Modern Data Architecture

Using a New Generation of Data Tools to Solve Modern Business Problems

slalom

Modern Data for a Modern World

Big Data's Promise

Data is literally exploding. Every size and every shape and a speed that could not be fathomed just a few years ago. Every industry and every company sees the value in data. Not just for a historical view of company performance but as a means to better determine what products to sell to which customers, or to better predict the health of a patient in the future and what to do with it, or to layer on value added services and experiences to product suites, data and the intelligence that we are deriving from it seems to be the opportunity or promise that Business Intelligence practitioners have touted for years.

However, the realization of these promises has been far from realized to date. Reasons for this have not necessarily been the lack of the right statistics or algorithms to apply to data to better predict what is statistically significant enough to be call Intelligent (Artificial Intelligence for that matter), but more the technology advancements from both a hardware and software perspective. Coupling this with the investments in systems that capture information from more and more everyday experiences (Internet of Things), and we had a gap between promise and reality.

We can see the ways in which modern data is materializing in our everyday lives. Most of us don't recognize it, but it is there and implicitly we benefit from it.

|		
Biometrics	Online Behaviors	Smart Energy Usage
Health Management	Product Development	Value Added Consumer Services

Finally, excuses and lack of understanding are no more. Everything is wired and connected from watches to clothes capturing biometric data, to physical ad displays capturing our eye movements and behaviors, to our everyday online experiences capturing our likes, dislikes and shopping behaviors. The investments have been made and the software has come along side it to be able to store this data more cost effectively and rapidly. And the hardware has matured to be able to process this data more rapidly so that patterns and intelligence can be applied and discerned. The combination of the data's existence coupled with our ability to store and process it means we can finally apply our mathematical methods to gain insights from it. And if your company can take advantage of this triple threat, the promise of Big Data and Analytics can be realized to

provide a competitive advantage to your competitors. And in today's rapidly evolving marketplace, an unfair advantage off the starting line may be all you need to dominate your segment.

Why modern data architecture?

With your organization collecting more data than ever before - from both existing and new data sources your traditional data environments are probably starting to feel the squeeze. Capacity issues, long query times, and overly complex transformation processes are all the result of the increase in available data. A study by the IDC estimates a 50x growth in data over the next 10 years[1] with 28.1 Billion IoT devices are expected to be online by 2020. All this while Forester tells us that only 12% of corporate data is actually being leveraged with the amounts of data that corporations have collected today.

50X	28.1	12%
Data growth in next 10 years[1]	Billion IoT devices by 2020[1]	of corporate data is actually used[2]
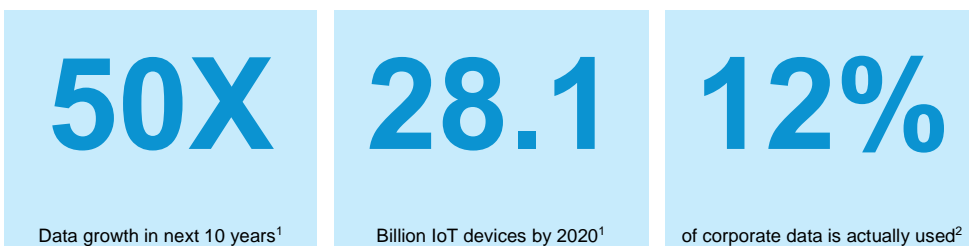
Consider what that means for your organization: what business opportunities does that create? How much strain will it put on your available resources to take advantage of that opportunity?

Is Modern Data the answer?

Modern data architecture can give you answers. Think of it as a platform for solving business problems by deriving insight from data in high volume, high velocity environments.

A modern data architecture establishes a framework and approach to data that allows people to make better decisions more quickly.

We find that it also reduces the cost of failure by providing nimble data storage and processing solutions. And it allows organizations to be innovative in the way they utilize data to meet changing needs, without the overhead of large solutions that aren't relevant anymore.

"If you want to increase innovation, you have to lower the cost of failure." – Joi Ito, Director of MIT Media Lab

Do you need a modern data architecture?

Is a modern data architecture approach right for your business? If you can answer yes to more than two of the following questions, you might consider it:

1| Can information consumed by the organization answer today's business questions and take into account all the relevant data?

2| Could you make better decisions and respond more effectively if certain information were available in more rapidly?

3| Do new data sources require significant changes to software or hardware?

4| Do your highly valuable data science teams spend more time aggregating data or building models to predict behaviors, actions, and insights into the business?

What problems does modern data architecture solve?

Modern data architecture addresses many of the problems associated with big data. What has become the classic description of what Modern Data is involves the 3V's. But we would add a fourth that is required in order to obtain value out of the data that is collecting collected:

Volume
Organizations are struggling with the costs of storage of existing data and processing of new data.

Variety
New data sources challenge enterprises with new formats or no format. There must be a way to quickly and efficiently acquire and process new data.

