

Overcoming the Challenges Associated with Traditional Data Warehouses

The Modern Data Platform: A Necessity in Today's Rapidly- Changing Business Climate



Current trends such as digitisation and the Internet of Things are causing a proliferation of data.

Traditional data warehouses cannot handle this unprecedented volume and variety of information.

The modern data platform helps eliminate the challenges associated with traditional data warehousing.

1. About the Author



Andy Steer

As the CTO of itelligence UK, Andy Steer is responsible for defining the company's technical direction. Andy has worked in a variety of consulting and management roles since the mid-1990s and dedicates himself to identifying the value that technological innovation can bring to an organisation.

andy.steer@itelligencegroup.co.uk

Table of Contents

1. About the Author	2
2. Executive Summary	4
3. Introduction	4
4. Five Challenges of a Traditional Data Warehouse	6
Challenge #1: Inflexible Structure	7
Challenge #2: Complex Architecture	7
Challenge #3: Slow Performance	8
Challenge #4: Outdated Technology	9
Challenge #5: Lack of Governance	10
5. The Importance of Adaptation	11
6. The Modern Data Platform	12
7. Conclusion	16
8. Why itelligence	17

2. Executive Summary

Business needs are changing rapidly. Digitisation, the Internet of Things (IoT), and social media are creating a data-driven culture where the amount and variety of information being produced is growing exponentially. New customer demands and the current prevalence of digital disruptors are also contributing towards this trend.

Against this background, traditional data warehouses are coming under fire. Many existing platforms are rigid and unable to combine diverse data types. In addition, they often fail to support ad-hoc reporting and can't answer forward-looking questions. As such, flexible, agile, and reliable data warehousing solutions are more necessary than ever. It is high time to adopt a modern data platform.

This white paper examines the five key challenges inherent in a traditional data warehouse approach (**inflexible structure, complex architecture, slow performance, outdated technology, lack of governance**) and explains how a modern data platform, based on SAP HANA®, can help eliminate them.

3. Introduction

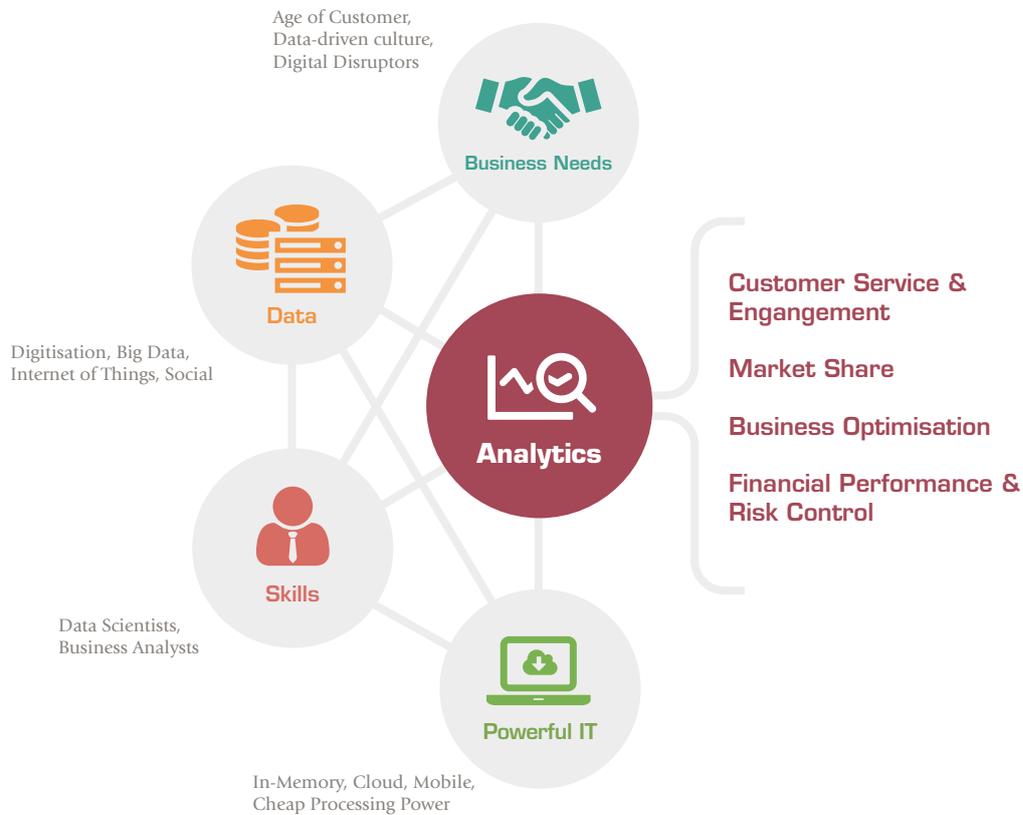
Time and again, executives from organisations of all shapes and sizes – both public and private, complain about a lack of access to accurate, timely, relevant, and reliable information. This is required to support and drive decision making. Yet the path from data capture to actionable insight is often blocked or at least littered with obstacles.

