Market Definitions and Methodology: Software

Published 24 October 2023 - ID G00794034 - 136 min read

By Analyst(s): Arunasree Cheparthi, Yanna Dharmasthira, Lisa Unden-Farboud, Laurie Wurster, Daniel O'Connell, Fabrizio Biscotti, Chris Pang, Craig Roth, Jim Hare, Alys Woodward, Julian Poulter, Brandon Medford, Balaji Abbabatulla, Eric Hunter, Sharat Menon, Chandra Mukhyala, Kevin Quinn, Robin Schumacher, Roland Johnson, Radu Miclaus, Nicholas Carter, Amarendra ., Varsha Mehta, Tarun Rohilla, Alexandre Oddos, Kelli Smith, John Harrell

Initiatives: Technology Market Essentials

> Gartner publishes comprehensive market trends, market share statistics and forecast statistics by major software markets and subsegments. Read this report to gain a better understanding of our terminology and definitions.

Additional Perspectives

- Update: Gartner to Revise Software Market Segmentation
  (22 November 2023)

What You Need to Know

Gartner publishes comprehensive market trends, market share statistics and forecast statistics by software market. The foundation for all software research is based on consistent nomenclature and classification. Primary survey data and vendor revenue are captured based on Gartner-defined software market segmentation.

This report is intended to be used in conjunction with Gartner's software research, including market statistics documents (Market Share: All Software Markets, Worldwide, 2022, which is updated annually, and forecast statistics documents for enterprise software markets, which are updated quarterly). A description of the methodology used to develop this data is included here.

The purpose of this guide is to enable readers of Gartner's enterprise software research to understand the methodology and definitions used to arrive at this forecast and market share data.

Any modifications to our market share and forecast segmentation and/or definitions are published as Update notes for the relevant Market Definitions and Methodology documents in the fourth quarter. Typically, these modifications are then applied in quarterly and annual Market Share publications, publishing in the second quarter, and subsequent Forecast publications.

Introduction

Gartner defines software as a general term for the various kinds of programs used to operate computers and related devices. Software is divided into:

- Application software (programs that end users work in directly)
- Infrastructure or system software, which allows someone to build, run and manage systems and includes any program that supports application software

Gartner's software research covers key areas of the enterprise application and infrastructure software markets worldwide. Although some of our research encompasses the entire horizontal enterprise software industry, the majority of research is done at the segment level. We break the software industry into logical segments, which enables in-depth and segment-specific research. Gartner's software taxonomy can be found in the High-Level Definitions and Segmentation section of this document. These definitions are revised, altered or expanded each year to reflect changes in software technologies and the software marketplace.

Within each of these segments, research documents produced will include some or all of the following:

- Competitive Landscapes
- Market Impacts
- Market Forecasts
- Forecast Analyses
- Market Size and Vendor Market Share
- Market Share Analyses
- Market Trends

- Survey Analyses

Our research covers software vendors worldwide by selected software categories as defined in the High-Level Definitions and Segmentation section of this document. Based on this research, the Gartner Software team develops, maintains and publishes information on software supply by vendor, revenue, region and software segment. Gartner Software defines a software vendor as a company that provides commercial repeatable software (functionality) to clients either directly or indirectly, via purchasing (software licensing) or rental (cloud hosting, application service provider, subscription or outsourcing).

Notable Changes

Effective April 2023, Gartner has made the following changes to its annual software market share and segmentation:

- **Enterprise Resource Planning (ERP):** The Manufacturing and Operations subsegment (Level 4) is split in two:
  - Core Manufacturing and Operations Management is part of the ERP market at subsegment level.
  - Manufacturing and Operations Management is part of the supply chain management (SCM) market at subsegment level.

- **Supply Chain Management (SCM):** A new subsegment, Manufacturing and Operations Management, is added alongside the existing and unchanged three SCM subsegments of Procurement, Supply Chain Execution, and Supply Chain Planning.

- **Analytic Platforms:** The subsegment ABI Custom Applications is redefined and renamed to Analytic Platform Domain Offerings.