Velocity
Real-time is becoming critical for enterprises. The line between Batch and Real-time is blurring and both people and applications need intelligence at the decision point.

Analytics
With advances in processing and storage come increased ability to analyze, predict, and optimize. Analytics at differing points provides the return to justify Modern Data Architecture.

# Slalom's approach to modern data architecture

Our approach looks at the data ecosystem holistically, based on the needs of the organization, and makes that data available when and where you want it.
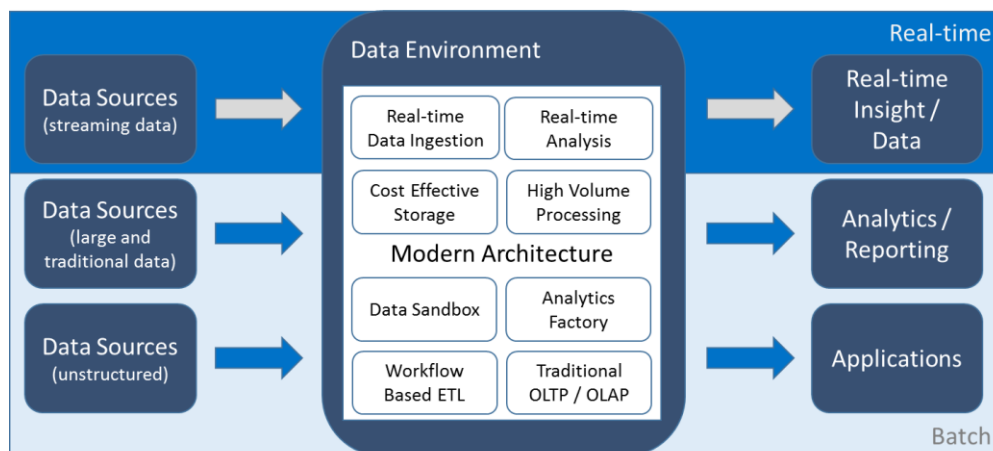
How do we see the cloud as a part of this conversation?

Using a cloud platform isn't a requirement of these technologies but it can be an enabler. The variable pay and linear scale model is an attractive way to test out new solutions and the integrated service layers are attractive to an organization that does not have the skill or bandwidth to quickly evaluate and architect these solutions in their on premise environments. Coupling this with the fact that a very large portion of the new varieties of data are created from off premise systems or external to the company, the cloud can be an attractive approach to modern data and an accelerator to moving forward.
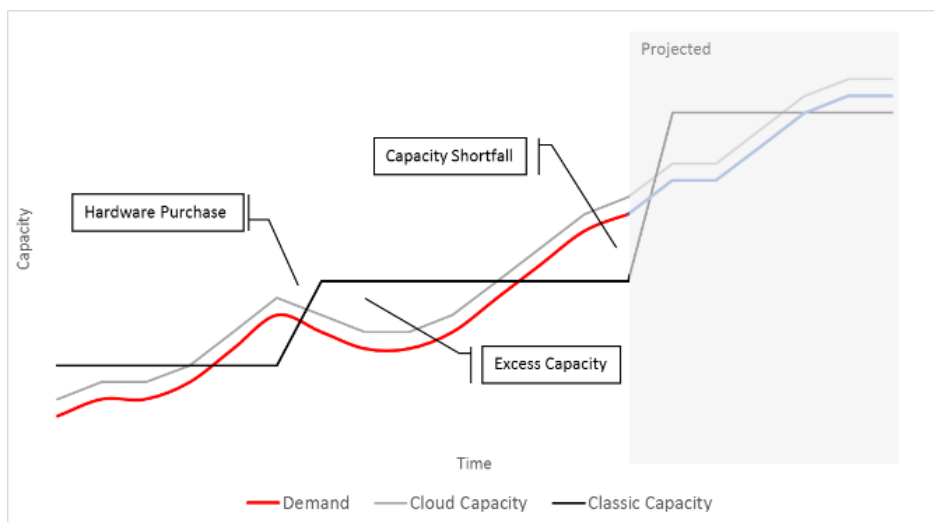
Real-time Systems

Historically real-time systems were completely contained within an application or given a specific data storage environment to use allowing high speeds. Today, we need integrated systems to make decisions that applications and business leaders depend on. Over the last decade the battle between data warehouse information vs. online data storage systems (OLAP vs. OLTP) has caused us to rethink how we architect data systems.

This struggle has been the basis of solutions for organizations that need real-time insight. Tools and design principles in this space are maturing and gaining adoption quickly. This

is not enough. Our approach includes an understanding of the operational details to create solutions that scale, are cost effective, and maintainable. Organizations that leverage this type of architecture are seeing tangible business advantages. Gartner says that organizations leveraging modern information management can expect to outperform competitors by 20% by 2015.

Analytics presents an even greater challenge. Analytics has been an offline process that presents insights in a highly latent way. Today, we need predicted outcomes minutes or even seconds after the data is created. This requires new thinking and a modern architecture to support it.

