into memory; and optimizing relational queries with aggregate tables, caching and multipass Structured Query Language (SQL).
- Vendors that have built their technology organically have better integrated infrastructure than those that have grown through acquisition. However, most vendors have done a reasonably good job of integrating disparate products by leveraging the same security and metadata infrastructure.
- Scorecards are tough to differentiate. Most vendors with a scorecard product were able to meet all the requirements we requested — the technology is the easy part. The hard part of deploying a scorecard is defining the key performance indicators, aligning the metrics and applying it to a performance management methodology.

Recommendations

- Even a bottom-up evaluation process such as this is still a subjective exercise. Gartner recommends organizations perform their own detailed analysis of BI platforms to ensure all their requirements are met.
- In particular, organizations should evaluate BI platform vendors on "as close to production level conditions" as possible. Buyers frequently complain that the pilot worked well, but when the software was installed it couldn't deliver.
- While text mining and BI integrated search are not mainstream BI platform capabilities, and therefore weren't included in this evaluation, BI architects should look to use this emerging technology where business requirements dictate.

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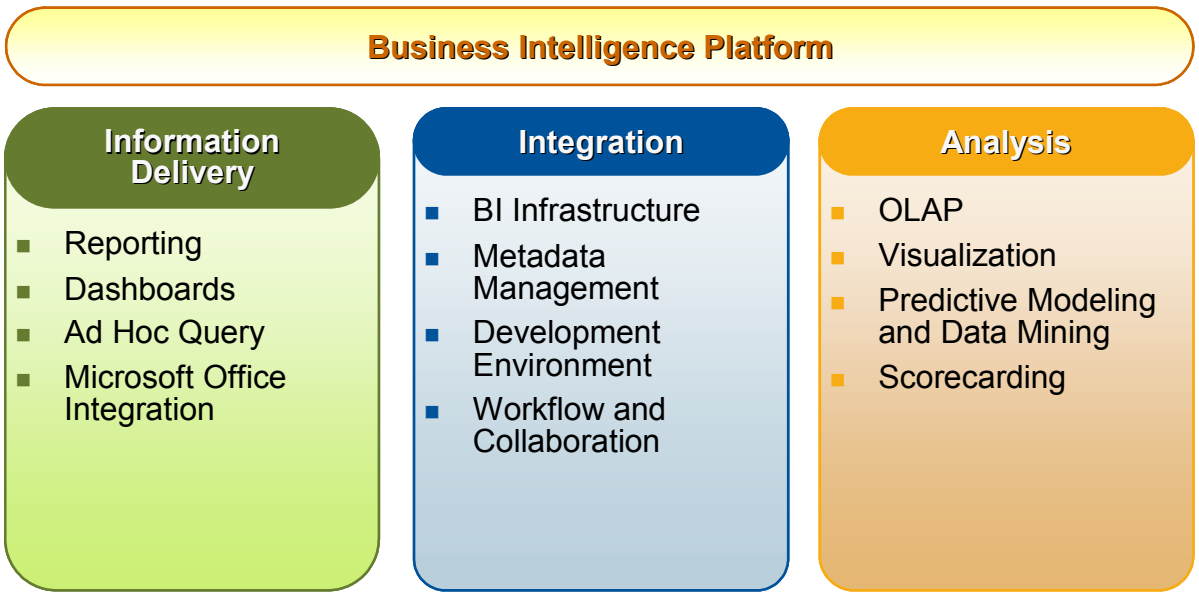
ANALYSIS

Gartner categorizes the 12 capabilities of a BI platform into three areas: integration, information delivery and analysis (see Figure 1). Currently, most attention is focused on information delivery, but the analysis and integration categories will play a much more prominent role in future BI deployments. Organizations must bolster their analysis capabilities to discover new insights that will lead to competitive differentiation and performance improvement. At the same time, BI platforms must improve their integration capabilities to weave these analytical insights back into the business at both the strategic and process level. Information delivery capabilities will always be necessary to inform stakeholders, enabling them to assiduously monitor the performance of the business and take remedial action when actual values are incongruent with projected goals. Only the combination of all three capability categories (integration, information delivery and analysis) can create a platform that delivers BI pervasively to the business.

