



THE ASSOCIATIVE EXPERIENCE: QLIKVIEW'S OVERWHELMING ADVANTAGE

A QlikView Technology White Paper

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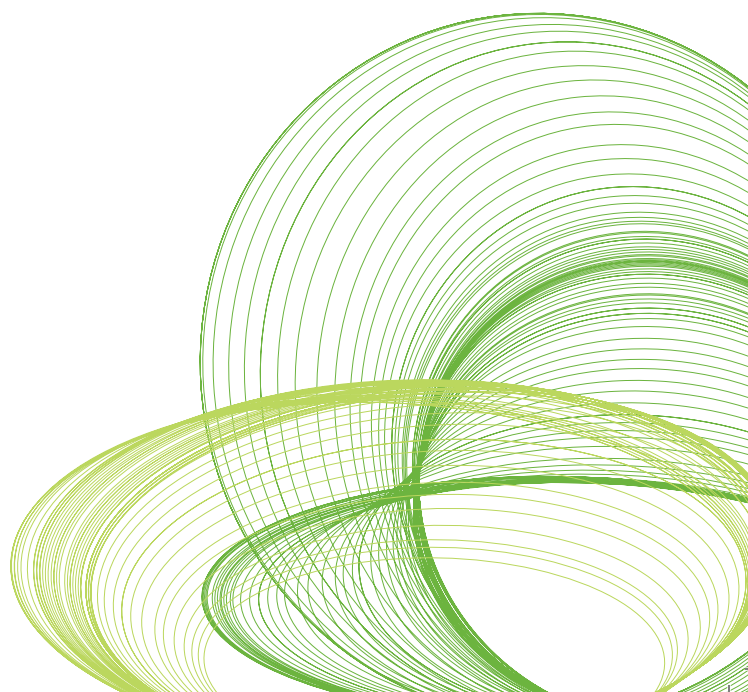
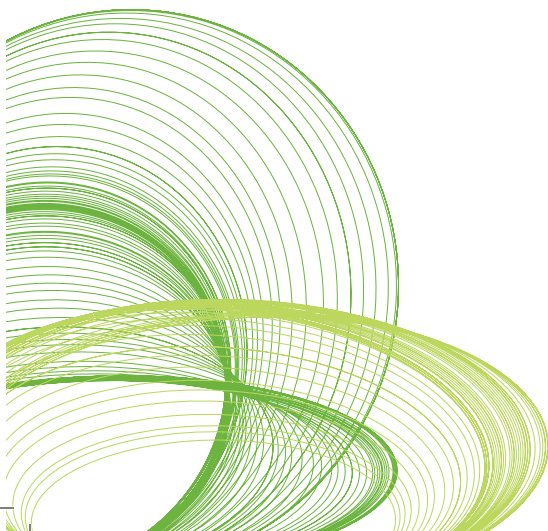




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An Introduction to the QlikView Associative Experience

This *QlikView Technology White Paper* illuminates the inner workings of QlikView's associative architecture and explains how it fundamentally improves the way people conduct business analysis. The core question this paper answers is, "What is an 'associative experience' and how does it help people make the best business decisions?" To do so, we will explain how fundamental differences in underlying technology make QlikView's associative experience different from the experience people have with other BI tools. Our target audience consists of those business decision makers who are evaluating business intelligence (BI) software, and the technology decision makers supporting them.

Queries and Cubes Create a Blind Spot

By their nature, most query-based tools divorce data from their context, leaving gaps for those trying to make data-driven business decisions. Those making complex business decisions don't always have full access to their supporting data — even when they have access to BI software. Some data is available only as isolated and discrete queries, without context between one query and the next.

