

Getting Value from Big Data: A Practical Six-Step Guide



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A Practical Six-Step Guide

Organizations are successfully uncovering new insights from Big Data, creating huge opportunities to transform business, entire industries, and even the quality of our lives. But transforming new insights into tangible results isn't always easy. Some companies move from idea to successful implementation quickly, while others seem to hit one roadblock and red light after another. This paper explores a [six-step approach to help ensure a Big Data project is in the fast lane to success](#).

With the promise of Big Data and the “Internet of Things” comes the need for a robust strategy. The strategy addresses the ability to implement appropriate data governance, negotiate the growing lineup of technology alternatives, reengineer business processes, address skills gaps, and demonstrate value. It's common knowledge that most organizations do not yet have a strategy for managing Big Data, whether that involves deploying new data management systems or extending existing systems to accommodate Big Data.

Every company is at a different stage of Big Data maturity (See this white paper from SAP: [Getting Value from Big Data: Focus on the Opportunities, Not the Obstacles](#)), and understanding where your company is on the spectrum can give you critical context as you move through this six-step guide. Of course, not everyone needs to achieve the highest level of Big Data maturity. Not everyone needs to invest the resources required to be at this level, and advancing just one stage from where you are today can yield substantial incremental benefits. What's more, moving to higher stages requires buy-in from a lot of people inside and outside of IT, an investment of time and resources, and a willingness to learn from failure.



Inductive reasoning is so powerful when you begin use-case development: it starts with hypotheses that lead to a series of **questions that data helps to answer**.





STEP 1: DEFINE YOUR USE CASES

For IT professionals in particular, there is an urge to rush into discussions about data sources or architectures. This urge is a detour to failure. Technology and tools are so advanced – and potential solutions so numerous – that you must start by first figuring out what questions need to be answered and then work toward the data (step 2) and architecture (step 4). The mantra of any Big Data project has to be “business value,” making the use-case construct invaluable as a starting point.

Identifying Use Cases

When identifying potential use cases to exploit Big Data, be as specific as possible. Consider what business goal you are trying to achieve by analyzing Big Data. Examples of business goals for using Big Data include:

- Gaining a better understanding of customer behavior; for example, to reduce costs associated with returned goods, identify which target groups are most likely to purchase and return goods
- Enabling more effective marketing and price promotions to improve profit by gaining deeper insight on buying behavior to assess which products are often purchased together (known as affinity insight)
- Avoiding downtime and production loss by analyzing machine sensors and variables impacting machine use to better predict when maintenance is needed
- Improving operations and complying with industry regulations by analyzing raw materials against maximum and minimum quantities in real time as a product is developed

Balancing Deductive and Inductive Approaches

In science, there are two ways of arriving at a conclusion: deductive reasoning and inductive reasoning. Organizations have typically taken a deductive, or top-down, approach by drilling through stockpiles of data in search of nuggets of insight. While this sort of data mining can be a fascinating exercise, it is often time and resource intensive. Data-mining techniques certainly have an important role to play, from helping you get your arms around data sets by using descriptive statistics to developing simple business rules. Moreover, insights gleaned can often be embedded directly into existing business processes to create entirely new and differentiated capabilities, for example, identifying segments in customer sales data by merging demographic information.

However, a much more impactful approach is to start with the destination in mind and first identify what questions you need to answer for the business. This is why inductive reasoning is so powerful when you begin use-case development: it starts with hypotheses that lead to a series of questions that data helps to answer. This approach results in a much clearer understanding downstream in the process of what data is actually relevant, given the use cases you are trying to pursue. Keep the following items in mind as you consider both deductive and inductive approaches to identify relevant data to support your Big Data use cases:

- Data you need might already reside in places you typically would not mine, such as Web logs, call logs, and click-stream data.



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- You may find that unstructured data is where the nuggets are hidden, so you need to use techniques such as text mining to gather insight.
- There may be opportunities to mash up data from external sources or machines, or to merge data with your own transactional data.

Tips for Identifying Use Cases

Look at What Your Organization Is Already Doing

What can be done better with Big Data techniques, such as mashing up social sentiment with product data or developing new pricing models based on user profiles?