- **Customer Experience and Relationship Management (CRM):** Of the five subsegments published within CRM, two changed with the introduction of new categories:
  - Cross-CRM: A new category of Customer Communication Management (CCM) is added. CCM was part of the Other Application Software market and is being tracked separately from 2Q23.
  - Marketing: A new category, Event Technology Platforms (ETP), is added. ETP was part of Multichannel Marketing and is being tracked separately from 2Q23.
- **Application Infrastructure and Middleware (AIM):** The subsegment Business Process Management Suites is redefined and renamed to Business Process Automation.

- **IT Operations Management (ITOM):**
  - Delivery Automation (DA): Gartner added two new categories and renamed one category:
    - Added Digital Employee Experience (DEX) and Digital Platform Conductors (DPCs) to increase granularity.
    - Changed the name of the DevOps Value Stream Delivery Platforms category to Value Stream Delivery Platforms.
    - Moved the DevOps Value Stream Management Platforms category to the Application Development (AD) market within the Plan subsegment and changed the name to Value Stream Management Platforms.
  - Health and Performance Analysis (HPA):
    - The Application Performance Monitoring (APM) category is renamed to Application Performance Monitoring and Observability (APM&O).
    - The Artificial Intelligence for Operations (AIOps) category is renamed to Artificial Intelligence for IT Operations (AIOps) Platforms.
  - Value Management:
    - The IT Service Management category is renamed to IT Service Management Platforms.

- **Application Development (AD):**
  - AD Mainframe Tools: Gartner is providing a more granular view by aligning detail for the following categories:
    - LODE Products (Proprietary Mainframe, Mini- and Midrange)
    - Software Change and Configuration Management Products (Mainframe)
    - Testing Products (Mainframe)
    - Other AD Mainframe Tools
  - Plan: Providing a more granular view of Plan tools by aligning detail for the following categories:
    - Enterprise Agile Planning Tools
    - Requirements Definition and Management Tools
    - Value Stream Management Platforms
    - Other Plan Tools
  - The Value Stream Management Platforms category is moved to Plan from the Delivery Automation subsegment of IT Operations Management.
  - Verify: A more granular view would be available for the following categories:
    - API Testing Tools
    - Test Automation Tools
    - Performance Testing Tools
    - Test Management Tools
    - Other Testing Tools

    - Create: A more granular view will be provided by aligning detail for the following categories:
        - Code Tools
        - Build Tools
        - Other Create Tools

- **Data Management Software (DMS):**
    - Other Data Integration Software: The subsegment is renamed to Other Data Management Software.

In addition to the above changes, additional changes listed below have been made to the software Forecast and associated reports starting June 2023:

- **Security Software:** The information security methodology is aligned to the software methodology for the security software segment to provide a consistent view across the markets. This change is to align our end-user spending (EUS) estimates for security software with our reporting of EUS in all other software segments (for more details, refer to Update: Gartner to Update Its Security- and Risk-Management-Related Estimation Process).

- **Networking Software:** The networking software methodology is aligned to the software methodology to provide a consistent view across related publications. Therefore, the networking software segments will not factor channel markups. For more details, refer to Market Definitions and Methodology: Enterprise Network Equipment.

Market Methodology

This document describes the methodology and segmentation applied to the software market. For Gartner's high-level Forecast and Market Share methodology, see How Gartner Forecasts a Market and How Gartner Estimates Market Share.

The following section describes the research metrics that Gartner uses for reporting vendor revenue, market size, market share and forecasts. Not all these metrics are used by every software market or by every software segment. Some may have more of these metrics, and some may have fewer.

Total Software Revenue

To produce the software Market Share reports, Gartner collects estimates and classifies IT vendors' total software revenue. Professional services, training, certification, consulting and hardware revenues are not included in total software revenue. (Note: Other IT services revenue, such as consulting, system integration and IT outsourcing revenue, is analyzed in Gartner's IT services research. For more information about the Gartner IT services methodology, see Market Definitions and Methodology: IT Services).

