Analytics and Artificial Intelligence for Technical Professionals Primer for 2023

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Initiatives: Analytics and Artificial Intelligence for Technical Professionals

> Converged analytics and AI functions drive innovation by augmenting business workflows with decision-making technologies. Data and analytics technical professionals should use this initiative to mature analytics and AI architectures, tools, processes, and skills.

Scope

This initiative provides technical professionals with assessment and implementation best practices for analytics, business intelligence (BI) and artificial intelligence (AI) technologies.

Topics in this initiative include:

- **Analytics Architecture and Modernization**: Build and modernize business analytics environments to enable better decision making, in accordance with broader data and analytics strategies.

- **Analytics Adoption, Skills and Governance**: Increase adoption of self-service analytics across business domains, alongside upskilling and embracing adaptive analytic governance models, as part of redesigning D&A architectures.

- **Analytics and BI Solutions**: Assess analytics capabilities across vendor solutions that incorporate new augmented capabilities within existing analytic architectures to support decision intelligence.

- **Advanced Analytics and AI Architectures**: Assess the reference architectures, best practices and operationalization framework documents to build next-generation advanced analytics and AI platforms supporting digital transformation.
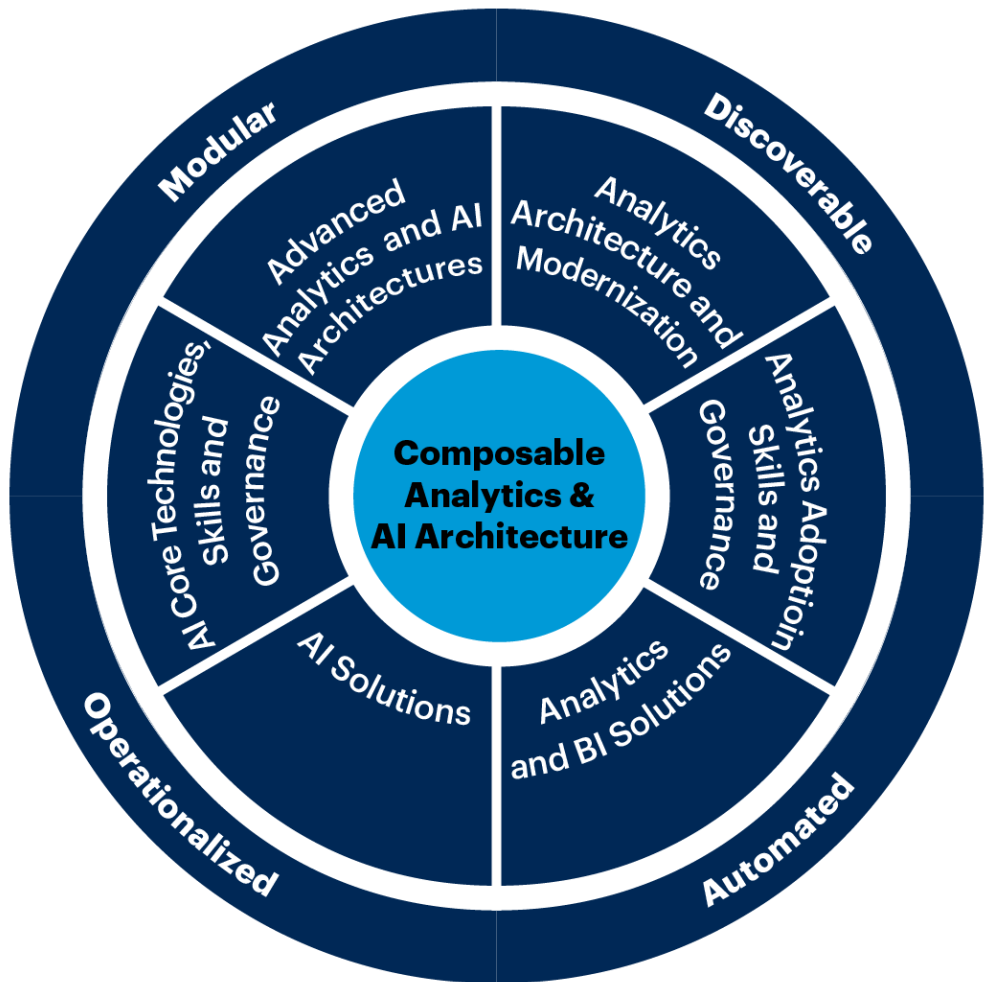
- **AI Core Technologies, Skills and Governance:** Assess core AI technologies, address governance and the responsible use of techniques and solutions, and upskill existing IT teams on AI competencies.