Look at What Others in Your Industry Are Doing

Perhaps you are not doing some things other organizations are, or maybe you can do some of them better and get superior results. SAP industry value advisors are a great source of information on best practices for vertical markets. You can also check out our value maps for your industry at <http://rapid.sap.com/se>.

Apply Design Thinking

Design thinking is a process of creating innovative ideas to solve problems. This approach can help you to identify new, previously unconsidered use cases.

Define the Use Cases by Outcome

Outcome-based use cases may be cost focused rather than revenue focused; for example, by predicting when a component is likely to fail, you can optimize maintenance schedules and spare-parts inventory.

Establish Clear Targets, Service-Level Agreements, and Key Performance Indicators for Your Chosen Use Case

If you don't define success, how will you know what success looks like? For a given use case, the definition of success varies by stakeholder. You want to be as clear as possible on how the use case will help each stakeholder.

Prioritize and Validate the Use Cases

Rank use cases in order of anticipated benefits, and validate your business goals with all stakeholder functions. If the goals are valid, determine what decisions need to be made that would move the needle on those goals.

To give you a jump-start on the process of defining use cases, SAP offers expert-led Big Data workshops focused on use-case development and designing to build value. Learn more in the “[Help Is at Hand](#)” section.





STEP 2: DISCOVER YOUR DATA

The biggest challenge most enterprises face is understanding their overall business data – knowing what data exists, its size and composition, where it's located, its source, how it is managed, its dependencies, and how it integrates with other systems.

That means carrying out an audit, which requires an understanding of how various applications share and access enterprise data. In the past, almost all data was under IT's control. However, data ownership has been devolving to business units or departments. It's not uncommon, for instance, for marketers to be the custodians of customer relationship management data. Therefore, IT should survey functional leaders to sweep up everyone's data demands. Start by tackling a few applications at a time to understand the metadata, interfaces, and application requirements, and find out how quickly the data needs to be accessed.

Check Under the Bed

Don't confine the audit to just the servers in your data center. Consider storage arrays, archive storage, data at remote offices, data on mobile or portable devices, and data in the cloud and on public and third-party systems. Take into account how much data is archived and where – in-house or outsourced, on premise or in the cloud.

Don't Overlook the Ordinary

Certain types of data may be collected for one purpose but can be used to do something completely different, known as "secondary uses." It's important not to dismiss these potential gold mines such as operational logs or e-mails.

As ordinary as they may be, these assets can be hiding some real business revelations. For example, by counting the number of logs or impressions, you may be able to identify challenges or unmet needs that your competitors haven't yet spotted.

Mine Opportunities in Machine Data

Think about how machine data can be exploited to improve operational effectiveness or reduce costs. What if equipment performance data can be used to trigger another machine into action, such as ordering a replacement part, instead of relying on human intervention?

Look Outside

Big Data gets really interesting only when you step beyond the four walls of your enterprise to combine internal and external data. This can take the form of customer comments gleaned from social media, the movements of employees and customers, or extractions of assets from location-based data.

Maintain Confidentiality and Compliance

When it comes to customers and business partners, identify what, if any, issues exist around privacy, security, and intellectual property. Make sure you don't fall foul of any government regulations or industry-specific compliance requirements.

Pay Attention to Neglected Data

Once you have a full inventory, evaluate what data can be used for decision support and what's being collected but is currently not used for analysis purposes. Consider what will help you get to know your operating environment, your customers, and your competitors more intimately.

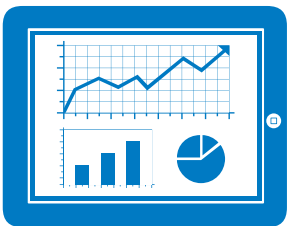


Read the Signs

Next, determine what business signals can be inferred from data. For example, customer sentiment analysis can help you predict an individual's or profile group's propensity to churn, so you can incentivize or reinforce their loyalty before they make the switch.

Separate the Useful from the Less Useful

As well as identifying what's useful, it's just as important to determine what you don't need. That way, you can avoid the ongoing cost and effort of collecting, maintaining, and moving unnecessary data around – and, to accelerate ROI, you may even be able to offset any tangible savings against your Big Data initiative.