Tracking total software revenue allows us to capture the impact of increasingly popular software business and consumption models, such as subscription (notably cloud and commercial open-source software).

Understanding Components of Recognized Revenue

Most software companies have the following main components of revenue:

- Perpetual license (may include upgrades)
- Software support (maintenance)
- Subscription (excluding cloud)
- Cloud subscription

Licenses (Including Upgrades)

Types of licenses include the following (also see Table 1):

- **Perpetual** — With a perpetual license, customers pay an initial upfront fee for the new license, and they have the right to use that software in perpetuity. However, this does not give customers the right to update to new functionality, new versions or technical support without an additional fee. For that, they must sign an update or maintenance contract (or buy the update one-off, if available that way). This type of license makes up the majority of software licenses sold.

- **Term** — A term license is when customers pay the initial fee for the new license, and they have the right to use that software for a contractually established term. The fee is paid in a lump sum upfront or over a certain period. Once that term is over, customers must again pay for a new term license. Prices probably will have changed since the initial purchase because of the availability of newer versions or price degradation. Customers also generally have a maintenance contract of the same duration as the term license contract. Gartner always clarifies in the vendor interview process whether updates are included directly in the term license. (If they are, this vendor is actually using a subscription license model as defined by Gartner.) True term license revenue (not including updates) is counted by Gartner as new license revenue. (Some vendors call their term licenses “lease licenses” or “rental licenses.”)

- **Appliance** — An appliance is a preconfigured bundle of hardware and software integrated at the factory, created for a specific purpose, and typically packaged with services at the time of sale.

- **Open source** — An open-source license is a type of license that allows the source code, blueprint or design to be used, modified and/or shared under defined terms and conditions. This allows end users and commercial companies to use and modify the source code for their own needs. Open-source licensed software is mostly available free of charge, although this does not necessarily have to be the case. Licenses that permit only noncommercial redistribution or modification of the source code for personal use only are generally not considered open-source licenses.

Table 1: License-Type Matrix

	Length of Term	Include Updates?
Perpetual	Forever	No
Term	Term	No
Appliance	Forever	Varies
Open Source	Forever	Varies
Note: If the vendor's licensing model, managerial accounting and investor reporting practices do not match up to Gartner's definitions, then additional adjustments may need to be made to estimate the software and hardware revenue according to those definitions. To better serve clients, Gartner is constantly seeking to provide the best and most current software industry analysis possible. As vendors modify and evolve licensing and pricing models to achieve a competitive edge, Gartner reviews and revises its models and rules to keep up with industry practices.		

Source: Gartner (October 2023)

Software Support (Maintenance)

This comprises revenue generated from providing software support services and updates. This mainly comprises maintenance software revenue resulting from work such as bug fixes, as well as technical support fees.

Subscription (Excluding Cloud)

A subscription license is when the customer pays for the right to use the software developed by the vendor for a contractually specified time. This is similar to a term license. However, unlike the term license, customers also have the right to subsequent updated versions of the software, as well as a certain amount of technical support.

Cloud Subscription

In this scenario, the customer buys and runs the subscription in-house or in a public or private cloud environment of the customer's choice. It provides the flexibility to run the software wherever the customer chooses.

Alternatively, the customer buys the subscription (commonly referred to as SaaS or platform as a service [PaaS]) that is hosted by the same software vendor, either in a private or public cloud. In the SaaS or PaaS model, the software company generally makes no tangible software product available to its users, and the product itself is available only as a hosted platform by the software vendor.

Market Share and Market Sizing Methodology

Annually, Gartner analysts review the lists of vendors and the segments that will be researched. This review allows for vendors to be added or removed, and for any adjustments that need to be made for new entrants, mergers and acquisitions, and regional expansion. The same is true for product categories as emerging segments are added or outdated segments are removed from the research agenda.