Interestingly, most of those complaining already have a data warehouse. Although it once satisfied requirements, it is now hopelessly overworked as information demands continue to change. Traditional data warehouses are like set concrete – too rigid. Many companies are unable to bring together diverse (structured and unstructured) data types. They suffer from time-consuming reporting, experience data quality issues, and most importantly cannot answer forward-looking, predictive questions (see Figure 1).



Clear the path
to actionable
insight.

Figure 1: Modern Demands on an Enterprise's Data Warehouse



Today, business relationships, customer demands, and organisational structures change with great speed. For this reason, many existing data warehouses and the teams that maintain them struggle to keep up with structural changes to data sources. They also have difficulty adapting to entirely new data sets from newly implemented systems or as a result of mergers and acquisitions. The dilemma is that they need to address these changes whilst trying to meet the enterprise's evolving and often challenging analytical needs.

All this does is enforce the opinion that the 'old data warehouse' no longer meets its users' needs. Consequently, companies are looking for more agile ways to obtain the information they need. To meet current and future business requirements, they need to bring all data-related processes up to speed by adopting a modern data platform.

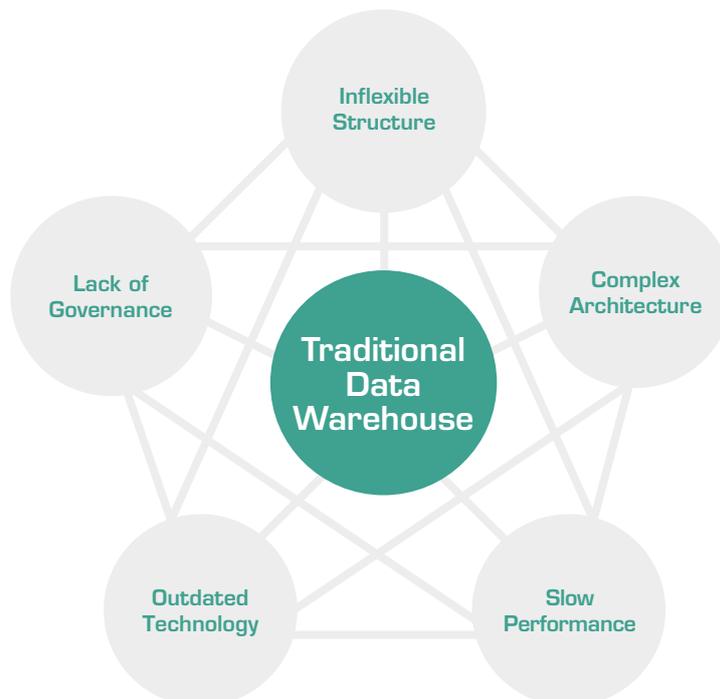
4. Five Challenges of a Traditional Data Warehouse

There are five key challenges inherent in traditional data warehousing:

- Inflexible structure
- Complex architecture
- Slow performance
- Outdated technology
- Lack of governance

So, let us now consider them in detail, and then find out how a modern data platform can help eliminate them.

Figure 2: The Five Core Challenges of a Traditional Data Warehouse at a Glance



Challenge #1: Inflexible Structure

A lack of flexibility has always been one of the most apparent faults in traditional data warehousing. This is a particular issue in today's turbulent, unpredictable business climate. Mergers and acquisitions are rife – and the app economy and resultant consumerisation of IT have created a culture where information must be accessible on demand. IT architecture needs to be agile and adaptable, enabling spur-of-the-moment decisions and frequent modifications.