The biggest challenge most enterprises face is understanding their overall business data.

EXPLORE THE VARIETY OF DATA AVAILABLE

- Web logs, call logs, and click streams
- Social data in blogs, tweets, reviews, and ratings
- Images
- Human language, audio, and video
- Event data streams from applications, sensors, or radio-frequency identification (RFID) tags
- Transactional data
- Geospatial data
- Personal productivity files (spreadsheets, documents, presentations, and PDFs)
- E-mails
- Public data (macroeconomic factors, weather, and traffic)



STEP 3: CONDUCT AN INITIAL EVALUATION

The liberating aspect of Big Data initiatives is that you don't have to defer gratification indefinitely; you can get started, experiment, and learn along the way. However, the tighter your up-front definition of what you hope to gain from Big Data, the more focused your experimentation time will be and the quicker you'll refine your skill set and create business value. Ask yourself:

- Have key stakeholders provided their input?
- Did we ask the right questions, with the right parameters?
- Did the data meet our requirements for the outcome?
- Did the experimentation validate our project assumptions?
- What is the likely cost-benefit calculation?
- How many core issues and edge issues remain, and are they within our control to fix?
- What is the realistic timeline to deliver the initial benefits?

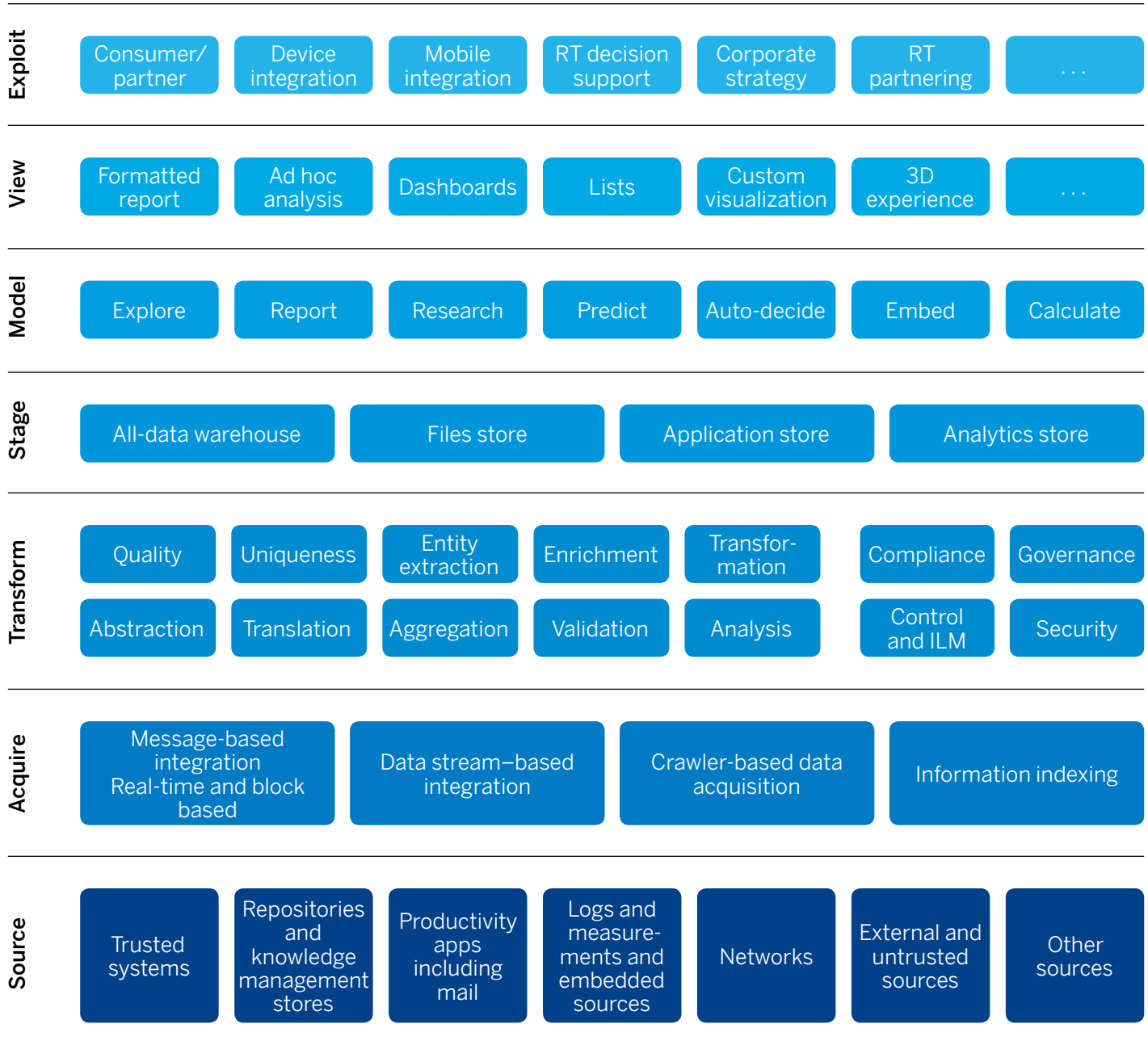
STEP 4: DESIGN YOUR ARCHITECTURE

Many different tools can be used to implement a Big Data solution. However, that does not mean that any tool can be used to successfully implement your chosen use case. There are multiple layers in the taxonomy of Big Data, and while you have a tool or technology in each layer, it does not mean that it will serve your purpose. Successful Big Data implementations begin first with understanding the complete logical architecture of possible solutions ([see Figure 1](#)).

Big Data architecture needs a common language, so we've developed a taxonomy to help. For assistance and pragmatic guidance, our Big Data taxonomy assessment ([see table](#)) can help you quickly assess and benchmark your organization's current capabilities in each area of physical architecture.



Figure 1: Logical Architecture of Big Data Solutions



RT = Real-time

ILM = Information lifecycle management



Answer a simple questionnaire at <https://valuemanagement.sap.com/BigData1> to get an analysis of how your organization compares to others in maturity. Optionally, you can receive a full report on the findings.

Taxonomy	Definition	Examples and Tools
