



## **An Analytical Platform For The Smart Enterprise**

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# THE DATA AND ANALYTICS DRIVEN ENTERPRISE

*The proliferation of mobile devices and presence on the web has made competitors much more visible*

In today's connected world, competition is increasing faster than ever. An obvious reason for this is the fact that the web has made competitors far more visible to customers and prospects. So much so, that retaining existing customers is now just as important and gaining new ones. Another key reason for this is the proliferation of connected devices. Almost all of us in the modern world are carrying some kind of device that connects to the Internet. Walk out on any street corner and just look around. Almost everyone is looking down at a device. It doesn't matter where you are. If you go into a coffee shop, a railway station, an airport, a shopping mall you see the same thing. They're all online whether it is searching, browsing products and services, looking at what others are saying on social networks, or reading reviews about products and services on review websites.

*Consumers are now spending considerable amounts of time online*

You might argue that this kind of consumer behaviour doesn't apply in the business-to-business world. Really? On the contrary, one piece of research<sup>1</sup> estimates that B2B online retail is projected to grow to \$6.7 trillion by 2020, more than twice that of the B2C market. The same research indicates that this is due to the rapid migration of organisations from legacy systems to open, online platforms. Companies are on a mission to transform traditional business practices. It's what some refer to as digitalisation - the rush to the web to get visible, cut costs, and make it easy to transact business online.

*Business-to-business online retail is projected to grow at twice that of the consumer market*

*Customers and prospects are more powerful than ever because they are informed*

So what is the impact? That is already clear. With increasing choice on the Internet, customers and prospects are more powerful than ever because they are informed. In a very short period of time they can search the Internet, find competitive products and services, bookmark what is of interest and switch between sites comparing prices, capabilities and options. In many cases they can go to comparison websites, which do all this for them. Once they have a good idea of what they want to buy, they can check out social media, find review web sites and ask questions in a few forums to see how others rate the products and services of interest. Then, with all this information at hand, the fully informed customer will choose. They can switch brands at the touch of a mobile phone screen or the click of a mouse. When you look at it this way, you quickly realise why this kind of capability has made customer loyalty cheap.

*Comparison sites are making it easier to get informed quickly*

*Customer loyalty is becoming cheap*

What has this got to do with data and analytics? Simple. In an increasingly online economy, you *have to* know your customers. You *have to* engage them consistently across all channels (Omni-channel), know what they want and offer personalised high quality products and services. The only way you can do that is with data and analytics. Evidence based decision-making based on effective analysis and interpretation of rich, high quality, verifiable data is now mission critical to success. Organisations that can do this are data and analytics driven enterprises. They have a greater chance of succeeding because they often have the richest insights to know what customers want.

*The omni-channel front office is now critical to keeping and engaging customers*

*Trusted data and analytics are mission critical to success*

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<sup>1</sup> Frost & Sullivan, Future of B2B Online Retailing, December, 2014

# KEY REQUIREMENTS IN A MODERN ANALYTICAL ENVIRONMENT

*Insights and analytics are needed enterprise wide*

It's not just customer related use of analytics that is important. Areas like risk, finance, and operations can all benefit from 'right time' insights. If your organisation is striving to become a data and analytics driven enterprise, then there are a number of key requirements and use cases that should be met in a modern analytical environment.

## BUSINESS ALIGNMENT

*Insights produced need to help companies achieve their strategic business goals*

The first of these is business alignment. Any analytical programme needs to ensure that insights produced, and decisions and actions taken, provide an effective contribution towards achieving the goals, priorities and targets set out in the organisations' business strategy. It doesn't matter if it is a big data project, a streaming analytics project or a traditional data warehouse project to produce reports and dashboards.

## TRADITIONAL AND NEW DATA SOURCES

*New data is needed to enrich what companies already know about customers*

The aforementioned discussion on customer insight is a classic example of the need for more data beyond what may already reside in data warehouses and data marts. Many companies are realising that if they are to remain competitive, it is not the technology that is going to make that happen. It's the data. And for many, internal and external data sources are needed to produce truly differentiating customer insights to give them an edge over competitors.

*Behavioural and social data is often missing from data warehouses*

Additional data on hobbies, interests, life events, previously unknown relationships and even desires may come from external social and professional network data. Also, new customer interaction data provides insight into behaviour. Examples include clickstream interaction data, which is challenging to process and analyse because it can be very large in volume.

*Analysing in-bound emails, call centre notes and social network data can provide insights into sentiment*

Inbound emails, call centre notes, social networks and review web sites are good sources of sentiment. Many of these new data sources provide data that is not structured and so data of interest first needs to be identified and extracted before it can be integrated with other data and analysed.