Three drawbacks to traditional query- and cube-based BI tools are:

- **They leave data on the table.** Query-based tools extract a small subset of data from the main dataset. They aggregate extracted data and return it in the form of a query result set. This result set is completely divorced from any other data not contained in the individual query. The very act of extracting the subset of data from the main dataset breaks associations.
- **They create a dissociative experience.** With cube-based technology, each individual query represents a single discrete chunk of information. This information is extracted from the underlying database or cube and passed on to the user as a discrete set of data. If the user wants to know more about how a piece of data contained in a query relates to another piece of data outside the query, the only choice is to formulate a new query that incorporates both data points and resubmit it.
- **They don't maintain relationships among queries.** While the least sophisticated query-based tools don't even attempt to provide context by tracking relationships among queries, some of the more sophisticated tools at least try. But this is a huge task. Each query is different, and most are not well-defined until users begin their analyses. So if it's not possible to know what query a user will formulate next, how can we provide associations between queries?

MOLAP, ROLAP, AND HOLAP: MAYBE FAST, MAYBE FLEXIBLE, BUT NOT ASSOCIATIVE

Online analytical processing (OLAP) uses aggregated data for decision support. Many variations of OLAP exist. Some are flexible and others are high-performance. But as long as they are query-based, they are unable to maintain associations among data elements (see Figure 1).

Figure 1: QlikView is flexible, high-performance, and maintains associations

	QlikView	ROLAP	MOLAP	HOLAP
Flexibility	High	High	Low	High
Performance	High	Low	High	High
Association	High	Low	Low	Low

Source: QlikTech, Inc.

For the past 50 years, query-based architectures have been the status quo for decision support. The ubiquity of structured query language (SQL) creates a blind spot to the shortcomings of using queries — whether SQL, multidimensional query expressions, or otherwise — as the fundamental component of a decision support engine.

- **ROLAP extracts data in real-time as it is needed, making it flexible.** The oldest form of OLAP decision support is relational online analytical processing (ROLAP). ROLAP is still prevalent today. It uses SQL or other query technology to extract and calculate data aggregates in real time as the user needs them. Once thought of as slow and unresponsive, today ROLAP is enjoying something of a renaissance with the more scalable decision support database architectures. ROLAP can be flexible, without requiring predefined dimensionality, but is computationally intensive and can therefore be slow. And because ROLAP is query-based, it is unable to maintain associations.
- **MOLAP pre-aggregates data, making it fast.** The next generation of technology for decision support came in the form of multidimensional online analytical processing (MOLAP), also known as cube-based OLAP. The main difference between ROLAP and MOLAP is that with MOLAP the query results are aggregated in advance while for ROLAP they are aggregated as needed. With MOLAP, data is pre-aggregated for multiple permutations of data points along preselected dimensions. This approach provides near-instantaneous access to aggregates as long as the question the business user has in mind lies within the predefined dimensionality. Because the aggregates are pre-calculated, MOLAP can be faster than ROLAP. However, with this speed comes a loss of flexibility. And again, because MOLAP is query-based it cannot maintain associations.
- **HOLAP offsets some ROLAP and MOLAP weaknesses.** The relative strengths and weaknesses of ROLAP and MOLAP led to the creation of a third technology: hybrid online analytical processing (HOLAP). HOLAP is any architecture that leverages both ROLAP and MOLAP in an attempt to offset the relative weaknesses of each. Because HOLAP is the product of the marriage of two query-based technologies, it is also a fundamentally a query-based technology. And — you guessed it — it does not maintain associations in the data.

In contrast, QlikView is flexible, fast, and maintains associations among all data elements. QlikView offers the flexibility of ROLAP (no predefined dimensionality) as well as the speed of MOLAP (near-instantaneous access to aggregates). While MOLAP tools sometimes have drill-through capabilities (in essence, a multidimensional engine with on-demand relational queries), QlikView is just the opposite: a relational engine with on-demand cubes.

QlikView's Secret: Our Associative Architecture

QlikView delivers the world's first associative architecture (see Figure 2 and Figure 3). QlikView manages associations among data sets at the engine level, not the application level. QlikView stores individual tables in its in-memory associative engine. Every data point in every field is associated with every other data point anywhere in the entire schema. Datasets can be hundreds of tables with thousands of fields.