Figure 1. BI Platform Capabilities



Source: Gartner (April 2007)

1.0 Information Delivery

There are four BI platform capabilities within the information delivery category: reports, dashboards, ad hoc query and Microsoft Office Integration. User organizations are investing heavily in all four of these capabilities, and this investment is pulling many vendors — even nontraditional BI vendors — into the space. The relative parity across most vendors' information delivery offerings will compel most organizations to justify their vendor spend in this area. More expensive BI platform vendors will need to differentiate themselves in the analysis and integration categories to sustain their higher prices.

1.1 Reports

This capability enables the creation of formatted and interactive reports with highly scalable distribution and scheduling capabilities. Interactive reporting enables users to create, display and save prompts that filter the data and layout of the report. In addition, BI platform vendors should

handle a wide array of reporting styles (for example, financial, operational or performance dashboards) with data from both operational and analytical sources. Reports should enable cascading parameters. For example, when a user drills down from an annual sales report to a monthly view, this monthly view should be maintained when navigating to another report. Finally, this capability should make it easy to search and navigate the information in the report, as well as a repository of reports.

1.2 Dashboards

This capability is a subset of reports that includes the ability to publish key performance metrics to a Web-based interface with an intuitive display of information, including dials, gauges and traffic lights. Dashboards should provide a positive or negative trend indicator and a color-coded summary that indicates the state of each metric compared to an established goal or threshold. End users should be able to build their own performance metrics. Real-time updating of dashboards to reflect events or scheduled updates to metrics is important for BI applications focused on operational tasks. Finally, dashboards should enable complex alerts and notifications based not just on one metric but rather on groups of related metrics.

1.3 Ad Hoc Query

This capability enables end users to create their own reports by asking ad hoc queries. A business-friendly semantic layer that hides the complexity of the underlying data sources is a key ingredient. Traditionally, the ad hoc query capability has been limited to just the data warehouse but, increasingly, ad hoc queries will be directed at a broader set of sources. Performance is a major issue for users performing ad hoc queries. Therefore, BI platforms that provide this capability should fulfill numerous requirements to improve query performance, including: aggregate awareness, caching, multi-pass SQL, query governance, performance auditing and native SQL commands. Another issue is the ability to harness ad hoc queries developed by end users so that they can be easily turned into standard reports and publishing systems.

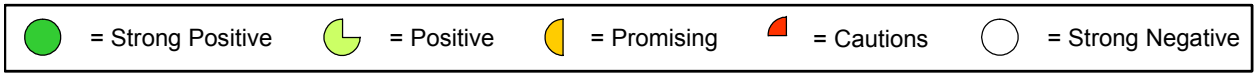
1.4 Microsoft Office Integration

In many deployments, the BI platform is used at the middle tier to manage, secure and execute BI tasks; while Microsoft Office, particularly Excel, acts as the BI client. At a minimum, BI platforms should be able to render reports in Excel while maintaining the report format and enabling Excel users to easily refresh the data. Increasingly, BI platforms are able to deploy all their traditional functionality — such as parameterized reporting, dashboards, scorecards and OLAP — in an Excel client. Some BI platforms extend this functionality beyond Excel to include other Office applications, such as Word and PowerPoint. Advanced functionality includes the ability to author new reports in Microsoft Office that can be saved back to the middle tier BI server, and the ability to centrally control and secure BI documents in Office.

Figure 2 scores the major BI platform vendors on their ability to provide the four information delivery capabilities.