*Analysis of more complex data is needed*

In the case of business customers, external data sets such as open government data or SEC filings (or equivalent) may add real value.

*Live streaming data to optimise business operations*

Finally there is high velocity data. Financial markets data and sensor data for example. Sensor data provide insight into usage of 'smart' products, manage assets and optimise field service, optimise manufacturing processes, supply chains and distribution chains.

*New platforms have emerged to support new kinds of analysis*

Looking at all this, the characteristics of new data needed are also changing in terms of data volume, data variety and data velocity. It is no longer just structured data that business wants to analyse. It is these characteristics together with the kinds of analysis needed that will dictate the platform best suited to processing and analysing it.

## THE NEED FOR TRUSTED DATA AND DATA GOVERNANCE

*Data governance is needed to produce trusted insights*

Trusted insights come from trusted data. Trusted data needs to be governed to ensure it is high quality, traceable, protected and commonly understood. This is especially important in compliance, operations, risk and finance. The same is true for heavily shared master data. Poor quality data can impact on decision-making and costs. For example, it causes false positives in predictive analytics.

## SCALABLE ANALYTICAL INFRASTRUCTURE

*Data preparation and analyses have to scale in big data environments*

*New scalable infrastructure is needed to make this possible*

As companies acquire new data, data capture, data preparation, data integration and analysis all have to scale to process high volume (e.g. Clickstream data), high velocity (e.g. sensor data) and multi-structured data. For this reason scalable cloud or on-premises based analytical infrastructure is needed e.g. scalable analytical relational DBMS, Hadoop, or scalable stream-processing software. These technologies extend existing analytical environments beyond traditional data warehouses and data marts. Therefore any analytical platform wanting to run traditional and new analytical workloads should be able to exploit the infrastructure best suited to producing the insights

## A NEW AND EXTENDED ANALYTICAL ARCHITECTURE

The fact that there are multiple analytical workloads now appearing in organisations running on Hadoop, Apache Spark, NoSQL databases scalable analytical RDBMSs and streaming data, means that a traditional data warehouse architecture is no longer enough. A new extended analytical architecture<sup>2</sup> (see Figure 1) is needed to also support new workloads. This includes multiple analytical SQL and NoSQL data stores, simplified access to multiple data stores, multiple analytical tools, and end-to-end data and systems management across the entire ecosystem. Note that visual BI/analytics platform can directly access personal data stores if needed. Also note that this architecture is not without its problems, which are discussed later in the paper.

*A new extended analytical architecture is now needed to support multiple analytical workloads*

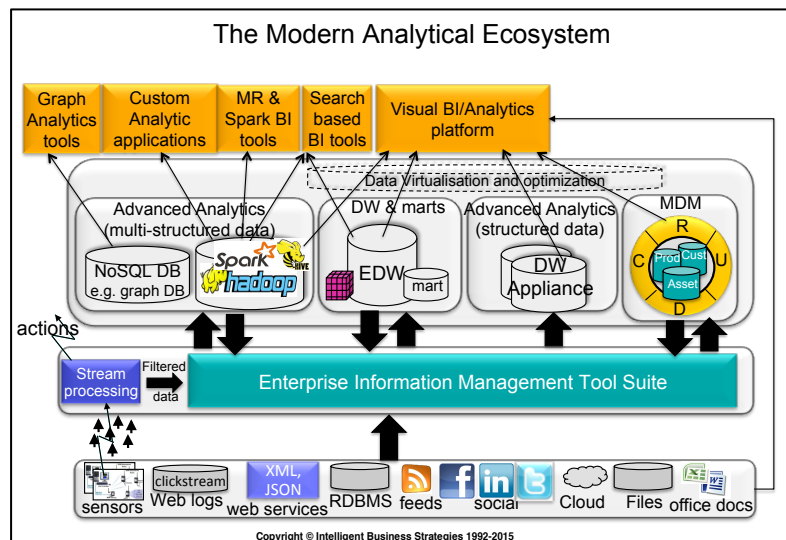


Figure 1

For now, suffice is to say that, over time, the Visual BI/Analytics platform shown in Figure 1 will expand to the left to support more types of analysis.

<sup>2</sup> Some analysts have referred to this architecture as the Logical Data Warehouse

## MODERN ANALYTICAL PLATFORM

Given the speed at which companies are having to adapt and respond to new commercial pressures, what about analytics? How is this impacted? What are the requirements of an analytical platform in a modern environment?

### Broader Use of Analytical Processing – More Use Cases

The first thing to recognise is that with pressure increasing to remain competitive, there is a growing need to add new data sources, support more types of analyses, and add new visualisations to produce new and richer insights. Business analysts therefore want more analytical power but within an agile, easy to use, self-service visual and collaborative environment. There is also a need to broaden the use of insights across the enterprise.