Source	Origin of structured, semistructured, and unstructured data	Applications, mobile devices, data streams, databases, data repositories, logs, sensors, networks, internal and external systems, and purchased sources
Acquire	Accessing data for analysis. This may or may not require data movement. Decisions about whether to move data may be impacted by the known value, volume, and structure of data as well as the immediacy of analysis.	Extract, transform, and load (ETL); data replication; data virtualization and federation; streaming; content crawling; and indexing
Transform	Converting data from one format to another to find patterns, improve data quality, process natural language, recognize images, and so on	Data cleansing, matching, deduplication, enrichment, translation, natural language processing, text analytics, event stream processing, aggregation, and image recognition
Stage	Location where data is placed for processing and analysis	In memory, transactional database, enterprise data warehouse, Hadoop, file server, and master data repository
Model	Design that shows how data items relate to each other and how data will be consumed by analytic tools, applications, and processes	Data model, information model, enterprise architecture model, metadata repository, predictive algorithms model
View	Visualization layer allowing input into human planning and decision making	Reports, dashboards, ad hoc analysis tools, Web or mobile business intelligence, enterprise search, data exploration, predictive analytics, and visualization tools
Exploit	Distribution to information consumers or partners, integration with devices or mobile, embedding into decision support and corporate strategy	Mobile analytics, portals, automatic device behavior programming, learning algorithms, and feedback loops





Once you have determined the right logical architecture needed to implement your chosen use cases, you can begin to work with your technology experts to layer in the correct components, such as specific platforms, tools, connectors, and data sources.

The SAP HANA® platform is designed from the ground up to support Big Data use cases, allowing you to rapidly get business value from Big Data while providing you “optionality” to grow more sophisticated use cases over time.

Performing a Gap Analysis of Your Information Architecture

Once you have identified and validated the use case you want to implement, it's useful to analyze whether your current infrastructure meets your business needs. The good news is that you probably have a lot of the technology and tools that you need to begin gaining value from Big Data. However, you might want to explore taking advantage of technology innovation to gain more value from the variety of data and the velocity by which you can process, analyze, and view it.