Figure 2. BI Platform Capabilities: Information Delivery

Vendors	Reports	Dashboards	Ad Hoc Query	Microsoft Office Integration
Actuate				
Applix				
arcplan				
Business Objects				
Cognos				
Hyperion				
Information Builders				
Microsoft				
MicroStrategy				
Oracle				
Panorama				
QlikTech				
SAP				
SAS				
Spotfire				



Source: Gartner (April 2007)

2.0 Integration

There are four BI platform capabilities within the integration category: infrastructure, metadata, development, and workflow and collaboration. Of all the BI platform capability categories, this is the least mature. Most of the BI platform vendors do a reasonable job of providing an integrated infrastructure, including security, metadata and administration tools, but some vendors with an aggressive acquisition strategy will find this difficult to maintain. Most BI metadata is used for just one purpose — as a semantic layer for self-service reporting. BI metadata must play a bigger role in standardizing dimensions, hierarchies, measures and performance metrics across the organization. Moreover, BI metadata must talk to more applications than just that same vendor's reporting tools. The development environment must move beyond programmatic software development kits (SDKs) to include more visual development functionality and more reliance on Web services. Finally, as BI becomes more process driven, BI platforms will need better integration with workflow and collaboration offerings.

2.1 Infrastructure

To evaluate this category, Gartner examined how tightly each BI platform was integrated, including common security, metadata, administration, portal integration, object model, query engine and shared look-and-feel. The real litmus test for tightly integrated infrastructure is the ability to deploy all BI functionality with a single installation. Gartner analysts examined other

infrastructure attributes, including support for workload balancing, zero footprint clients, 64-bit computing, Ajax, Unicode and the ability to run on multiple operating systems/databases.

2.2 Metadata

Strong metadata is the most important capability of a BI platform. Not only should all tools leverage the same metadata, but the offering should provide a robust way to capture, store, reuse and publish metadata objects. To evaluate a BI platform's capability in this area, Gartner analysts looked for a single repository for various types of BI metadata, including dimensions, hierarchies, measures, performance metrics and report design objects. BI platform vendors were asked if they could support multiple (and simplified) views of the metadata based on subject area domain. Data lineage and impact analysis were also important requirements. BI platforms were also evaluated on a range of other features, including: the ability to infer metadata; search ability and openness of the metadata; and the ability to promote and reuse metadata across different users, developers and application types.