Use cases in demand now include:

- Traditional reporting off data warehouse or non-data warehouse data
- Building of interactive dashboard applications
- Governed self-service, interactive visual discovery to quickly build prototypes using trusted warehouse and new non-data warehouse data to produce new high value insights. This is needed *before* initiating changes to a data warehouse add to what organisations already know
- Collaborative and mobile BI
- Embedding analytics and insights in other applications
- Building new custom analytic applications
- Predictive analytics and prescriptive analytics
- Complex analysis of large amounts of structured data
- Exploratory analysis of un-modeled, multi-structured data using advanced analytics
- Analysis of real-time streaming data

*The way business wants to analyse data is now changing*

*Early prototyping and exploratory analysis is now needed before initiating changes in a data warehouse*

*New kinds of analytical workloads beyond those in a data warehouse*

*Scalability is important when analysing big data*

With respect to big data, the difference from traditional data warehouse environments is that, large data volumes and high velocity data means that information producers like data scientists and business analysts need to prepare, filter and analyse data at scale using scalable infrastructure.

### Anatomy Of A Modern Analytics Platform

Given this backdrop, the challenge is to deploy a modern analytical platform that can enable all of it. That's a pretty tall order. Nevertheless it is achievable.

Looking at Figure 1, it shows. multiple analytical tools accessing multiple analytical data stores. However there is a problem with that kind of setup. Why should users have to switch between tools just to analyse different data or to perform specific kinds of analysis? Historically, so called BI Platforms where just that – multiple separate tools for query and reporting, OLAP, production reporting, data mining etc. However why the complexity? Why should you have to switch between tools? While it is not the case that all users need all functionality, it is the case that people want to leverage different services for different analytic workloads e.g. interactive query and reporting, dashboards, exploratory analytics, predictive analytics, embedded analytics etc.

*Multi-tool BI platforms of old are giving way to analytical services that can be mixed and matched*



*The modern analytical platform now has to support multiple analytical workloads across multiple analytical data stores*

Ideally there should be a single, self-service, modern analytical platform that provides the services needed to support multiple analytic workloads (use cases) and span all of it. This platform should be capable of accessing all required data in 'fit for purpose' data stores within the Extended Analytical Ecosystem<sup>3</sup> while masking complexity from users. The platform could then be configured to offer data management, analytical, visualisation and collaborative services to fit the role of the user whether that is a data scientist, a business analyst or an information consumer. This is shown in Figure 2.

*Descriptive, predictive and prescriptive analytics all need to be supported*

*Analysis of structured and multi-structured data is now needed*

*Data management now needs to be integrated into the analytical platform*

*Self-service data visual discovery for business analysts and 'citizen' data scientists*

*Support for advanced analytics is needed to analyse more complex data*

*Alerts and recommendations*

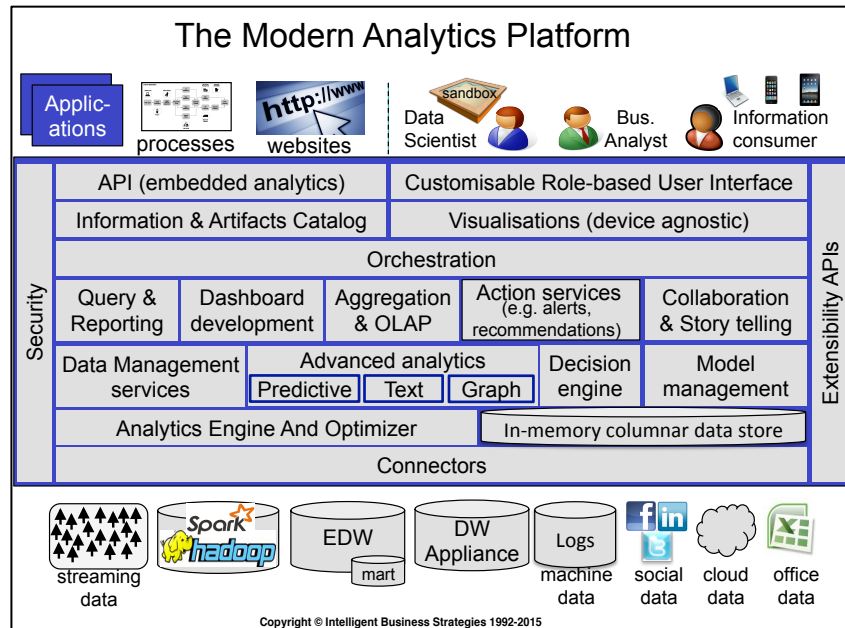


Figure 2

This single analytics platform alternative can run on-premises or in the cloud and needs to offer a broad range of services including:

- Data management – data connectivity, data profiling, data cleansing and data integration, business glossary (common data definitions)
- Self service interactive visual discovery
  - Business glossary (common data definitions)
  - Query and reporting
  - Dashboard development
  - Aggregation and multi-dimensional analysis
  - Visualisation services
- Advanced analytics
  - Machine learning, text analytics/indexing, graph analytics
- Model management to manage versions of analytical models
- Automated decisions (decision engine)
- Action services e.g. Alerting, recommendations etc.