Batch Processing

New challenges in batch processing have made existing approaches challenging. Large data volumes or multi-format data feeds create problems for traditional processes.

Modern data architecture overcomes these challenges by providing ways to address volumes of data efficiently. Many of the tools developed to address big data have helped to overcome this. But those tools need to be part of a strategy and architecture to be efficient.

Multi-format or completely unstructured data requires an environment of discovery and analysis before becoming part of the larger workflow. Modern architecture allows for this type of investigation while maintaining environment integrity and efficiency.

Analytics are most comfortable in the batch world, but we're asking it to operate in a new fashion. Analysts and data scientists can't wait until the data lands in the warehouse. Now they become part of the discovery process and tell us what data is important. The risk is that these users are familiar with a data warehouse environment where database administrators protect them from themselves. New approaches must provide some of the same guardrails while allowing for their participation.

What are the key differences between traditional and modern architectures?

There are three main differentiators between the traditional and modern approaches:

SCALE

Scaling is an important part of a modern approach. In a traditional environment leaders are trying to stay ahead of the demands for storage and processing power. The beauty of a modern approach is that scale is flexible and can be added or removed whenever it's appropriate. Legacy

COST

Costs are dependent on the deployment model. When modern data architecture is deployed with some level of cloud infrastructure, it can be used from proving ground for production concepts to a full cloud production environment. If production environment needs are stable, cloud remains a

SPEED

In a traditional environment, we have become experts at deriving insight from our pre-defined processes. Analysts and tools are organized to allow data manipulation and analysis quickly. The issues come from new data sources or formats that kick off an IT project. These must be prioritized, scoped and turned

How does Modern Data Architecture Work?

Each component of a traditional data environment is challenged in new ways with this data explosion. A modern approach to these areas helps address their unique needs.

Reporting

Granularity is the lifeblood of reporting. Decision makers need a view of the metrics that is appropriate for their level of management. Providing the capability to quickly drill down into the details given a large amount of data is where traditional environments can struggle.

Modern architectures provide options in the approach to reporting. Some organizations take an aggregation approach while others want the power to build aggregates on the fly. Modern architecture accommodates either approach while allowing for speed of processing, added data capacity, and ability to handle concurrent users.

Analytics

Modern architectures solve analytics issues in batch and real-time scenarios. In batch, analysts need the ability to pull data together quickly. They also need the ability to decide what data is important. Modern approaches allow for the processing power to store vast amounts of data and organize it quickly to run predictive algorithms.

Real-time analytics was barely available until now. Analytics is becoming part of production applications. This means organizations must enable analytics to participate in the software development lifecycle. Modern approaches allow analytics developers to test not only the accuracy of the models but the speed and reliability.

Big Data

For years we've heard that data is an organization's greatest asset. We believe this to be truer today than ever before. The growing data volumes and velocity are stretching the limits of traditional systems.

Modern approaches allow us to economically store data and prioritize access based on users, the age of the data, the subject area, etc. This approach helps organizations

understand the value of the data and organizes it in a way that maximizes access to the most important data without sacrificing the added value of ancillary information.

Visualization

As the data visualization space continues to mature, it is important to understand the unique challenges that this type of processing and reporting poses. Modern approaches to data architecture allow visualizations to provide value through visual explorations of the data as well as metric reporting, trending, and drill down.

How Can Slalom help you design a modern data architecture?

Slalom brings a range of expertise to help clients achieve their data and insights objectives. Our MDA architects have worked in many Fortune 50 companies across industries bringing the needed expertise to create systems that deliver results.

Typical projects start with an in-depth analysis of the existing architecture to determine the gaps that need to be addressed. Slalom helps clients design systems that not only work, but play nicely with existing infrastructure. Architects take into consideration more than just the technology. New technologies require new skills. Organizations often vary in their ability to take on new technology stacks. Crafting the right solution means utilizing technology that meets the client objectives but can also be supported by the organization once in place.

After an architecture is agreed upon, Slalom delivers the solution incrementally. Typically utilizing an agile approach, Slalom consultants and engineers begin the build out. The delivery team can be setup in a number of ways including co-mingling clients with consultants to build out the solution. This integrated approach helps organizations build the skills necessary to support the tools once the solution is built.

Once the solution is complete, Slalom helps deliver insights. Slalom's data science teams are experts at utilizing traditional and modern tools to find answers to client's hardest questions. Quickly providing insight allows business owners an easy way to realize the return on their investment.

Let's get started

Interested in learning more about how a modern data architecture can help your business? Let's connect.

About the Author

Adam Hood works on Slalom's National Information Management and Analytics practice where he is the Modern Data Architecture Solution Principle on that team. Adam's background in Marketing Data and Analytics has allowed him to work with a variety of environments where Big Data is collected and Analytics are applied to it to gain insights and advantages throughout the Customer Experience lifecycle.

To learn more about Modern Data Architecture, contact Adam at **adamh@slalom.com**