Figure 2: Qlikview's underlying architecture is associative

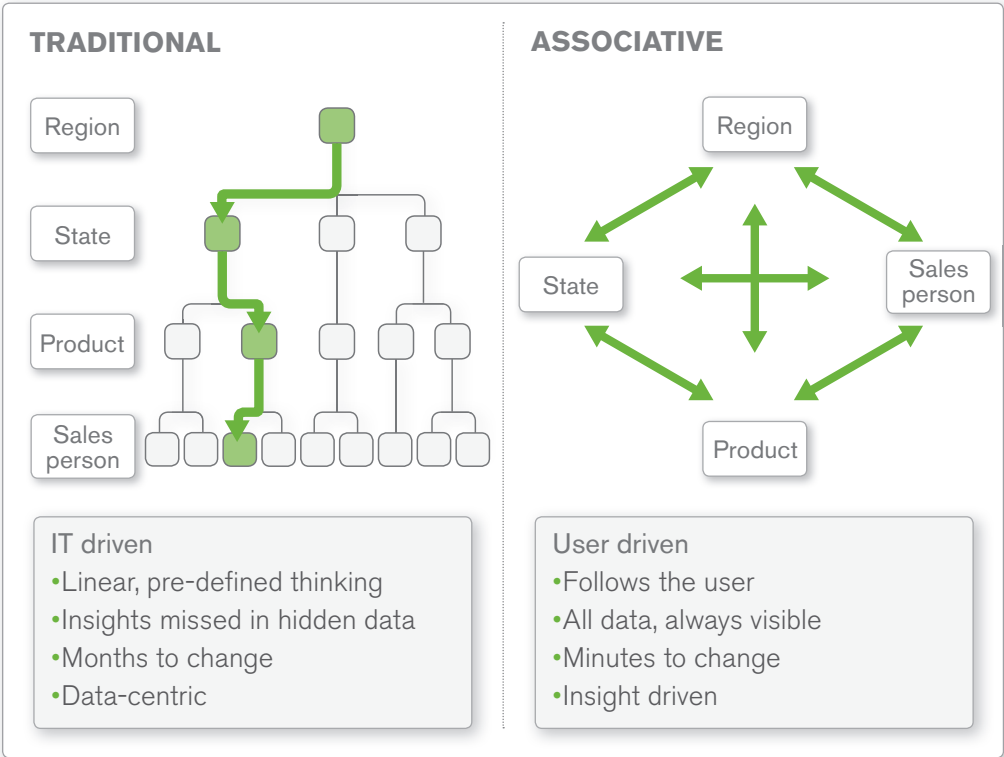
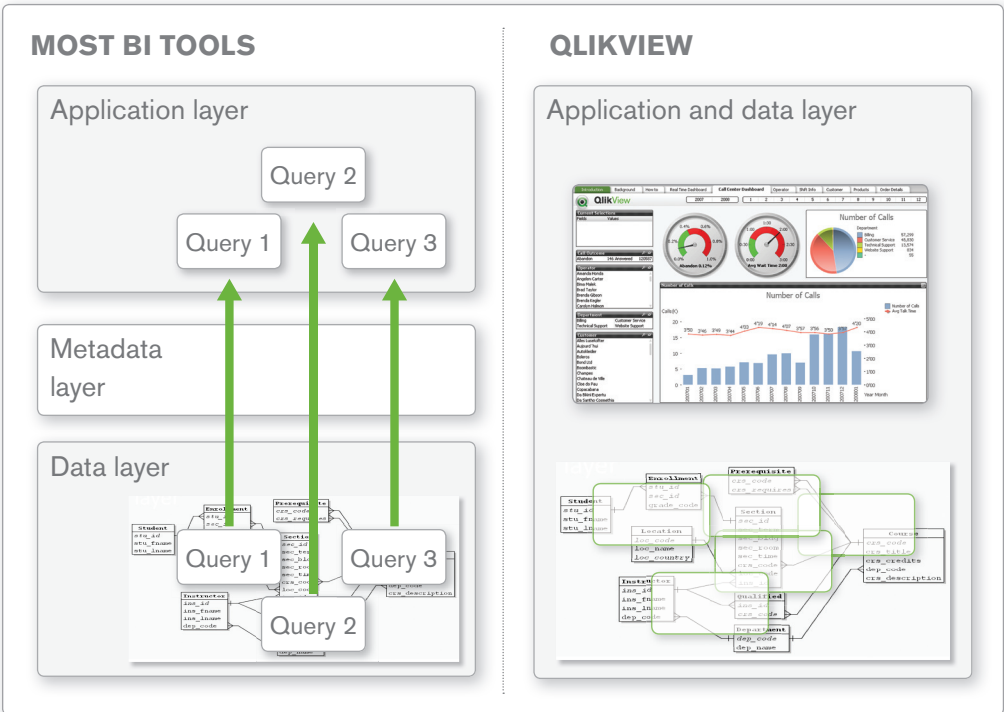