With an inflexible data warehouse, the simplest request to amend a data model may take months, involve several individuals, and necessitate completely new data sources. This costs companies a significant amount of time, money, and effort. Thus, those with a rigid data hub will struggle to remain competitive.



Inflexibility is a common but nonetheless serious challenge in data warehousing. In today's business climate, a lack of flexibility can have significant consequences.

Challenge #2: Complex Architecture

To meet ever-evolving requirements, many organisations purchase add-on solutions, creating a complex environment comprising numerous data silos. Each of these requires constant management and regular updates to ensure its accuracy and consistency. Running isolated silos leads to a number of issues, including:

- **A lack of integration.** The several technologies that make up complex infrastructure often lack native integration across standard processes. This in turn results in increased cost of ownership, governance issues, and a loss of agility.
- **A lack of insight.** Without a single source of truth, enterprises with complicated data warehouse architecture lack access to clear, actionable insights. This hinders their ability to make informed decisions.
- **Redundancy.** Many tools possess the same – or at least very similar – capabilities. This means investing resources in duplicate technologies that bring no extra benefit.

Challenge #3: Slow Performance

Today's businesses are generating and gaining access to far more information than in previous years – and the volumes are growing. An overload of data can affect a platform's performance and cause delays in reporting. At the same time, users increasingly expect on-demand access to information, meaning it is more crucial than ever to avoid interruptions to normal service.

Slow performance in data warehousing relates to both the preparation and consumption of data. In data preparation, latency can be attributed to four general causes:

- **Growth in source system data volumes.** Unprecedented amounts of data can bring traditional warehouses to a halt.
- **Growth in extract volumes.** More data means migrating more information, which can prove complicated for traditional data warehouses
- **Outdated read and write processes.** Shifting data between slow disks draws out the preparation process.
- **Inefficient methods.** Many traditional data warehouses duplicate and fail to reuse data, complicating the preparation procedure.

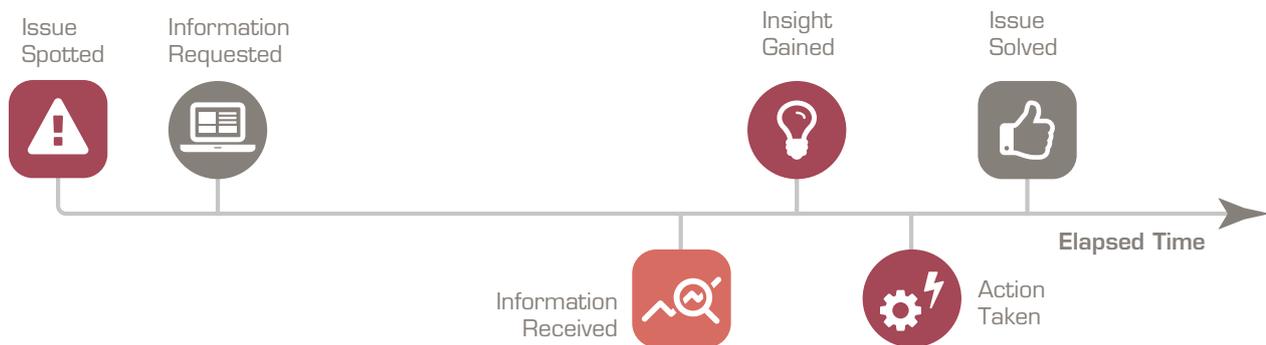
 In many organisations, data consumption processes for timely reporting or crucial analytical requirements are hindered by both delays in query execution and information presentation.

As well as suffering as a consequence of the above issues, data consumption processes are hindered by delays in two key areas:

- **Query execution.** Increasing volumes of data, a larger number of data sets, and more complex analytical requirements lead to longer-running queries.
- **Information presentation.** Greater technical requirements and higher performance expectations mean data platforms today have to present more detailed and complex information. This can put older data hubs under strain and negatively affect their performance.

