



PREPARING YOUR ORGANIZATION FOR ADVANCED ANALYTICS

What You Need to Know to Succeed from the Start

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INTRODUCTION

IT decision makers are on the front lines of gathering, sorting, and analyzing big data in order to equip their organizations to make the best business decisions today, and tomorrow. While IT departments have access to more data and more tools than ever, the sheer amount of information being generated, and the growing number of applications and platforms available to harness and understand that information, make managing advanced data analytics a challenge for many IT professionals.

Big data analytics can deliver efficiency and speed, with the ability to identify insights for instant and informed decision-making. This enables an organization to work more quickly and productively, stay agile, and even gain a competitive advantage.

But there are challenges that come with big data as well, from segmenting useful data from clusters and identifying the right data stores and platforms to eliminating problematic data silos and finding and integrating the best big data tools into your architecture.



Advanced analytics enables organizations to:

- Work more quickly
- Stay agile
- Gain competitive advantage



THE DATA LANDSCAPE

As the volume of data grows exponentially, from the heart of enterprise data centers to the cloud and the outer edges of the network, IT departments must learn to extract value from data more quickly and accurately than ever before.

A highly optimized and scalable platform for analytics is necessary to support the complex compute requirements of increasingly heavy and diverse data workloads—from traditional business intelligence (BI) and structured databases to more advanced artificial intelligence (AI), predictive analytics and machine learning.

Efficiently tiered storage strategies enable rapid analysis of different data types, both structured and unstructured, across disparate systems. This is necessary for businesses to extract timely value for actionable insight as well as faster networks. In fact, every domain of infrastructure must be transformed to handle the extreme demands that advanced data workloads will place on compute, memory, storage, interconnect, and I/O subsystems in data centers.

It is only through identifying deeper, more beneficial insights—in real time—that IT decision makers can help their staff, and their organizations, to move beyond traditional data analytics and embark upon more critical and high-value initiatives, including machine learning and AI.

This requires leveraging intelligence from widely distributed sources in order to store that data efficiently, analyze the data rapidly, and identify insights that can be used to make better business decisions at every opportunity.

In order to utilize data as a competitive advantage, organizations need to modernize their data acquisition and analytics across every critical domain, including:

 **Compute**

 **Network**

 **Storage**

 **Security**



The Five Categories of Analytics

While analytics continue to evolve rapidly, it's important to know the types of analytics that organizations are working to capture and leverage today.

It is widely accepted that there are five separate categories of analytics:

- **Descriptive analytics:** Summarizes historical data; answers questions about what happened in the past
- **Diagnostic analytics:** Examines data to gain insight into why things happened
- **Predictive analytics:** Analyzes both new and historical data to forecast activity, behavior, and trends
- **Prescriptive analytics:** Uses data techniques such as simulation or machine learning to identify the best course of action for a given situation
- **Cognitive analytics:** Leverages AI technologies and high-performance data analytics to automate decisions or augment human decisions

While most companies typically use the traditional analytic techniques of descriptive and diagnostic analytics, they have not yet moved up to the advanced analytics of predictive, prescriptive, and cognitive analytics.

By moving up to this higher level of data analytics that leverages machine learning and AI, companies can utilize the power and sophistication of advanced analytics to provide natural interaction-based collaboration, where human experience is augmented with smart machines to offer breakthrough insights for businesses.



The Four-Layered Analytics Solutions Stack

An *analytics solution stack* is a bundled set of programs and application software put together to produce a desired result. The technologies and applications of each component work together, often in a sequential manner, to create functional programs that deliver advanced analytics solutions.