Figure 3: What makes QlikView's underlying architecture associative



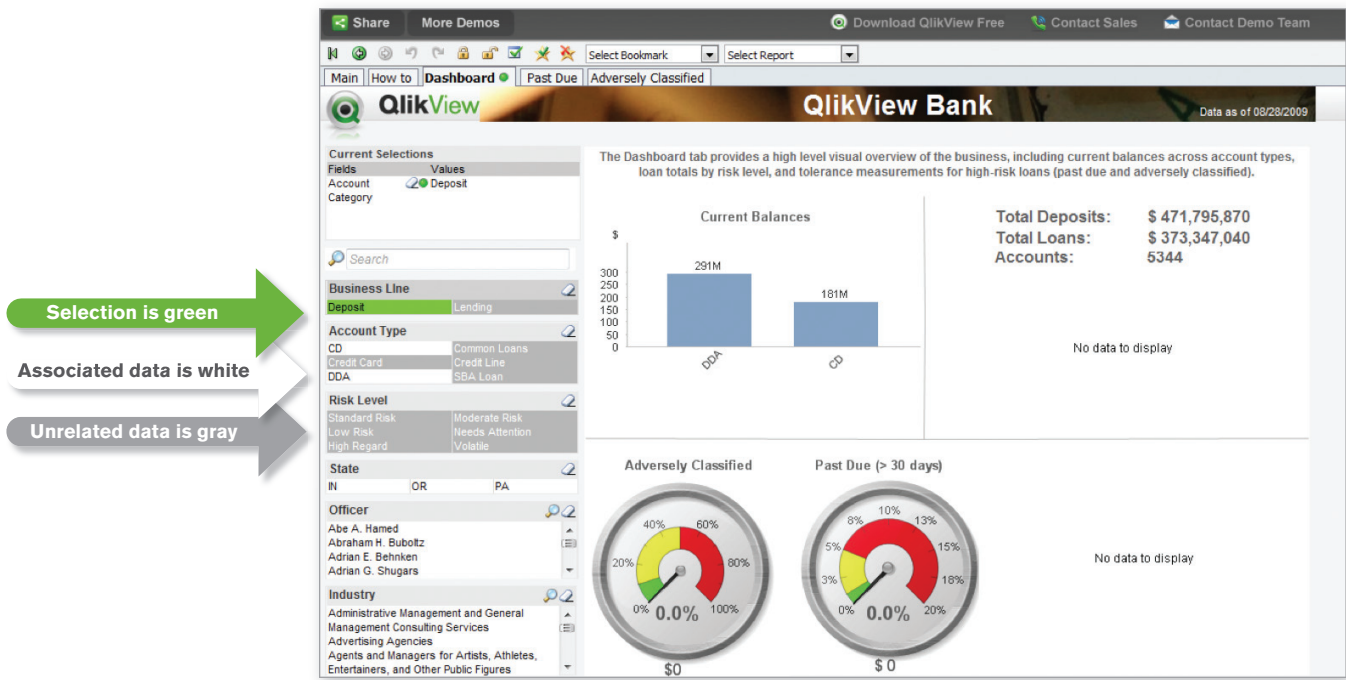
Source: QlikTech, Inc.