Innovations in technology, such as in-memory computing, enable new breakthroughs. It is now possible to run complex mathematical algorithms across large volumes of data in real time, enabling you to predict future outcomes that traditional systems cannot handle. Other innovations such as Apache Hadoop and MapReduce enable you to store extremely large volumes of data cost-effectively, enabling you to mine large oceans of data of unknown value to uncover hidden signals that can lead to competitive differentiation.

SAP and our partners offer a variety of solutions, including a flexible platform powered by SAP HANA, advanced analytics solutions, and innovative applications to help you fill the gaps in your Big Data needs. In addition, SAP experts can work with you to perform the gap analysis so you can gain the most from your existing technology infrastructure while building a foundation to support ongoing innovation.

STEP 5: IMPLEMENT YOUR USE CASE

Big Data is not a “one and done” activity – it's an exercise in change management. You need to create a long-term vision for how to gain value from Big Data and work iteratively to gather momentum and competency.

Start with quick wins that have a narrow focus, are based on existing internal data, and build on your successes. This can be accomplished by implementing a proof of concept (POC) or pilot project. Then expand into new target audiences, with new offers, via new delivery channels, or using new data sources (especially external ones) and new functionality (such as text analysis) as you gain confidence.

Over time, you can move from the POC or pilot project to a scalable business capability.



GAINING VALUE FROM DATA GOVERNANCE

Big Data can cause big headaches – a billion records of bad data will not lead to smarter decisions. Many systems create and store data in isolation, resulting in data that is misaligned, duplicated, or inconsistent. The problem of poor data quality is compounded when you try to obtain a 360-degree view or implement joined-up business processes.

An entire company – not only the IT department – is responsible for data governance. Getting data governance right requires a management discipline that spans people, processes, policies, and metrics. Fortunately, solutions such as SAP® Data Services software can make it easier for you to automate, monitor, manage, and report on data quality. These take into account the entire information lifecycle – from creation or capture through to archiving and deletion and everything in between.

STEP 6: MAKE BIG DATA A BUSINESS CAPABILITY

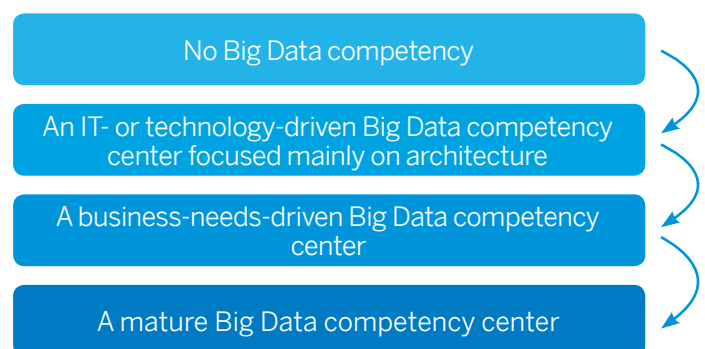
Only by working out what you have will it become clear what you lack – and that doesn't mean just infrastructure, but people and know-how too.

Conscious Competence

Identify whether your internal skill sets align with your data composition. If you mostly outsource, you may need increased project management skills to deal with external vendors than if data were retained in-house. If your data is primarily in the cloud, you'll need people who are familiar with cloud storage.

For any skills gaps you identify, you'll need to consider how resources can be realigned, trained, or hired. While consultants have their uses, you'll need to cultivate these skill sets internally in tandem to avoid an unhealthy level of external dependency that can be costly and potentially destabilize your future progress.