- **AI Solution Implementation:** Assess AI products and platforms to identify the right set of open-source and proprietary vendor solutions to build best-of-breed, easy-to-integrate and operationalized AI architectures.

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Analysis

Figure 1: Analytics and Artificial Intelligence for Technical Professionals Overview

Analytics and Artificial Intelligence for Technical Professionals

Source: Gartner
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The quest to become data-driven is now more important than ever, as organizations strive to improve decision making, increase process efficiencies, find new opportunities to increase revenue and enhance customer satisfaction. Analytics and AI are essential to achieving these goals, and are a core component of major transformational initiatives, often requiring a shift to cloud-native solutions or evolving into a multicloud or hybrid architecture. These initiatives also challenge analytics and AI teams to increase the pace of implementation and reduce the time from experimentation to production deployments and integration.

As part of this transformation, Gartner is seeing a significant convergence of analytics and AI capabilities, and the need for composable business architectures built on four design principles — modularity, autonomy, orchestration and discovery. Central to delivering on composable business architectures is the ability to adapt and change solutions in the portfolio by delivering composable digital artifacts — data models, semantic layers, dashboards, insights, and machine learning (ML) and AI models. Hence, the inherent architecture must be modular, provide autonomy for individual businesses and be adaptable to different analytics contexts. Analytics and AI architectures should be designed to enable operational and exploratory analytics supporting the entire spectrum of descriptive, diagnostic, predictive and prescriptive analytics.

Looking beyond just building persistent data stores, the emphasis must be on relationships across diverse datasets to support modern analytics environments. The combination of knowledge graphs, structured and unstructured data, machine learning and deep learning, natural language technology (NLT), and computer vision (CV) should push toward new methodologies that deliver "analytics everywhere" and to everyone in the organization.

Finally, the maturation and composition of AI solutions pose a new set of challenges. AI-enabled decisions must be accurate, explainable and ethical. AI systems operating with various degrees of autonomy need to be trusted, and their risks must be managed. Efficient AI agents should operate at the edge, at the periphery of traditional computing systems, and continuously adapt to changing conditions.

This initiative offers comprehensive guidance on implementation architectures and assessment of technologies, products and tools, alongside best practices on governance, upskilling and encouraging adoption of new analytics and AI capabilities.

Topics

Analytics, combined with AI, provides powerful decision-making tools and techniques. This initiative provides guidance on building effective analytics architectures and solutions by leveraging AI to drive improved performance, enhanced customer experiences and timely decision making with the help of streamlined architectures and infrastructure. Technical professionals will find independent assessments of key products, tools and technology providers across multiple categories of analytics and AI techniques.

Our research in this area addresses the following topics:

Analytics Architecture and Modernization

Modern D&A architectures must enable analytics for everyone everywhere. This requires new strategies, such as using cloud-based SaaS/platform as a service (PaaS) solutions to scale and operationalize analytics workloads, and alternative data architectures. They must also provide accessible, reusable metrics and measures for fast access to insights, with governance and access frameworks that meet organizations' security and privacy goals. Our research will provide guidance on next-generation analytics architectures, empowering users with effective exploration, preparation, visualization and decision making of data.

Questions Your Peers Are Asking

- How do I modernize data and analytics architectures to support self-service analytics and introduce augmented capabilities?

- How do I consolidate and rationalize the analytics tool portfolio?

- How do I migrate data and analytics architectures to the cloud?