Query-based BI tools separate the application layer from the data layer. This leads to long deployments while expensive developers customize the application layer to manage the specific associations required to answer a particular business question. When the BI application needs to answer a slightly different business question, the application layer must be altered again. This process is time-consuming and expensive.

By Maintaining Associations, QlikView Answers Un-Asked Questions

Unlike traditional BI tools, when the user clicks on a data point in a field in QlikView, no queries are fired. Instead, all the other fields instantaneously filter themselves based on the selection the user made (see Figure 4). The user's selections are highlighted in green. The datasets related to the user's selection are highlighted in white, while unrelated data is highlighted in gray.

Figure 4: QlikView shows selections, associated data, and unrelated data



Source: QlikTech, Inc.

When users look at two different data points they know precisely how the points relate to each other. If they want to narrow their data down to a single product, country, or year, for instance, they can see how the rest of the data in their analytic dataset responds. They are not restricted to seeing the effect upon just a set of query results.

With QlikView, any and all aggregates are recalculated in real time, regardless of the source fields. All associations are stored generically against the entire dataset, ready to answer any business question as it comes up without requiring any customization. The data from all tables is always available in context and ready to answer the next business question, whatever that may be.

A FEW ANALOGIES: MAPS, ENGINES, AND THE RUBIK’S CUBE®

This is complicated stuff. How about an analogy or two?

First, let's say the goal is to understand how an internal combustion engine works using digital models. With the query-based paradigm, we would look at individual parts of the engine in isolation (see Figure 5). We would see one part at a time. We would be left to attempt to understand the relationships (or associations) among the parts and how the parts all fit together as a cohesive whole to create a working engine.

Figure 5: Analogy #1 — Understanding an internal combustion engine



Source: QlikTech, Inc.

Using QlikView's associative technology, however, we now have access to a digital model of a complete working engine with each part in correct relationship to all of the other parts. We can tweak the throttle in the digital model (or execute a selection, in QlikView) and see how that affects the fuel intake, carburetor, and exhaust. We can watch the pistons pump and turn the crankshaft. We can deconstruct the engine at our leisure and look at each part in context with the parts next to it. This is the power of QlikView's associative architecture.

In another analogy, imagine a Rubik's Cube puzzle — but to solve it you can only see one face at a time (see Figure 6). As you change one face, you cannot see what is going on with the other sides. In contrast, using QlikView is like being able to see all faces of the Rubik's Cube at the same time, so you can understand what else is changing based on changes you are making.

Figure 6: More analogies — Maps and the Rubik's Cube



Source: QlikTech, Inc.

In a third example, let's say you are planning a trip from London to Rome. A traditional road atlas can help. But the atlas is time-consuming because you have to relate how the map fits together across multiple pages in the atlas. In addition, you may miss details as you are consumed by following a particular road. QlikView is more like Google® maps: you can see the entire route at once or zoom in on areas of special interest. You can identify better routes quickly based on traffic patterns. Importantly, you become far more engaged with the interactive map than with the atlas.