2.3 Development

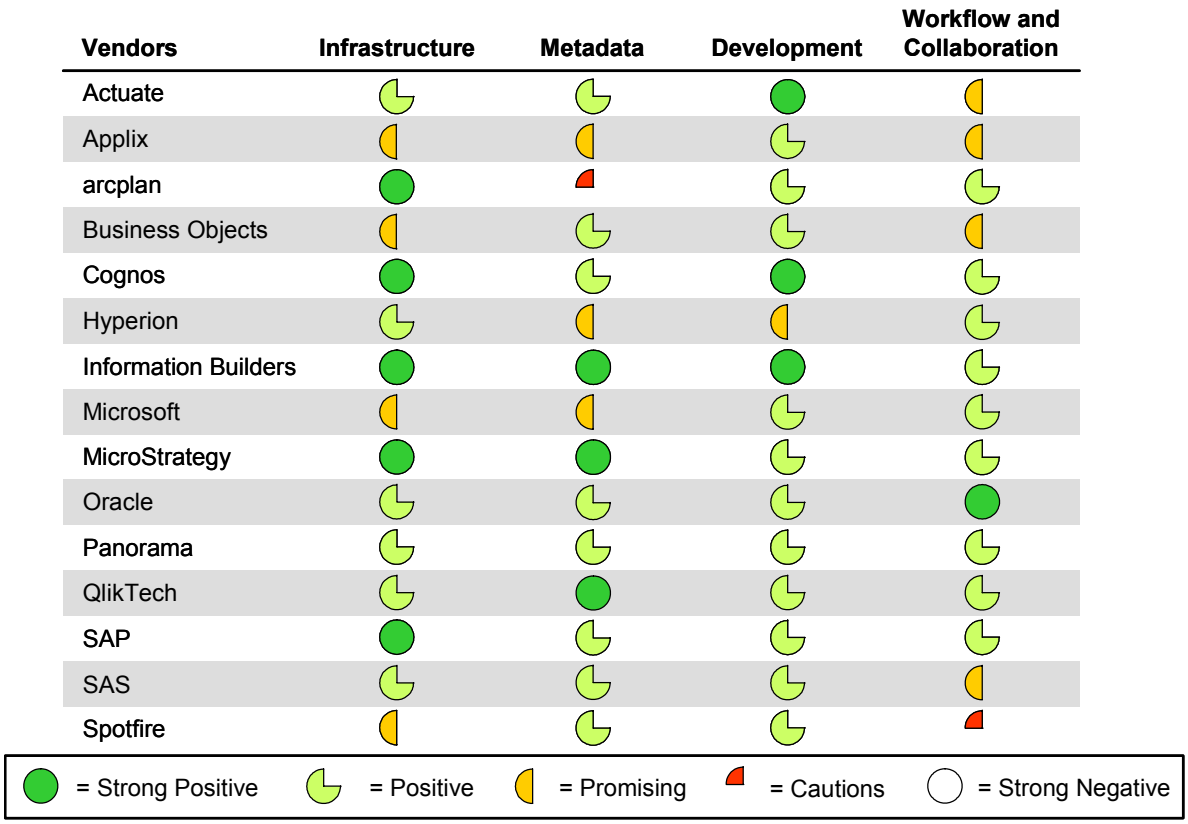
The BI platform should provide a set of programmatic development tools, coupled with a software developer's kit, to create BI applications and integrate them into a business process and/or embed them in another application. In addition, the BI platform should enable developers to build BI applications without coding by using wizards and drag-and-drop tools for a graphical assembly process. The development environment should also support Web services to perform common tasks such as scheduling, delivery, administration and management.

2.4 Workflow and Collaboration

This capability enables BI users to both share and discuss information via public folders or discussion threads, and to integrate BI results within the context of a specific business process. Using this capability, the BI application can assign and track events or tasks assigned to specific users. Often, this capability is delivered by integration with a separate portal or workflow tool. Gartner analysts evaluated each BI platform's ability to trigger a task-specific workflow based on the outcome of BI-generated data. The ease with which users could build and edit business rules to automate the workflow was also a major requirement. Support for emerging standards, such as the business process execution language (BPEL), was also requested.

Figure 3 scores the major BI platform vendors on their ability to provide the four integration capabilities.

Figure 3. BI Platform Capabilities: Integration



Source: Gartner (April 2007)

3.0 Analysis

There are four BI platform capabilities within the analysis category: OLAP, predictive modeling, scorecards and visualization. To date, the vast majority of organizations focus on just the OLAP capability. But with increasing interest in process- and strategy-driven BI, requirements for predictive modeling and scorecards will also increase. Predictive modeling is needed to determine in advance the outcome of various business events. When used correctly, this information can promote better planning and optimize business processes. Scorecards are used to bring alignment to the business by making performance metrics and their cause-and-effect relationships visible to the entire organization. Finally, visualization, which uses best practices to display data in a cognitively efficient manner, will be increasingly adopted by BI platform vendors to make their solutions easier to consume by a broader set of users.

3.1 OLAP

This capability allows end users to analyze data with extremely fast query and calculation performance, enabling a style of analysis known as "slice and dice." This capability could span a variety of storage architectures (for example, relational, multidimensional and in-memory). Gartner analysts looked for the ability for users to easily define functions and add/edit dimension members. BI platforms were also checked for the ability to perform sophisticated sorting/ranking, alternate hierarchies, inter-row calculations, asymmetric hierarchies and drilling down on measures. Performance attributes, such as the ability to perform relational OLAP (ROLAP) calculations, in-memory aggregations and trickle feed cube loading, were also examined.