Recommended Content

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- Decision Point for Selecting Cloud Analytics Solution Architecture

- Reference Architecture to Enable Self-Service Analytics

- Design IoT Stream Analytics From Edge to Platform

- Video: Demystifying the Metrics Store

Planned Research

- Analytics and BI tool rationalization and migration

- Demystifying semantic layers for self-service analytics

Analytics Adoption, Skills and Governance

Clear business strategies, technical architectures and governance plans are foundational to any self-service analytics program. Organizational models (e.g., centers of excellence [COEs], data governance boards and broader D&A communities) provide structures required to drive continued adoption of self-service analytics, breaking down silos between IT and the business and ensuring consistent governance at scale. In this topic, we examine the role that data literacy, governance and organizational models play in the successful adoption and rollout of self-service analytics.

Questions Your Peers Are Asking

- How can I play an active role in establishing and adopting data and analytics?

- How do I build essential skills for supporting analytics and BI initiatives?

- What are the best practices for implementing governance for analytic solutions?

Recommended Content

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- Data and Analytics Governance Approaches for the Technical Professional

- Self-Service Analytics Governance With Microsoft Power BI

- Tackle Data Literacy Head-On to Avoid Data and Analytics Program Failure

- Communicate Insights Effectively With Augmented Data Visualization and Storytelling

- Infographic: Self-Service Analytics and BI Adoption Roadmap

Planned Research

- An assessment of self-service data preparation

- Effective dashboard design

Analytics and BI Solutions

Analytics platforms are expanding to involve a wide spectrum of user personas across various stages of the data and analytics pipeline. However, this expansion blurs the distinctions between traditionally disparate product offerings and services provided internally by IT and business teams, as well as between the various roles of data analysts, BI analysts and data scientists. New approaches and architectures are needed to focus on supporting heterogeneous, multitool environments to eliminate siloed and shadow analytic pipelines. We will provide Solution Criteria and Solution Comparison documents to evaluate analytics and BI vendor platforms. We will also assess analytic technologies that help bring augmented analytics and self-serviced data preparation toward modernizing analytics and BI architectures.

Questions Your Peers Are Asking

- How do I assess and select analytics and BI technologies and platforms?

- What are the best practices for building domain-specific, embedded, geospatial, streaming and edge analytics solutions?

Recommended Content

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- Evolving Capabilities of Analytics and Business Intelligence Platforms

- Solution Comparison for SaaS Analytics and Business Intelligence Platforms

- Streaming Analytics in the Cloud: A Comparative Analysis of Amazon, Microsoft and Google

- Inter- and Multicloud Analytics: Optimize Amazon Redshift, Google BigQuery and Snowflake for Power BI

Planned Research

- Solution criteria for analytics and BI platforms

Advanced Analytics and AI Architectures

An AI implementation requires orchestration of several components and services, including data, computation, algorithms, other AI models and cognitive services all integrated into a workflow to provide trustworthy business decisions. This needs a reliable architecture that meets the organization's scale, performance, modularity and extensibility requirements. This topic includes research that provides guidance on best practices and capabilities required for such implementations.

Questions Your Peers Are Asking

- What are the key capabilities required for an AI platform?

- How do I design and implement AI architectures?

- What are the best practices to develop and implement a robust AI (ML, NLT, CV) model?

Recommended Content

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- A Guidance Framework for Deploying Data and Analytics in the Cloud

- Comparing Platforms and Capabilities for Data Science and AI

Planned Research

- Data strategy for machine learning

- Reference architecture for machine learning

- Sustain production-ready machine learning with monitoring

- Machine learning deployment patterns

- Guidance framework for operationalization of machine learning models

- Demystifying XOps

AI Core Technologies, Skills and Governance

AI core technologies support AI-based systems, including ML, deep learning, NLT and CV. Hence, the assessment of toolkits, frameworks, libraries, architectures, infrastructures as well as the skills required to implement them become critical to leverage AI. Gartner research assesses new technologies and operationalization frameworks in AI. This will augment research on upskilling technology teams to support future AI architectures and implement the right governance frameworks for responsible AI.