<sup>3</sup> As shown in Figure 1

*Libraries of pre-built components help speed up information production*

*Collaboration and storytelling to share insights across the enterprise*

*APIs and toolkits to allow developers to embed analytics in applications*

*'Push down' analytics to exploit scalable underlying infrastructure*

*Information producers and information consumers both now need to be supported*

*Information production is now going on in traditional, exploratory and real time analytical environments*

*Consumption of new insights needs to be accelerated and expanded to maximise effectiveness*

*Self-service for business analysts AND 'citizen' data scientists improves productivity and reduces time to value*

- Orchestration – to create powerful analytic applications
- Libraries of pre-built visualisations and analytic algorithms
- Information production and information consumption
- Collaboration and storytelling
- Governance – security, lineage, lifecycle management
- Embedded analytics

In addition it needs to be extensible so that new functionality (services) can be added to the platform. Alternatively the platform can add new services by calling out to third party technologies to integrate with existing investments and leverage what has already been created.

The same platform should also offer the ability to embed analytics in applications, processes and websites to deliver insights directly to where decisions are made. This integration can be done using APIs and toolkits.

Underpinning all of it is an analytics engine. The purpose of this is to provide 'speed of thought' interactive analysis and the 'smarts' needed to exploit underlying scalable infrastructure so that data transformation and analytics can be 'pushed down' to the appropriate data store where the data resides. For example, if the data is in Hadoop, the analytics engine may chose to run data integration and analytics in Hadoop and/or Apache Spark to get scalability. Equally for live streaming data, it would run streaming analytics to detect patterns that may cause alerts.

## Information Production and Information Consumption

Irrespective of the use case, in simple terms it is about two things - information production and information consumption

Information *production* includes producing trusted datasets ready for analysis and producing new insights by analysing Therefore, information production is going on using simple structured data in files (e.g. Excel spread sheets), in traditional data warehouse environments, in real-time, and in exploratory big data environments.

Information *consumption* is about making it easy to consume and utilise insights that have been produced to maximise effectiveness across the organisation at operational, tactical and strategic levels. The purpose is to consume and use insights, alerts and recommendations everywhere to facilitate more accurate, timely, effective decision-making and action taking.

## Self-service Data Discovery and Data Visualisation

The benefits of a platform such as that described in Figure 2, is that it lowers skill sets needed to analyse data in a logical data warehouse. You don't have to be a developer. Business analysts can become 'citizen data scientists' using self-service visual discovery tools built on top of the platform that can leverage everything from simple query processing to advanced analytics. Productivity is improved and time to value is reduced.

Information producers can:

- Connect to multiple underlying data sources including relational databases, NoSQL databases, Hadoop, files of various popular formats and real-time streaming data sources



*It should be possible to support multiple use cases off the same analytical platform*

- Integrate user defined subsets of data from multiple sources for use in analysis (e.g. join relational to non-relational data)
- Leverage data management at scale to prepare big data for analysis
- Leverage scalable in-memory processing to interact with and visualise data quickly to discover and produce insights
- Produce reports, interactive dashboards and analytical models to guide information consumers and help them make more effective decisions
- Build or make use of already deployed predictive analytical models during analysis to predict outcomes on data being analysed
- Leverage advanced analytics in underlying scalable infrastructure so that execution of analytic models on big data runs in parallel either in-memory, in-database or in-hadoop to get the performance needed
- Leverage prescriptive analytics to provide recommendations and alerts
- Organise reports and dashboards into stories (storytelling) to explain the business impact of discoveries to decision makers.
- Publish these analytical artifacts and stories to a catalog (also known as a library) for information consumers to find, subscribe to and (re-)use
- Collaborate over insights produced with information consumers
- Search an 'information catalog' and/or 'data marketplace' for and subscribe to already created trusted data sets
- Search a catalog for reports, dashboards etc., to (re-)use in analyses

Also information consumption can be accelerated to quickly make insights available to decision makers by:

- Allowing information consumers to easily find and subscribe to role-based, interactive dashboards and stories already published and available in a catalog
- Making insights available on any web browser and mobile device
- Embedding analytics into applications, processes and web sites

With respect to governance and security, trusted data sets can be published in marketplaces and information catalogs by authorised users and IT professionals for others to re-use rather than re-invent. In addition, common data names and data definitions can be made available to all information producers via an information catalog / business glossary. Also security can be used to govern access to APIs, datasets, data stores, reports, dashboards, stories, and analytics.