The analytics solution stack is made up of four layers:

Infrastructure layer:

The foundation for acquiring, storing, and protecting data, as well as for running commercial and open source analytics solutions

Data layer:

Relational databases are often supplemented by Hadoop Distributed File System (HDFS), which can form the basis of enterprise data hubs or data lakes

Analytics layer:

Building blocks for the analytic end-user application, and may include open source offerings such as Apache Spark™ and Apache Storm™, or suites from enterprise leaders such as Microsoft, SAP, SAS, Oracle, or IBM

Applications layer:

Out-of-the-box analytics applications that provide analytics to the various user types of data

The four layers of a solution stack should complement each other as a flexible big data platform that can take advantage of existing data management systems to deliver traditional and advanced analytics. Other technologies, such as AI and performance and security solutions, run through all the layers of the solution stack, accelerating advanced analytics insights, and protecting your data.



What is Big Data? What is AI? How Do They Work Together?

The internet of things (IoT) is creating a world of connectedness we could never have imagined even a decade ago. *Big data* describes the incredibly large volumes of information being processed, and how this information is an almost endless source of insights about the digital world and how people interact with technology. This data is ideally suited for analysis, and can be used to understand trends and make critical predictions.

Yet as more people connect to more devices in more ways, there is no practical way for humans to efficiently analyze and monitor the data at a pace that is quick enough to be useful. Which is why there is increasing demand for artificial intelligence (AI). One of the truly revolutionary developments in computing, AI has become a fundamental tool for a wide range of technologies, including robotics, medicine, communication, and the previously mentioned IoT.

With IT departments being expected to manage all of the extremely complex issues associated with big data, they needed a better technology solution to address these issues. The answer: AI. Sorting and analyzing all the intricacies of big data may be too much for even large teams of IT pros, but AI can cut through the clutter to automatically analyze millions of data sets quickly and efficiently. AI provides the insights hidden in big data, so organizations can use those insights to improve everything from provisioning servers to improving customer service.





MAKING A PLAN FOR YOUR ORGANIZATION

Planning is critical in the use of data analytics to spur innovation, create better customer experiences, and drive business. You must be prepared to maximize your analytics capabilities by developing a modern data center infrastructure to keep up with the growing velocity and volume of data.

Begin by gaining a comprehensive understanding of how data flows into your organization and how it is shared and utilized across departments. This will enable your organization to utilize increasingly sophisticated analytic techniques to gain rapid, actionable insights.

You also need a comprehensive analytics strategy to address the distributed nature of data from the cloud to the edge and examine key infrastructure capabilities needed to support a broad range of analytics—from traditional to real-time big data analytics to machine learning—with higher levels of data protection.

The ability to efficiently capture, store, transport, and analyze these data streams is a critical competitive differentiator—setting apart organizations that are overwhelmed by data from those that know how to use data as a powerful business tool.



Utilize analytic techniques to gain insights:

- How does data flow into your organization?
- How is data shared across departments?



Three Priorities of an Effective Data Analytics Plan

More than ever, companies need timely, in-depth insights to compete on a global level. But those insights can only come from better ways of accessing, organizing, and interpreting information—in effect, taking a “holistic” approach to analytics.

Here are three imperatives of a successful plan:

- 1 Tame the data deluge:** Enterprises must get their data layer right from the start. Successful enterprise analytics requires eliminating data “silos,” and providing highly structured and enforced data governance, integrity, and quality.
- 2 Accelerate insights:** Faster time to value was the number one requirement that executives wanted from their analytics infrastructure, according to a 2016 Forrester survey.² By accelerating the insights from that data, companies are better prepared to drive business growth and innovation.
- 3 Enable enterprise AI:** Increasingly, disciplines such as advanced analytics and AI are merging. Forward-thinking organizations are already taking steps to achieve this integration. The value created will leave less-prepared competitors in their wake.



INTEL OFFERS PROVEN SOLUTIONS FOR ADVANCED DATA ANALYTICS

As your organization begins developing and executing its own advanced analytics initiatives, Intel can be your guide to ensuring that your infrastructure and solutions deliver the performance and scalability needed to succeed on this project. Intel can also help you continually optimize for the future.