QLIKVIEW IS QUICK TO DEPLOY, EASY TO USE, AND READY TO DELIVER INSIGHTS

QlikView customers love us. Here's why:

- **QlikView is quick to deploy.** Because QlikView's associative architecture does not need to be reconfigured to answer new business questions, QlikView is quick to deploy. According to the IT team at FHL Banks, "Without QlikView, it would take a year and a million dollars to implement this functionality with traditional BI." Radiometer told us that "QlikView enables us to analyze data much faster and to react much faster. Generating reports only take 25% of the time that used to be needed." Agora Publishing deployed QlikView in 20% of the forecasted time and came in 60% under budget. And the CIO of Superior Graphite Company said, "In four hours, one person achieved with QlikView what teams of IT consultants ... couldn't achieve in a year and a half."
- **QlikView is easy to use.** Because QlikView's associative architecture preserves all of the associations between all fields being analyzed, users find it intuitive and easy to use. According to the IT director at Bliss, "Users love QlikView and how they can instantly access data for planning new campaigns or running inventive sales promotions. With QlikView, employees are now more accountable for performance and truly empowered with the visibility to make the best business decisions possible at that moment in time." An analytics project manager at a global investment bank said, "QlikView is so flexible, powerful and easy to use—views of data have not been seen this way previously. Our salespeople are winning more business from clients directly as a result of QlikView."
- **QlikView opens up fresh insights.** The ultimate value in QlikView is enabling decision makers to interact with data holistically, leading to better business decisions that ultimately help the bottom or top line. According to the IT Manager at Meilleurtaux, "QlikView enabled us to quickly pinpoint specific areas of the business in need of improvement. In less than a month, we regained 20 to 40% of client business that had been previously turned down." According to the director of strategic planning at Arbinet, "Before QlikView, we did not have good decision-making insight into revenue month-to-date or transactional intelligence, which was critical for knowing how to improve our business performance."

THERE'S A TECHNICAL REASON WHY PEOPLE LOVE QLIKVIEW

The terms "high user acceptance" and "business intelligence software" don't typically appear in the same sentence together. QlikView is the startling exception to that rule. Our underlying associative engine is the reason for the passion our customers feel for our software. Our pioneering in-memory approach certainly enables high-quality performance, but even query-based BI vendors that also offer in-memory solutions cannot deliver an associative experience. Query-based tools simply cannot provide the unique combination of benefits QlikView's associative architecture delivers: ease of use, speed of deployment, and unexpected business insights via an associative experience.



Appendix

Links to Related QlikView Technology White Papers

QlikView Architectural Overview, October 2010

Links to Related QlikView Blog Posts

“Unpredictable Questions and the Power of Gray,” August 18, 2010

<http://community.qlikview.com/blogs/theqlikviewblog/archive/2010/08/18/unpredictable-questions-and-the-power-of-gray.aspx>

“Build to Think: Applying Design Thinking to BI,” August 25, 2010

<http://community.qlikview.com/blogs/theqlikviewblog/archive/2010/08/25/build-to-think-applying-design-thinking-to-bi.aspx>

“QlikView Supports a Build to Think Approach to BI,” August 25, 2010

<http://community.qlikview.com/blogs/theqlikviewblog/archive/2010/08/25/qlikview-supports-a-build-to-think-approach-to-bi.aspx>

“QlikView Is Associative to Its Very Core,” August 16, 2010

<http://community.qlikview.com/blogs/theqlikviewblog/archive/2010/08/16/qlikview-is-associative-at-its-very-core.aspx>

“The Car Engine Analogy,” August 13, 2010

<http://community.qlikview.com/blogs/theqlikviewblog/archive/2010/08/13/car-engines-and-the-associative-experience-an-analogy.aspx>

“It All Comes Down to Simplicity,” August 12, 2010

<http://community.qlikview.com/blogs/theqlikviewblog/archive/2010/08/12/simplicity-equals-success.aspx>

“QlikView Users Have an Emotional Attachment to the Associative Experience,” August 6, 2010

<http://community.qlikview.com/blogs/theqlikviewblog/archive/2010/08/06/qlikview-users-have-an-emotional-attachment-to-the-associative-experience.aspx>

“The Consumer Enterprise: I Want My Home Technology at Work,” August 3, 2010

<http://community.qlikview.com/blogs/theqlikviewblog/archive/2010/08/03/the-consumer-enterprise-i-want-my-home-technology-experience-at-work.aspx>

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