## EMBEDDING BI TO MAXIMISE EFFECTIVENESS OF DECISION MAKING

*Not everyone can make use of visual data discovery tools in their day job*

*Visualisation is not enough*

Despite the productivity benefits of self-service visual discovery tools, a key point to recognise is that not all people can make use of such tools in the everyday tasks they need to perform. They may be 'tied' to an application e.g. a call centre operator. Therefore, applications and websites also need to leverage insights. Visualisation alone is not enough. To address this, analytical platforms should provide the ability for developers to embed role-based insights and analytics in applications and business processes and web pages. This helps to maximise effectiveness at the point of decision making so that

everyone is able to work 'smarter' in the context of the tasks they are performing. It also provides a mechanism to alert people and systems when needed to keep business operations running optimally.

*On-demand insights are needed in applications, processes and websites to support operational decisions*

However it can go further by embedding BI and analytics in applications outside the firewall. There is nothing to limit this capability to internal use only. For example, you could embed analytics in customer portals, supplier portals and other web properties.

Embedding can be done via APIs (as shown in Figure 2), software development toolkits (SDKs) or other mechanisms to make insights available in context at the point of need.

*Extensibility enables new data sources, new visualisations, and support new analytical workloads to be added the platform*

Opening up the platform to developers also allows the platform to be extended via published APIs. For example, to add new visualisations, add new data sources, plug in third party predictive analytics or third party data integration services etc. All of this is important when building out an analytical platform for the enterprise.

# THE QLIK PLATFORM APPROACH TO VISUAL ANALYTICS

Having understood the demands of the newly emerging analytical ecosystem and the requirements of a modern analytics platform, this next section looks at how one analytics vendor is taking on this challenge. That vendor is Qlik.

Qlik is a provider of a platform-based approach to visual analytics. It was founded in Lund, Sweden in 1993. It has approximately 34,000 customers in more than 100 countries with over 2,000 employees worldwide.

As the use of business intelligence and analytics broadens Qlik have recognised the need to transition beyond visualisation to create a platform approach to visual analytics. This is shown in Figure 3 with the components described in more detail below.