Figure 2: Big Data Competency Center Development Path



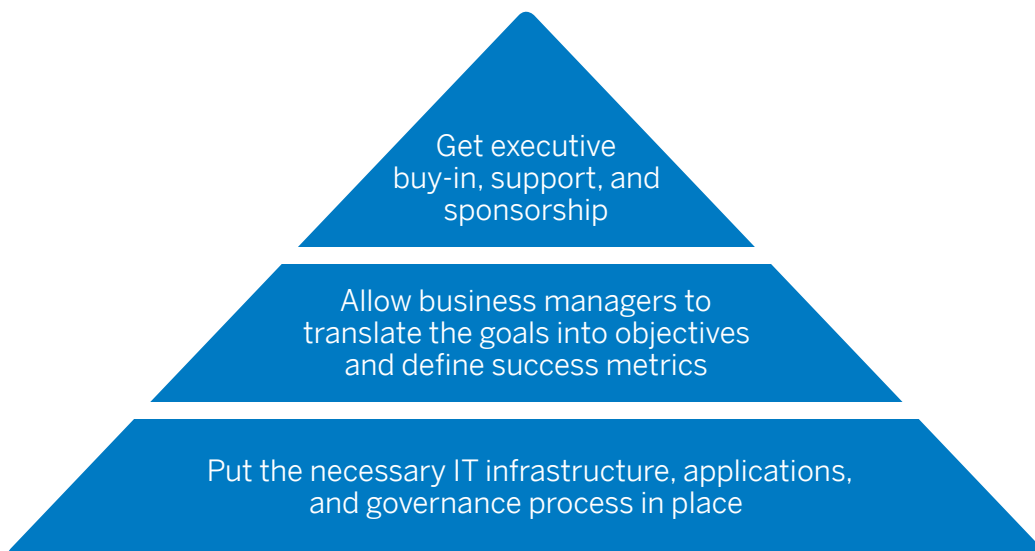
Think about what skill sets you want to build internally to create a Big Data competency center or center of excellence. This involves setting up a cross-functional team with specific tasks, roles, responsibilities, and processes for supporting and promoting the effective use of Big Data across the organization. This type of organization is part of the overall Big Data maturity model, but it also has its own development path ([see Figure 2](#)).

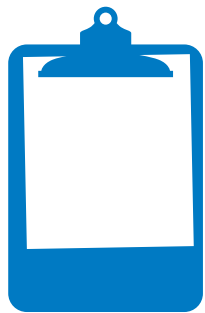
Getting Buy-In

Technology only gets you so far. Serious Big Data initiatives won't get off the ground without the right governance and stewardship. You'll need to ensure you have the right team, champions, and stakeholders on board:

- Start at the top. When putting together the strategy, make sure you have buy-in, support, and sponsorship from executives.
- Get input from the middle. Line-of-business management is best placed to translate missions into objectives and determine the metrics used to measure success.
- Lay a rock-solid foundation. Ensure you have the IT infrastructure, applications, and governance processes in place to bring it all together.

Figure 3: Build Governance and Stewardship





Serious Big Data initiatives won't get off the ground without the right governance and stewardship.

Help Is at Hand

NEXT STEPS, TOOLS, AND SUPPORT TO MOVE YOU FORWARD

Big Data can help you achieve big impact. You're eager to gain the advantage on your competitors – but being a pioneer can be a lonely and precarious existence. Fortunately, experienced, objective, and expert help is at hand.

Getting Started with Big Data

Take advantage of a half-day session that will help launch you on your Big Data journey. The format and content are designed to help you pinpoint quickly where you are on your Big Data journey and where you should go next for the most value. Learn from experts and exchange ideas with other organizations on similar journeys.

Participate in a Big Data Workshop

Maybe you are past the overview stage and want to jump straight into it. In that case, SAP offers a full-day workshop at your location to identify and get started on your most important use cases, dive deep into your specific architecture considerations, and codevelop the road map needed to make your use cases come to life.

Develop Your Big Data Strategy with Our Experts

Strategic advisory services offered by SAP can guide you in building a long-term strategy. That strategy may include simplifying your IT landscape to transact, analyze, and act instantly or updating governance to include Big Data implications. SAP experts work with you to identify the new skills your organization will require to get the most value out of your initiative.

TAKE THE NEXT STEP

Talk to the Big Data experts from SAP to take the Big Data Maturity Model assessment. We can help you develop your business strategy, solution architecture, and road map for getting breakthrough business value using Big Data and advanced analytics. We'll help you align with internal executives and leaders, bring best practices and use cases from your industry, understand where the gaps truly are, and gather your leaders around the change management.

FIND OUT MORE

Reach out to a Big Data expert from SAP in your region. Learn how at www.sap.com/bigdata.



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