These challenges ultimately expand decision lag (see Figure 3). In other words, they increase the time it takes for decision makers to receive data in a consumable format after they have requested it.

Figure 3: The Decision Lag



Challenge #4: Outdated Technology

As mentioned, many existing data warehouses are built on core platforms that are rigid and cannot be updated. Businesses that deploy such technology are missing out on a multitude of innovations. This is especially problematic at a time when expectations are high and competition is fierce.

Outdated technology not only causes issues with software (covered in the other four challenges), but also with hardware, including:

- **Processors.** Outdated CPUs require more frequent and significant upgrades to keep up with new requirements. The challenge is that a processor is a single component within an integrated server. It is therefore difficult or even impossible to change without upgrading the entire platform.
- **Memory.** Outdated servers often mean slow memory processing, which hinders the central data hub's performance.
- **Storage.** Many traditional data warehouses use basic hard drive arrays that struggle to meet the demands of increasing volumes of information and complexity of user queries.
- **Networking.** Older networking standards and sub-optimal routing between the data warehouse, the source, and business intelligence systems introduce bottlenecks and delays.

 Data platforms need to ingest and prepare information of increasing variety and volume—and they need to do so more quickly than ever.

Challenge #5: Lack of Governance

According to the Data Governance Institute, data governance is ‘the exercise of decision making and authority for information-related matters’¹. It helps organisations make decisions on how to manage and gain value from data whilst minimising cost, complexity, and risk. And in an age of growing legal, regulatory, and ethical requirements, it is more important than ever.

Delivering effective data governance means creating a synergy between people, processes, and technology. If one of these elements is underperforming, the whole strategy is compromised. Traditional data warehouses may not only struggle to support data governance; they may even undermine it.



Data governance is more important than ever.



Effective data governance means creating a synergy between people, processes, and technology. Traditional data warehouses may not only struggle to support data governance; they may even undermine it.

In the context of a data governance initiative, established data platforms can disrupt processes throughout the data value chain, including:

- **Source systems.** When companies propose changes to source systems, traditional data warehouses can complicate impact analysis. They may also make it difficult to map and catalogue new systems without compromising data governance rules.
- **Extract, transform, load.** ETL processes within a traditional warehouse may fail to produce standard log details, which makes them more difficult to review and query. They may also lack consistent methods and tools, as well as controls to ensure that sensitive data is processed correctly. Moreover, attempting to quickly load new datasets within an outdated warehouse can compromise data governance structures.
- **Storage and optimisation.** Traditional data warehouses often lack standardised data models, as well as the rich metadata necessary to support semantics-based discovery. In addition, they may fail to support data segmentation based on standard rules.

¹ http://www.datagovernance.com/adg_data_governance_definition/

5. The Importance of Adaptation

Many renowned analysts and industry experts agree that data warehousing is an integral part of modern business – but that traditional solutions are no longer sufficient. Gartner states that ‘emerging data sources, trends, and technologies challenge the effectiveness of data warehouses in supporting analysis and decision making.’² However, according to IDC, they ‘will not disappear as they have a key place in an organisation’s data architecture.’³ Adaptation is therefore essential.



Adaptation is essential.

Failing to embrace change will cost an organisation far more than the price of implementing a solution. For example, enterprises without advanced analytics capabilities will be late to recognise trends and so will miss opportunities to boost their competitive advantage. They will also lack relevant insights, reducing the accuracy and effectiveness of their marketing campaigns, which will in turn weaken their brand. Eventually, they will begin to lose customers to their competitors. All of these things result in lost revenue and – ultimately – the company’s collapse.

So how can enterprises avoid these consequences? And how can they overcome the five core challenges associated with traditional data warehousing? The answer is the modern data platform.

Figure 4: Failing to Address the Limitations of the Traditional Data Warehouse Results in...



² “2016 Strategic Roadmap for Modernizing Your Data Warehouse Initiatives” Mark Beyer and Lakshmi Randall, Gartner, October 2016

³ Worldwide Business Analytics Software Forecast, 2016–2019 by Dan Vesset et al, IDC, July 2016. Doc # 257402

6. The Modern Data Platform

Today, companies of all sizes require a data platform that allows them to adapt to ever-changing business needs and handle the proliferation of data. It must be flexible and responsive, with standardised processes and a single source of truth to support decision-making. Furthermore, it must run on state-of-the-art software supported by high-performance hardware.