*Qlik have created a platform approach to visual analytics*

*Cloud and on-premises based visual data discovery and dashboard building*

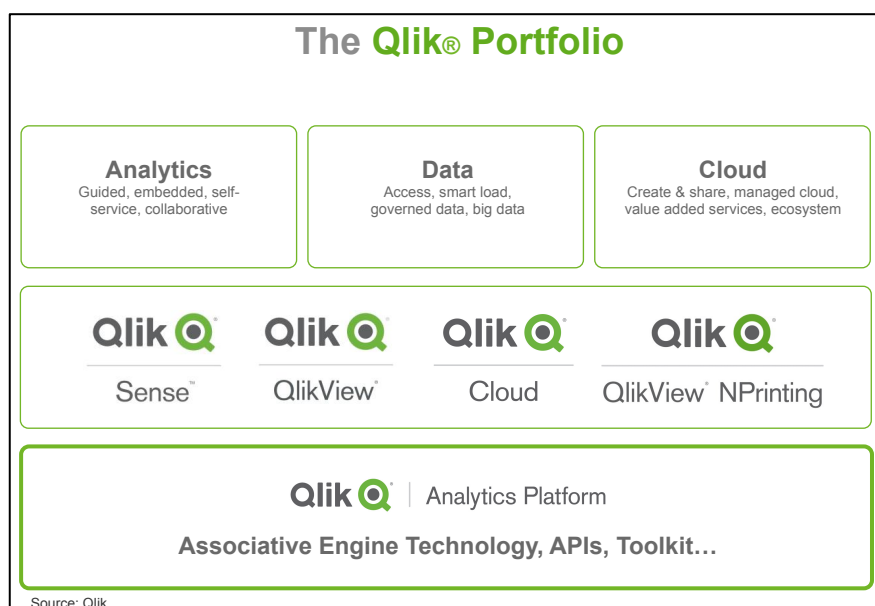


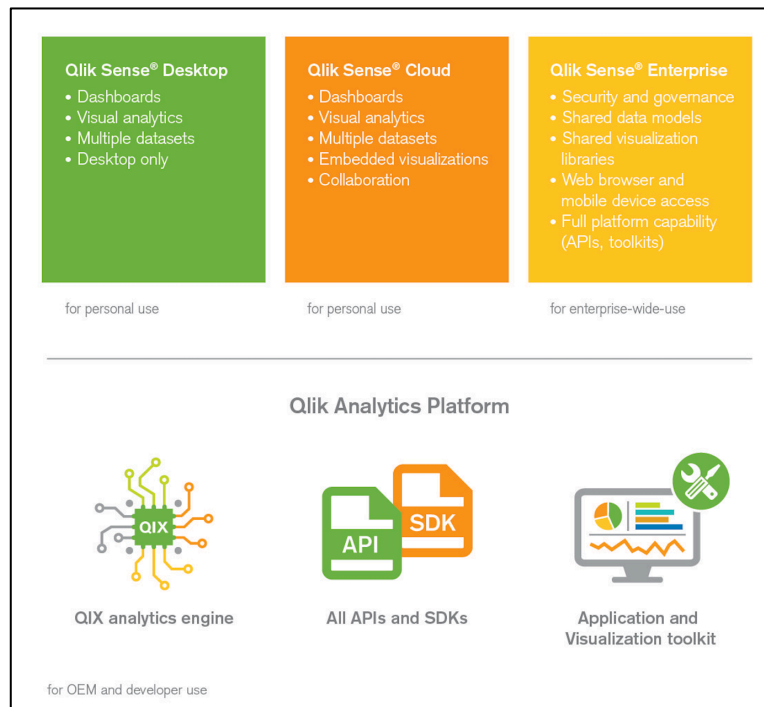
Figure 3

## THE QLIK SENSE PRODUCT FAMILY

The Qlik Sense product family consists of Qlik Sense Enterprise, Qlik Sense Desktop and Qlik Sense Cloud all built on top of the Qlik Analytics Platform. This is shown in Figure 4.

### Qlik Sense Enterprise

Qlik Sense Enterprise is a self-service visual analytics platform built on top of the Qlik Analytics Platform (discussed below). It supports self-service visual data discovery, interactive dashboard analytic applications, reporting embedded analytics, collaborative BI and storytelling. It also includes Smart Data Load for visual data loading and data integration. Smart Data Load generates script to integrate and load data into memory. It includes connectors to a wide range of data sources including packaged applications such as SAP and Salesforce.com. It also has support for security and governance, mobile device access and the ability to print objects and sheets to PDF or PowerPoint.



Source: Qlik

Figure 4

## Qlik Sense Desktop

Qlik Sense Desktop is a free Windows desktop based visual data discovery tool for personal and internal business use. It allows users to use Qlik Sense and create personalised, interactive data visualisations, reports and dashboards using data from multiple underlying data sources. These Qlik Sense applications can then be reused, modified and shared with others.

## Qlik Sense Cloud

Qlik Sense Cloud is a hosted SaaS version of Qlik Sense. It is a solution for sharing Qlik Sense applications, so that you can easily collaborate with others. Users can access the cloud and the Qlik Sense applications from any device with an Internet connection and a web browser. Qlik Sense Cloud is built on top of the Qlik Analytics Platform (discussed below) using exactly the same APIs that have been made available to developers.

## QLIKVIEW

QlikView is an associative, in-memory product for building intuitive and interactive dashboard applications. It allows purpose built interactive dashboard applications to be built specifically for groups of decision makers in different parts of the enterprise to provide them with the insights they need at a glance<sup>4</sup>. They work by loading data from multiple data sources (including from packaged data warehousing solutions like SAP BW) into memory from where QlikView's in-memory engine allows concurrent users to interact with the data. In that sense QlikView applications could be considered as in-memory data marts.

<sup>4</sup> Often referred to a guided analytics

## QLIKVIEW NPRINTING

QlikView NPrinting is a report generation, distribution and scheduling tool for QlikView. It can create pixel perfect reports, and HTML reports for web publication, through built-in editors, using data and analytics from QlikView. It also includes the ability to customise reports using banding, scripting, and formatting and graphics. QlikView reports can be also be created in Microsoft Office formats such as PowerPoint, Excel, and Word. In addition, reports can be scheduled or run conditionally, encrypted for secure distribution, and delivered through a variety of channels including email, file transfer, and web.

## QLIK DATAMARKET

Qlik DataMarket provides a library of additional data sets for analysis to add to what you already know. It is available directly from Qlik Sense with a QlikView connector in development. Both free and premium paid data sets available in Qlik DataMarket.

## THE QLIK ANALYTICS PLATFORM

The Qlik Analytics Platform is a subset of Qlik Sense Enterprise. It underpins both QlikSense and QlikView and is available to developers and OEM partners.

