Your Data Can Do More

An executive’s guide to data architecture in the Microsoft Cloud.
Digital Transformation is Powered by Data

In the digital age, all businesses are data businesses. Data fuels the innovation of digital products, services, and organizational processes. From a small business with online accounting and stock-keeping to the largest internet retailers, all organizations run on data.

Are you extracting maximum value from your data?

At Artis Consulting, we specialize in helping our customers engineer modern data architectures and applications in the Microsoft Cloud to **power their businesses forward**. This eBook provides 5 suggestions to help you better architect and get value from your organization’s least utilized asset – its data.

Implement these five suggestions and you will have a more agile organization that can prosper in the digital age.
All businesses need to be analytics businesses
Without analytics data is a cost center not an asset

It is one thing to gather and manage data, but it is another to make decisions based on data. This is where analytics comes in. **Without analytics, data does not help your organization grow.** Analytics enables you to:

- Improve visibility and make accurate predictions
- Get the right products to the right place at the right time
- Offer customers exactly what they want, when they want it
- Fix problems proactively
- Explore new business opportunities
4 Types of Analytics

Depending on the types of analytics performed, you receive different benefits.

**Descriptive Analytics**
Historical reporting of data and creation of static reports typically from data in a data warehouse.

**Diagnostic Analytics**
Ad-hoc reporting and data discovery to gain new insights and diagnose problems.

**Predictive Analytics**
Use historical data and predictive models to predict future data points.

**Prescriptive Analytics**
Use historical data to make recommendations.

4 types of analytics comes from Gartner’s stages of data analysis in a company.
Businesses need to evolve to data science

Every business has opportunities to make analytics faster, easier, and more insightful. Analytics are important, but it is increasingly evident that not all analytics are equal. Businesses can do more complex predictive and prescriptive analytics for better, faster, and more automated insights with data science.

**Data science empowers us to go farther.**

Too few organizations are supporting data science as both a technical and a business practice. For example, predictive models need to be available and applicable in the real world of your operations, at scale, in a reliable manner that matches your organization’s demands.

The Microsoft Digital Transformation maturity model provides a good framework to guide your organization forward.
Elevate To New Heights

Knowing where you are along the Microsoft digital transformation maturity model is critical to your success.

**Mature – Emerging data science & operational capability**
Understands model lifecycle and management; Building a foundational data architecture

**Aspirational – Experimented and applied AI**
High digitization; Desires new business models; Achieved a data culture

**Approaching – Hopeful on AI and its promise**
Digitization underway; Looking to increase or optimize processes; Cautious about disruption.

**Foundational – Questioning what AI is and how to apply it**
Wrong expectations or disappointment; Low digitization; Basic analytical capabilities.
TAKE ACTION – CONDUCT AN ANALYTICS STRATEGY WORKSHOP

1. Define your specific business objectives and success criteria.

2. Identify where you are in the digital transformation journey (foundational, approaching, aspirational, mature)

These activities are about collecting data points, challenges and inspiration from your team and can be gathered in a couple hour workshop. The information forms the foundation for effectively utilizing analytics and data science to improve performance.
Identify the specific workloads that matter to you
Drill into the details

Creating an effective data architecture depends on identifying the types of reporting and analytical capabilities you need to drive your business forward.

Here are some key activities to work through:

- Conduct working sessions with subject matter experts to gain an understanding of existing analytics platform components, how information is captured, stored, processed, managed, analyzed, and collaborated on.
- Identify key analytical/operational questions used to enable better decision making.
- Review key artifacts such as reports, data sources and departmental documentation.
Map your business

The following domain mapping exercises enable you to design an effective data architecture for your business.

- **Processes**: Document key business processes that support the enterprise, or business unit you are focusing on.
- **People**: Identify people (by role) and types of information they need to do their jobs.
- **Systems**: Identify applications people use to support each business process.
- **Data**: Document information being produced by each system.
TAKE ACTION – CREATE A FEASIBILITY MATRIX

After mapping your business across the four domains, create a feasibility matrix to determine technical and business priority. The feasibility matrix provides a roadmap to prioritize what should be built and in what order to provide the greatest return to the business.

The mapping activities in this section can be completed in 3-4 weeks resulting in the following artifacts:

• Logical data architecture

• Data model design

• Project plan for implementation
Utilize the cloud for **better economics and capabilities**
The Cloud changes the economics of data architecture

Our most recent client implementations in the Microsoft cloud (Azure) have resulted in a cost savings of 40-60% compared to our client’s on-premises platforms.

A major reason for the cost savings is due to on-premises hardware having a fixed storage to compute ratio. To add more storage you incur compute costs, regardless if it is required or not. As a result, data storage and compute requirements never align – there is always excess of one or the other. The cloud enables you to separate storage from compute, so you can independently scale the storage versus the compute. You can architect to meet your exact needs while lowering your costs.
The Cloud enables better architectures

The cloud also enables a more nuanced architecture design with more capabilities. For a modern analytics platform, a data lake architecture enables flexibility and agility to your organization, supporting streaming, batch, operational reporting, enterprise reporting and data science workloads. We recommend a three-zone architecture, with each zone enabling different business capabilities and value.
Bronze zone – raw data

The bronze zone consists of raw data that is ingested from batch or streaming workloads. We recommend restricted access to this data because it has not been prepared for end users.

This zone supports data science exploratory access.
Silver zone – standardized data

The silver zone consists of filtered, cleaned, or augmented data available for exploratory query or ad-hoc reporting access.