More specifically, enterprises require the following:

- A data pipeline capable of capturing and storing a large amount and variety of data from an increasing range of sources, including social media and text logs.
- The ability to process data in memory to quickly prepare it for reporting, helping to deliver real-time insights.
- Tiered storage so that data can be separated and easily accessed when it is needed—for a financial audit, for example.
- Compatibility with all business intelligence processes to allow simple, instant access to business users.
- Advanced analytics capabilities to deliver deeper insights, create opportunities, and predict future outcomes.

SAP HANA is a comprehensive solution that provides all of these functions, enabling enterprises to bring their data warehousing into the modern era (see Figure 5).

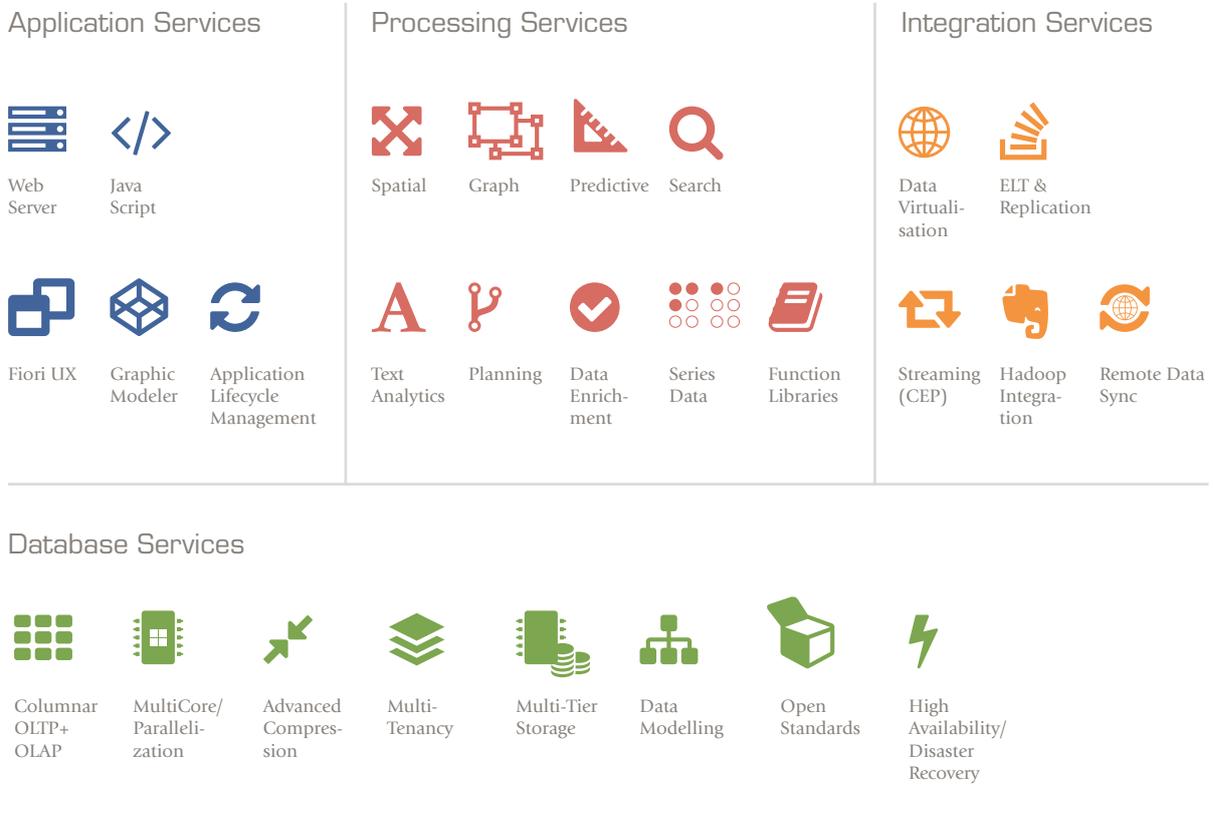


Forrester Research: SAP HANA is a step ahead of comparable solutions.