*The Qlik Analytics Platform includes a number of components*

It consists of a number of components:

- The Qlik QIX engine
- A set of APIs and toolkits to embed insights into applications, access platform services (e.g. visualisations, security) and extend functionality
- A UI development client and library of pre-built visualisations
- Management and security

### The Qlik QIX Engine

At the heart of the Qlik Analytics Platform is the Qlik QIX Engine. A detailed explanation of the QIX engine and what it offers is covered in a previous paper<sup>5</sup> but, for convenience, some key capabilities are covered again. The engine:

- Is a multi-threaded engine that can fully exploit multi-core processors
- Has its own APIs to allow access to engine services or to embed it in other applications
- Uses in-memory compressed columnar data and indexing to support concurrent interactive user and application requests for insights
- Uses logical inference to continuously minimise the data needed to satisfy a user's query with every click the user makes
- Does all calculations only on relevant in-memory data
- Knows about data a user selected but which is then excluded due to a subsequent selection

*A powerful analytics engine supporting interactive analysis on compressed in-memory data*

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<sup>5</sup> Interactive Data Exploration With An In-Memory Analytics Engine ([URL needed](#)).

- Can show the user other related data associated with the user selection  
- this is referred to as the 'associative experience'

*An associative experience that not only highlights selected data, but also data related to user selections and data selected but excluded by another selection*

The associative capability in the QAP means the QIX engine knows the relationships between data tables users allowing user attention to be drawn to insights from associated data. In addition a user can also see data they did not select. This has advantages over SQL generating self-service visual discovery tools because they would not be able to do this. It would require additional SQL queries. Also, given that there are APIs directly to the QIX engine, it could also potentially make associated and unselected data available to applications within which the engine is embedded.

## APIs

*APIs are available to allow developerst to integrate insights and build new applications*

The Qlik Analytics Platform provides front and back end APIs to developers to:

- Embed analytics in operational applications and processes
- Build web analytic applications on top of the platform for use by internal and external information consumers
- Build a client outside a web browser (e.g. in .NET or Java)
- Extend the capabilities of the platform itself

*APIs to build mashups using Qlik Sense objects and data*

The APIs include:

- A mashup API to integrate with Qlik Sense objects. You can reuse Qlik Sense visualisations including custom extensions, and make use of Qlik Sense data and calculations.
- QIX Engine APIs to embed the engine in other applications
- Extension APIs allow developers to extend platform capability e.g. with new visualisations from GitHub or d3js.org for example.
- Backend APIs to allow you to integrate custom data sources using the Qlik data eXchange (QVX) SDK. There is also a .Net SDK available for Microsoft Visual Studio for creating .Net applications.
- A Qlik Sense Repository Service API to communicate directly with the repository service to start tasks from an external scheduling tool and extract data

*APIs to embed insights and the entire engine in other applications*

*APIs to extend the platform by adding visualisations and data sources*

*APIs for automation*

## UI Development and Visualisations

*User interface development tools, chart libraries and templates to speed up development*

In addition a user interface development tool and a library of Qlik charts are available to developers to build visual analytic applications with embedded Qlik Sense content for information consumers. The tool allows you to develop mashups without having to write any code. Also a number of templates exist to get developers started more rapidly.

## Governance

*Integration with user directories to support standard corporate authentication*

With respect to governance, the Qlik Analytics Platform also has a user directory connector API to connect to an external system (e.g. Microsoft Active Directory) so that user authentication integrates with corporate standards. This applies no matter if access to the platform is from Qlik Sense, QlikView or via other applications and websites where analytics have been embedded. All authentications are managed by a proxy service, which also has an API.

*Dynamic authorisation control what users see*



With respect to authorisations, access control is implemented via the Qlik Sense Repository Service API. Also data for multi-user applications built on top of the platform can be dynamically controlled based on user information.

## USE CASES SUPPORTED BY THE QLIK

Looking at Figure 2, the extensible Qlik platform approach to visual analytics can support the following use cases in a secure managed environment:

*One platform, multiple use cases*

- Self-service data discovery and visualisation with aggregation, multi-dimensional analysis, collaboration and storytelling
- Development of interactive dashboard applications to provide information consumers with everything at a glance<sup>6</sup>
- Reporting and alerting
- Collaborative and mobile BI
- Embedding analytics
- Development of custom analytic applications and mashups

*Pre-built connectors and extensibility to access data sources in a logical data warehouse*

The Qlik Analytics Platform also has connectors to popular traditional and big data sources in a logical data warehouse environment and can be extended to connect to other data stores inside and outside the enterprise. In addition Qlik Sense, which is built on top of the Qlik Analytics Platform, supports Smart Data Load for self-service data management.

*Information consumption on desktop and mobile devices*

Information producers can publish interactive dashboard applications for consumption via a browser or via a mobile device.