Intel, along with a select group of partners, can provide your company with the proven technologies needed to create a comprehensive advanced analytics solution stack, including:




COMPUTE: Intel's rich portfolio of workload-optimized processors covers the full range of analytics needs. [Intel® Xeon® Scalable processors](#) deliver highly scalable performance for a wide variety of analytics, AI, and other data center workloads. This proven, integrated platform offers low TCO for batch deep learning inference and classic machine learning workloads. [Intel® FPGAs](#) (Field Programmable Gate Arrays) complement Intel® Xeon® processors for real-time programmable acceleration of intensive data analytics and deep learning inference AI workloads. Count on Intel® FPGAs when power efficiency, low-latency, and programmable flexibility are critical considerations.




STORAGE: Breakthroughs in storage media, such as solid state drives and Intel® Optane™ technology, are redefining the cost, capacity, and latency of storage. [Intel® 3D NAND SSDs](#) deliver the response times, capacity, and resilience you need to have significant impact on accessing data more quickly for much faster analysis. With a robust data tiering strategy established, you can choose the data architecture (in-memory scale-up system like SAP HANA or scale out database like Apache Hadoop) that best supports the requirements of your analytics initiatives.





 **NETWORKING:** To help your organization avoid delays in moving your data from your data lake or warehouse to your compute infrastructure, Intel provides the [Intel® Omni-Path Architecture](#), the next-generation fabric for AI, analytics, and high-performance computing (HPC). [Integrated Intel® Ethernet with scalable iWARP RDMA](#) provides up to 4 x 10GbE high-speed Ethernet capability for high data throughput and low latency workloads. It's ideal for software-defined storage solutions, NVM Express over Fabric solutions and virtual machine migrations.

 **SOFTWARE LIBRARIES AND ACCELERATORS:** Computational speed is a key ingredient for success and Intel helps you get there. How? With innovative software libraries and accelerators that optimize frameworks for higher performance on Intel® architecture, from the [Intel® Data Analytics Acceleration Library](#) (Intel® DAAL), designed to help software developers reduce the time it takes to develop their applications to the [Intel® Math Kernel Library](#) (Intel® MKL), which accelerates math processing routines that increase application performance and reduce development time. Intel also supports [BigDL](#), a distributed deep learning library for Apache Spark. Using BigDL, you can write deep learning applications as Scala or Python programs and take advantage of the power of scalable Spark clusters.



CONCLUSION

Intel is a proven and trusted partner for organizations that want to enable and accelerate the promise of advanced analytics and AI. Intel has been delivering breakthrough advancements and optimizing analytics/AI workloads for decades.

In order to speed up the “time to insight” within your organization, you need to take a holistic approach across the hardware, software, and solutions framework. At the hardware and infrastructure level, the choice of processors, memory capacity, storage media, network technologies, and cluster architecture can all determine improvements in speed and efficiency.

Intel® Xeon® Scalable processors provide an ideal foundation for taking your advanced data analytics to the next level, and beyond. Intel® Xeon® processors offer an agile platform for artificial intelligence and analytics workloads, able to handle scale-up workloads with the largest in-memory requirements, and process massive data sets distributed across myriad clustered systems.

Intel® Select Solutions offer end users confidence in a performance choice built on decades of experience and collaboration among Intel, our industry ecosystem of partners, and data center leaders. From simplified evaluation to fast, easy deployment, Intel® Select Solutions provide the benefits organizations seek from advanced data analytics.

When used in collaboration with Intel® Xeon® Scalable processors, Intel® Select Solutions make workload optimization a competitive tool for growing your business.

Ready for the next step?

EXPLORE THE EGUIDE

LEARN MORE AT [INTEL.COM/ANALYTICS](https://www.intel.com/analytics)



For additional information, explore the following assets:

- White paper | [*How to Tame the Data Deluge*](#)
- White paper | [*Five steps to the data-driven business*](#)
- White paper | [*Data In, Value Out*](#)
- Planning guide | [*Getting Started with Advanced Analytics*](#)

Sources

¹ Business Technographics Global Data And Analytics Survey, Tyler McDaniel, Forrester Research, 2016

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