Questions Your Peers Are Asking

- What are the most promising techniques, toolkits and methods that are emerging in AI?

- How do I build teams and essential skills for advanced analytics and AI initiatives?

- What are the best practices for implementing a governance framework for AI?

Recommended Content

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- Emerging Use Cases for Natural Language Technology

- Improve Computer Vision Use Cases With Standardized Implementation Patterns

- Incorporate Explainability and Fairness Within the AI Platform

- Roles and Skills to Support Advanced Analytics and AI Initiatives

- Video: Why Is Responsible AI Important for Data and Analytics Professionals?

Planned Research

- Technical professionals' role in a COE for AI governance

- Integration and assessment of feature stores

- Assessment of generative AI

- Use of AI-generated synthetic data for privacy and data gaps

- How to securely design and operate machine learning

- Graph machine learning: what, why and how

AI Solution Implementation

Organizations are increasingly expanding AI solutions to include time-series data, documents, conversations, images and videos beyond the initial focus on structured data. Solutions include a combination of user-friendly products and services, and in-house developed solutions using ML, NLT and CV algorithms. However, organizations are challenged with identifying and assessing the various techniques, algorithms and products to implement such solutions.

We include in this topic guidance on selecting AI tools and platforms as part of identifying the right combination of capabilities for building advanced analytics and AI solutions.

Questions Your Peers Are Asking

- How do I assess and select AI technologies and platforms?

- What are the best practices to optimize AI solutions?

- What are the common AI use cases?

Recommended Content

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- Overcoming Data Quality Risks When Using Semistructured and Unstructured Data for AI/ML Models

- Solution Criteria for Enterprise Conversational AI Platforms

- Solution Comparison for Cloud Data Science and Machine Learning Platforms

Planned Research

- Solution criteria for data science and machine learning platforms

- Anomaly detection — use cases and algorithms

- Testing of machine learning models

- Assessment of machine learning training engines

- Text analytics — what, why and how

- Leveraging NLT to identify insights from documents

Suggested First Steps

- Solution Path for Building a Holistic Data Management and Analytics Architecture

- Solution Path for Building Modern Analytics and BI Architectures

- 2023 Planning Guide for Analytics and Artificial Intelligence

- Machine Learning Playbook for Data and Analytics Professionals

- Gartner Data and Analytics Summits

Essential Reading

- A Guidance Framework for Deploying Data and Analytics in the Cloud

- 2023 Planning Guide for Data Management

- Data Engineering Essentials, Patterns and Best Practices

- Working With Semistructured and Unstructured Datasets

- Building a Comprehensive Governance Framework for Data and Analytics

- Building an Analytics and AI Architecture Using Amazon Web Services

- Building an Analytics and AI Architecture Using Microsoft Azure

- Building an Analytics and AI Architecture Using Google Cloud Platform

Evidence

Gartner clients shared with us how various technical professional teams build data and analytics platforms with internal and customer-focused AI features. This initiative has emerged from the detailed thematic analysis of the source client interaction base over the past two years, overlaid with demand identified from analysis through primary and secondary research carried out during the past year. In addition, we included insights and strategic planning assumptions from our analyst team about where the market and industry is headed.

Document Revision History

Analytics and Artificial Intelligence for Technical Professionals Primer for 2022 - 4 February 2022

Analytics and Artificial Intelligence for Technical Professionals Primer for 2021 - 4 February 2021

Business Analytics and Artificial Intelligence for Technical Professionals Primer for 2020 - 24 January 2020

Analytics and BI Solutions for Technical Professionals Primer for 2019 - 5 February 2019

Analytics and BI Solutions for Technical Professionals Primer for 2019 - 5 February 2019

Related Priorities

Initiative Name	Description
Data Management Solutions (Tech Professionals)	This initiative helps organizations identify innovative approaches and practices, technology assessments, architectures, methodologies, and deployments for modernizing their data management solutions.

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