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<sup>6</sup> Qlik refer to this as 'guided analytics'

## CONCLUSIONS

*The demand for more insights is relentless*

*The analytical environment now includes new workloads, new data stores and live streaming data*

*The analytical platform has to grow to support multiple analytical workloads and more powerful analytics*

There is no doubt that the demand for new data sources to add to what is already known is resulting in new analytical workloads over and above traditional data warehousing environments. New data stores have emerged and the use of analytics is broadening. In addition, the demand by executives to get enterprise wide mass contribution to business objectives is driving analytics beyond its typical use in tactical and strategic decisions to being embedded in operations. The intention is to support contextual operational decisions at the point of need. The result is that the modern analytics platform has to scale to handle more concurrent requests from information consumers on web browsers and mobile devices as well as from applications. Insights are also being made available in websites for wider internal and external use.

More complex analytics are also in demand in a self-service environment as we move towards 'citizen data science' without the need to write code. The implications are clear. The modern analytical platform is being pulled to the centre of the enterprise and wired to scorecards, front-end tools, operational applications, mobile devices, web portals and more (See Figure 5).

*The analytical platform is being wired to everything to create the intelligent enterprise*

*The Qlik platform approach to visual analytics supports reporting and alerting, self-service visual discovery, dashboard applications and embedding of insights*

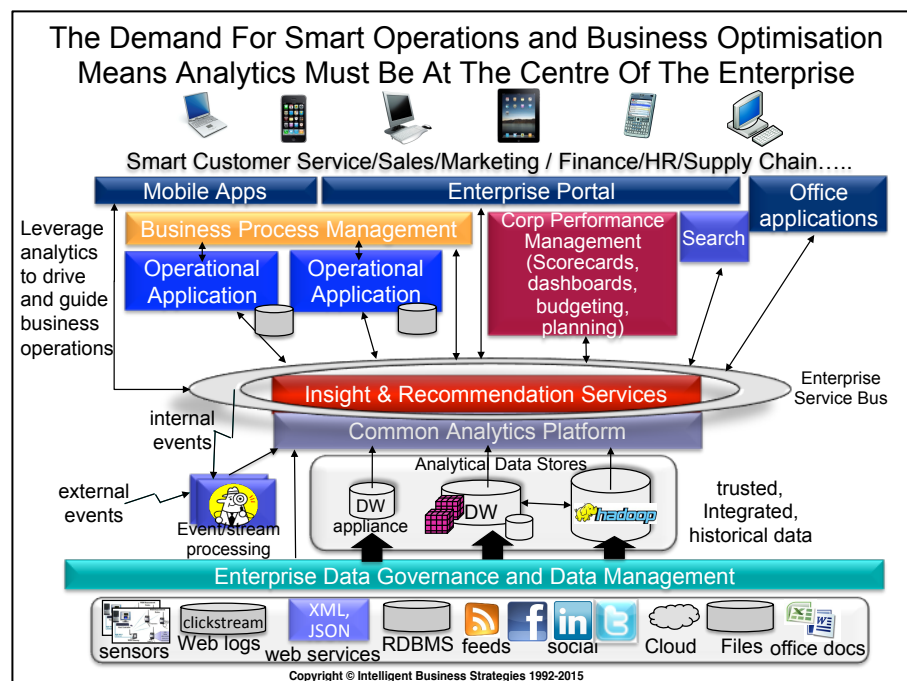


Figure 5

The Qlik platform approach to visual analytics not only supports interactive self-service visual data discovery and dashboard building but also makes it possible to integrate with executive scorecard applications at the strategic level and support the thousands of decisions made in day-to-day business operations. While more will no doubt follow, Qlik is now making it possible to bring analytics to the masses to help organisations transition to becoming intelligent enterprises.



## About Intelligent Business Strategies

Intelligent Business Strategies is a research and consulting company whose goal is to help companies understand and exploit new developments in business intelligence, analytical processing, data management and enterprise business integration. Together, these technologies help an organisation become an *intelligent business*.

### Author



Mike Ferguson is Managing Director of Intelligent Business Strategies Limited. As an analyst and consultant he specialises in business analytics, big data, data management and enterprise business integration. With over 34 years of IT experience, Mike has consulted for dozens of companies on business intelligence strategy, big data, advanced analytics, data governance, master data management and enterprise architecture. He has spoken at events all over the world and written numerous articles. Formerly he was a principal and co-founder of Codd and Date Europe Limited – the inventors of the Relational Model, a Chief Architect at Teradata on the Teradata DBMS and European Managing Director of Database Associates, an independent analyst organisation. He teaches popular master classes in Big Data Analytics, New Technologies for Business Intelligence and Data Warehousing, Data Virtualisation, Enterprise Data Governance, Master Data Management, and Enterprise Business Integration.

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