However, there are several modern data platforms on the market, so why choose SAP HANA? According to IT research company Forrester, SAP HANA is a step ahead of comparable solutions.

Figure 5: SAP HANA—The Capabilities of SAP’s Modern Data Platform

On-Premise | Cloud | Hybrid

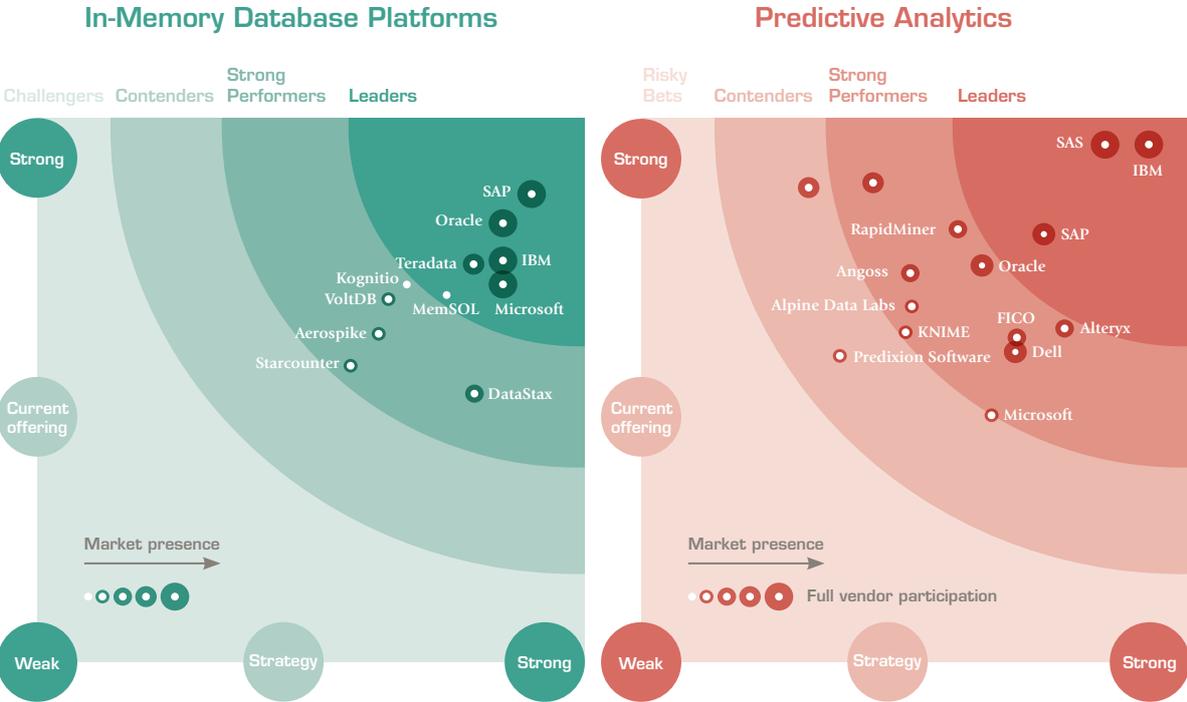


Additionally, SAP HANA is able to interoperate with the Hadoop programming framework. The SAP Vora in-memory query engine serves as a bridge between Hadoop and SAP HANA, facilitating high-performance advanced analytics that can access data wherever it is stored.

SAP HANA offers companies state-of-the-art database and data management technology, analytical intelligence capabilities, and intuitive application development tools on a single, unified in-memory platform. It makes it easier for application developers to deliver smart, insight-driven apps that support all kinds of decision making processes.

The solution provides enhanced high availability, security and workload management, enterprise modelling, data integration, and data quality. It also comes with enhanced analytical processing engines for text, spatial, graph, and streaming data, as well as improved application server capabilities and development tools.

Figure 6: How SAP HANA Compares to the Competition According to Forrester Research



Here are some reasons why SAP HANA is a step ahead of the competition:

- **Advanced analytics capabilities.** Prepare, model, deploy, and visualise data more effectively than ever.
- **Real-time enabled.** Actionable insights in minutes to hours instead of weeks to months.
- **Scalable.** From ten to tens of thousands of variables.
- **Cost effective.** 32GB Edge Edition costs approximately £15,000.