This zone will store data that can serve as an operational data store layer in the architecture.
Gold zone – dimensional data

The gold zone consists of dimensional data or data that supports business level aggregates. Data in this zone is core to the business and the structure does not change often.

The gold zone provides the basis for Data Warehouse compute, such as Azure Synapse Analytics.
Historically, Business Intelligence (BI) teams struggled to keep up with the demands of the business when they chose a strategy of a centralized, highly structured data warehouse to house all data. As a result, organizations could not make informed decisions at the speed needed to adjust to market conditions because IT could not meet the ad-hoc analysis needs of stakeholders.

With the dramatic increase in the volume, variety, and velocity of data in the digital age, realize no one technology will meet all your organization’s needs. Only data that is core to the business and does not change often needs to live in the data warehouse.
Focus on data models
Three data models for the modern data architecture

Data models are a critical component of your data architecture, as they describe the concepts, relationships, rules, and standards that make up your business. Three models are needed in a modern data architecture:

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<tr>
<th>Enterprise Models</th>
<th>Azure Synapse Analytics</th>
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<tr>
<td>- Built and maintained by IT</td>
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<tr>
<td>- Consolidated data from many systems</td>
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<td>- Centralized authoritative source for reporting and analytics</td>
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<th>Self-Service Models</th>
<th>Power BI</th>
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<tr>
<td>- Built and maintained by business users or BI developers</td>
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<tr>
<td>- Use enterprise models, departmental data, and external sources</td>
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<td>- Focused on single subject area, but often widely shared</td>
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<th>Machine Learning Models</th>
<th>Azure Databricks</th>
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<tr>
<td>- Built and maintained by data scientists</td>
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<tr>
<td>- Mostly developed from raw sources in the data lake</td>
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<td>- Often experimental, needing a data engineer for production use</td>
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Enterprise models

Enterprise models focus on consistency, governance and efficiency.

- **Consistency** – Numerous business processes should be built once and shared as a corporate standard, such as defining product catalogs, staff hierarchies, and client organization IDs.

- **Governance** – Certain data sets, such as customer information or financials, need security and privacy controls which may be complex and dynamic.

- **Efficiency** – If models already exist in the data warehouse, there is no need to repeat the work of design, preparing and loading data, or securing the model.
Self-service models

Self-service models drive flexibility and efficiency.

- **Flexibility** – Numerous data sets are temporary, external, or ad-hoc and unlikely to be consolidated in the data warehouse. In these cases, self-service models are useful. For example, planning and monitoring a short-term campaign, or modelling a budget for a department project.

- **Efficiency** – Speed of business is critical. Self-service models enable employees to quickly explore new and innovative business ideas that drive organizations forward. Successful and widely adopted self-service models may be re-factored into the data warehouse for future enterprise use.
Data science is about creating machine learning algorithms. Machine learning algorithms seek to give computers the **ability to decide** about a situation given previously observed data, even if that **exact situation** has not been seen before. Machine learning requires a different approach and differs from business intelligence (self-service) in a couple of important ways.

**Approach** – Data scientists are mostly concerned with running experiments to see what discoveries can be made using data. Since you are running experiments, there is no guarantee of success with data science. If the experiments yield business benefits, the experimental model can go into production where the rules can be applied to millions of new transactions, products, customers, and other real-time sources of data.

**Data** – Data scientists want large and varied datasets and they tend to work with raw data rather than data that has been cleaned and transformed for business needs. Data scientists are interested in raw data so they can run many experiments with many algorithms so they can reduce risk and find patterns.
General Approach to Machine Learning

1. Business Understanding
   - What is the objective?
   - How can data science add value?

2. Data Understanding
   - Data exploration and understanding relative to the business

3. Data Engineering
   - Integrating, cleaning, formatting, and constructing the data

4. Modeling
   - Model selection and development

5. Evaluation
   - How does the model perform?
   - How does this compare to existing solutions (if any)?

6. Deploy
   - Model application and consumption
Build intelligent apps to drive data literacy at scale
Communicating with data is a critical skill in the digital age

To move at the speed required in the digital age, a shift to drive data literacy needs to occur in organizations. Creating easy-to-use applications on top of a cloud data architecture enables data literacy at scale.

Data literacy is a shared organizational practice that demands collaboration between IT and the business. Creating intelligent applications – applications that incorporate machine learning and artificial intelligence to make large data sets actionable – power data driven processes and are essential to digital transformation.
Creating intelligent applications

We worked with a customer to build an application powered by artificial intelligence (AI) to evaluate the impacts of marketing campaigns before they run them. By partnering with IT, we built a cloud data architecture that aggregates and analyzes data from numerous sources on products, sales, stores, customers and more. The cloud architecture enables dynamic scaling capabilities to meet the performance needs of the business and ensures all data is secure.

By partnering with the business and IT, we built a web application that utilizes machine learning to make the underlying data actionable – anyone on the marketing team can use a drag-and-drop experience to analyze and understand the impacts a campaign will have on sales before they run the campaign. By digitizing the value chain and making complex data meaningful to employees in a self-service manner, IT was able to help the business grow and increase profits.
Information technologies (IT) new role

When shared data literacy is combined with self-service tools, organizations can move faster and make better decisions. IT plays a critical role in steering the organization forward in the digital age. IT is tasked with supporting data literacy capabilities in a manner that ensures the proper self-service tools are available in a secure and performant manner.
Analytics in a Day Workshop

The analytics in a day workshop is designed to simplify and accelerate your Microsoft cloud analytics journey using a modern data architecture to power your business.

Streamline cloud analytics pipelines
Empower self-service analytics
Enable a data-driven culture

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