3.2 Visualization

This capability allows numerous aspects of data to be displayed more efficiently by using interactive pictures and charts instead of rows and columns. BI platforms were evaluated on their ability to project multidimensional data in a two-dimensional screen using the size, shape and color of objects to represent dimensionality. The ability to project data onto any physical design surface (such as a physical store, airplane or stadium) was also examined. Finally, Gartner analysts looked for BI platforms that provided a wide range of chart types beyond basic bar and pie charts, to include chart types such as heat maps and geographic maps. Credit was given to BI platforms that enabled easy interactivity with these charts.

3.3 Predictive Modeling and Data Mining

This capability enables organizations to classify categorical variables and estimate continuous variables using advanced mathematical techniques. Most of the BI platforms could provide basic comparative statistics. Gartner analysts evaluated BI platforms on their ability to build predictive models based on more sophisticated algorithms performing the following types of analysis: forecasting, classification, attribute importance, clustering, affinity analysis and optimization. BI platforms were also evaluated on their ability to manage a predictive modeling environment, including: experimental design, data transformations, model management, model assessment and real-time/batch scoring.

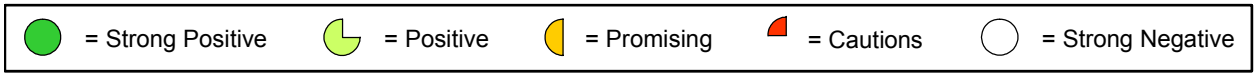
3.4 Scorecards

This capability takes the metrics displayed in a dashboard a step further by applying them to a strategy map that aligns key performance metrics with the achievement of strategic objectives. Moreover, the scorecard implies the use of a performance management methodology such as the "balanced scorecard" framework or Six Sigma. Gartner analysts evaluated BI platforms on their ability to design strategy maps, support common scorecard methods, apply performance management methodologies, foster collaboration about performance metrics, and summarize, display, and group performance metrics. Most vendors with a scorecard product were able to meet all the requirements we requested. Some vendors without an officially designated scorecard product were able to demonstrate some scorecard functionality with their reporting and dashboard products.

Figure 4 scores the major BI platform vendors on their ability to provide the four analysis capabilities.

Figure 4. BI Platform Capabilities: Analysis

Vendors	OLAP	Visualization	Predictive Modeling	Scorecards
Actuate				
Applix				
arcplan				
Business Objects				
Cognos				
Hyperion				
Information Builders				
Microsoft				
MicroStrategy				
Oracle				
Panorama				
QlikTech				
SAP				
SAS				
Spotfire				



Source: Gartner (April 2007)

4.0 Methodology

Participating vendors were asked to complete a survey of 220 technical questions that mapped onto the 12 BI platform capabilities. Vendors responded to each question with one of the following multiple choice answers:

0 Functionality not provided.

1 Functionality provided; requires customized integration with third party.

2 Functionality provided by the vendor but requires customization by the vendor.

3 Functionality provided seamlessly by a third-party product.

4 Functionality provided out-of-the-box.

Each vendor was then asked to demonstrate or explain how its BI platform met the technical criteria. Gartner analysts adjusted the scores based on how satisfactorily the vendor responded. The analyst-adjusted scores for each of the 220 questions were then used to calculate a summary score for each of the 12 BI platform capabilities.

Note that this analysis was performed before the Oracle Acquisition of Hyperion and before the release of Business Objects' Voyager product and MicroStrategy's latest release at the end of March 2007.

RECOMMENDED READING

"Magic Quadrant for Business Intelligence Platforms, 1Q07"

Acronym Key and Glossary Terms

BI business intelligence

BPEL business process execution language

MOLAP multidimensional online analytical processing

OLAP online analytical processing

ROLAP relational online analytical processing

SDK software development kit

SQL Structured Query Language

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