Crucially, the Modern Data Platform designed with SAP HANA provides answers to the five challenges covered in this white paper:

Flexibility

Enterprises increasingly require speed of thought, agility, and the ability to make quick, well-informed decisions. These traits call for a data platform that provides a high degree of flexibility. SAP HANA delivers this flexibility through virtual data access, which reduces the need for aggregated data. Moreover, the platform is able to store and analyse data irrespective of its source, form, or structure. This is due to a shift away from the traditional ETL to the extract, load, transform paradigm (ELT). ELT allows raw data to be loaded directly into the target system and transformed there, resulting in faster loading times.

Open and Simplified Architecture

To reduce total cost of ownership and tackle governance challenges, enterprises require simplified architecture. SAP HANA reduces overall complexity in a number of ways. Firstly, it unites data within a single system, allowing in-situ analysis that reduces data movement. Secondly, the combination of SAP HANA's in-memory processing power and Hadoop's huge capacity eliminates the need to model and index data to improve performance. Finally, the platform enables smart data access, which means unstructured data can be organised and displayed more easily – as if it were structured.

High Performance through In-Memory Processing

There is a growing demand for speed in all data preparation and consumption processes. SAP HANA delivers advanced analytics and high-speed transactions throughout the data-processing cycle. Its in-memory architecture reduces disk bottle necks and greatly accelerates performance to provide accurate responses in a fraction of a second. At the same time, the platform's virtual models allow in-situ analysis, reducing the need to move data around and eliminating tasks such as aggregation and duplication. Its compatibility with powerful integration tools enables faster data delivery and loading.

Future-Orientated Technology

Outdated technology is unable to meet the demands that modern business places on it – through big data and the IoT, for example. SAP HANA, on the other hand, has been designed specifically to overcome these challenges and drive performance. The platform can be hosted in the cloud, allowing companies to operate it on a 'pay as you grow' basis. This reduces capital expenditure and therefore financial risk. Furthermore, SAP HANA supports a tiered data architecture that can help organisations avoid archiving potentially useful data.

Full Control and Governance

Decision makers require a flexible data warehouse that provides visibility into all relevant information without compromising data governance obligations. SAP HANA provides comprehensive security and auditing functions and enables multi-tenancy solutions that allow controlled access to data. Its simplified structure reduces the potential for governance issues arising from mistakes and complications. The platform also delivers visibility into data lineage and presents it on a graphical user interface.



Reduce capex
with pay as
you grow.

7. Conclusion

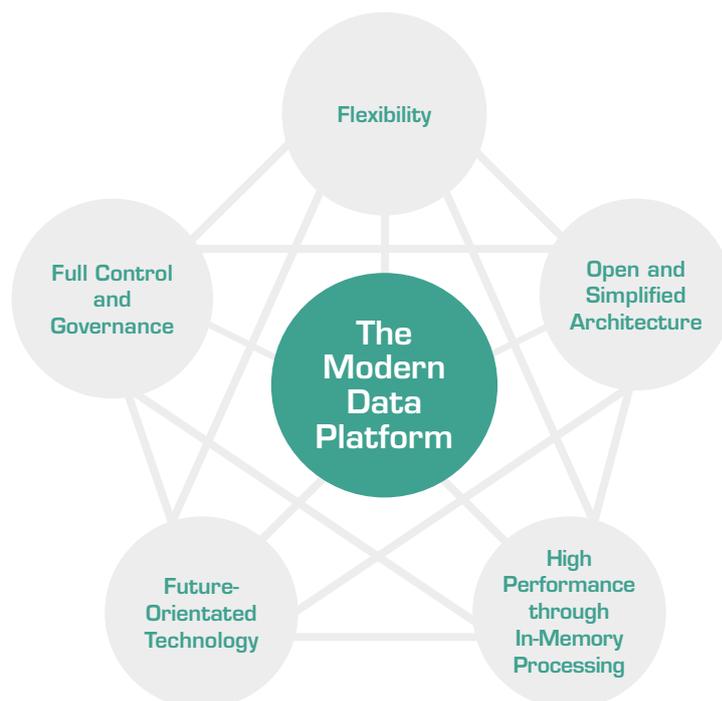
Many organisations possess a data warehouse of some form. However, most fail to meet the demands of today's ever-changing, unpredictable business climate. This is largely due to their inflexible structure, complex architecture, slow performance, outdated technology, and lack of governance. All of these issues hinder a company's access to reliable data and therefore their ability to make well-informed, forward-looking decisions. Without this, enterprises will suffer serious consequences – from a loss of customers to decreased competitive advantage and eventual collapse.

The modern data platform helps organisations avoid these potential outcomes by providing solutions to all the key challenges covered in this white paper (see Figure 7). With a more flexible structure and compatibility with leading-edge technology, the modern data platform is equipped to handle today's constantly changing data requirements. Its simplified architecture clears the path from data capture to actionable insight, thereby reducing the decision lag. Crucially, it delivers these benefits without compromising on governance requirements. In fact, the platform can form the foundation of a data governance strategy that can be extended across the enterprise.



SAP HANA
holds the key.

Figure 7: How SAP HANA Frees Organisations from the Constraints of Traditional Data Warehouses





8. Why itelligence

The aim of this white paper was to highlight the difficulties associated with traditional data warehousing. It also sought to propose a solution to those challenges. That solution is the modern data platform, designed with SAP HANA. However, installing a new data solution requires expert support from a dedicated team of consultants. It requires a partner that is present throughout the process – from planning to implementation and beyond.

itelligence is an SAP Platinum Partner with over 25 years' experience helping companies implement analytics and data warehouse solutions. This means that, regardless of your location, industry, or the kind of project you are running, there is no better qualified partner than itelligence. Our data warehousing architects will help you design and implement your modern data platform and will remain by your side for as long as you need. We will empower you to improve your data quality and integration and increase your reporting efficiency. At the same time, you will reduce both risk and TCO. With itelligence's ongoing support, your organisation can optimise all information-related processes, match the pace of change, and get ahead of the competition.

Learn more about how itelligence can support your migration to a modern data platform.

Visit:



www.itelligencegroup.com

References

http://www.datagovernance.com/adg_data_governance_definition

"2016 Strategic Roadmap for Modernizing Your Data Warehouse Initiatives",
Mark Beyer and Lakshmi Randall, Gartner, October 2016

"Worldwide Business Analytics Software Forecast",
2016–2019 by Dan Vesset et al, IDC, July 2016. Doc # 257402

"The Forrester Wave™: In-Memory Database Platforms",
Q3 2015 by Noel Yuhanna, Forrester, August 2015

This white paper outlines our general product direction and must not be relied on in making a purchase decision, as it is not subject to your license agreement or any other agreement with itelligence. itelligence has no obligation to pursue any course of business outlined in this white paper or to develop or release any functionality mentioned herein. This white paper and itelligence's strategy for possible future developments are subject to change and may be changed by itelligence at any time for any reason without notice. This document disclaims any and all expressed or implied warranties, including but not limited to, the implied warranties of merchantability, fitness for a particular purpose, or non-infringement. itelligence assumes no responsibility for errors or omissions in this document, except if such damages were intentionally caused by itelligence or its gross negligence.

About itelligence

In the digital age, you need an IT partner you can rely on. Someone who understands the digital and real-life challenges of your industry and helps you rethink your business. A partner who is with you every step of the way.

With over 25 years' experience, itelligence knows SAP software inside out. We work closely with our clients to identify their specific needs and fulfil them. Numerous SAP awards, certifications, and our SAP Platinum Partner status are testament to our success. From consulting to implementation and managed services, we have over 5,000 employees with the expertise to take your business further.

As part of the NTT Data Group, we can draw upon a global network of over 9,000 SAP specialists. And our presence in 24 countries around the world ensures we are always close to your business. What's more, our strong ties to SAP mean we stay up to speed with the latest innovations and can help you get more from them. No matter what industry you are in – we are the IT partner for your digital transformation. Think ahead. Go beyond. Visit www.itelligencegroup.com for more information.