Gartner's vendor market share methodology combines publicly available information, primary and secondary research sources, and data unique to Gartner as the quantitative foundation of software market statistics reports. In addition, tracked vendors are surveyed and interviewed by Gartner analysts in the following regions — Asia/Pacific, Europe, Japan, Latin America, the Middle East and Africa, and North America (the U.S. and Canada). Market share is further informed by Gartner's established, extensive statistics on current and past computing and telecommunications spending, research on IT metrics, end-user survey data, Gartner.com search analytics, and local analyst expertise.

Other sources of data used by Gartner include but are not limited to:

- The more than 100,000 end-user inquiries that Gartner receives each year
- Interviews with the channel, including manufacturers, distributors and resellers
- Information published by major industry participants
- Estimates made by reliable industry spokespersons
- Government or trade association data
- Published product literature and price lists
- Relevant economic data
- Articles in the general and trade press
- Published company financial reports

- Reports from financial analysts
- Information and data from online data banks and content aggregators
- Demand-side (end-user) surveys

Particularly significant sources of information are those published by vendors to the U.S. Securities and Exchange Commission (SEC) and to similar non-U.S. government agencies. The data is used by Gartner to prevent “double counting” revenue in more than one segment. Information filed with government agencies is used to cross-reference analyst estimates, and is the final check as separate segment and market estimates are rolled up.

Gartner undertakes defined processes to ensure its market share data is as accurate and meaningful as possible. However, careful attention must be paid to market definitions as companies, government agencies and trade associations may use slightly different definitions of product categories and regional groupings, or they may include different business entities in their summaries. These differences should be kept in mind when making comparisons between data provided by Gartner and data provided by other research organizations or by the vendors themselves. In Gartner’s research, vendor revenue reflects Gartner’s estimates in all cases.

Accounting Standards and Revenue Recognition

Compared to 10 years ago, today’s software vendors offer a much wider variety of contract terms and conditions, as well as pricing, billing and payment models. Sometimes, it is the customer that is demanding variations from a “standard” contract. Other times, it is the vendor that is adjusting the terms and conditions to make the customer “sticky” (less likely to switch suppliers) or to smooth the vendor’s revenue recognition on its income statement.

Gartner anchors its published vendor market revenue estimates for publicly traded companies to the revenue numbers reported in the vendor’s SEC filings or the international equivalent. We assume that the vendors are following generally accepted accounting principles (GAAP) and Financial Accounting Standards Board (FASB) or IFRS Foundation guidelines for how and when to recognize software contract revenue.

In accordance with these guidelines, if a software vendor contract contains contingencies, all or part of the revenue must be deferred until the contingencies are removed and "delivery" is thereby completed. As a result of this revenue deferral, in any particular quarter, a software vendor's revenue will be made up of revenue not only from current-quarter sales closing activity, but also from billing previous quarters' activity. For example, the value of a newly closed maintenance contract is always posted as a liability to the balance sheet and only later recognized as revenue on the income statement. Depending on the terms and conditions of a particular contract, software license revenue might be recognized over many quarters as well, rather than in the quarter the sales activity was closed. Some types of software license contracts may result in gradual recognition of software license revenue by the vendor rather than a big lump in a single quarter. These are popularly called term, lease, rental or subscription (including SaaS and PaaS) licenses.

Abstract Components Versus Real-World Complexity

The SEC and the International Accounting Standards Board have a lot to say about when elements of contracts for software products and service revenue can or must be recognized on the income statement as revenue. However, these regulatory bodies do not require that public companies decompose revenue into product or brand line items, such as license, maintenance or consulting.

Software vendors that choose to decompose their revenue for public reporting purposes do not use consistent terminology among themselves. Terms such as "product," "license," "new license," "update license," "maintenance," "technical support" and "services" are used differently by different vendors in publicly filed reports. Regulatory authorities do not dictate what words such as "license," "maintenance," "updates" and "support" mean in a public report. In fact, these words are used at the vendor's discretion. Practice varies widely as the vendor decides how to describe its business to its investor community and how much it wants to disclose without giving competitors an edge.

As a result, Gartner analysts carefully analyze and review software vendor public statements and filings to understand and rationalize the different usage of terminology and reporting practices between vendors.

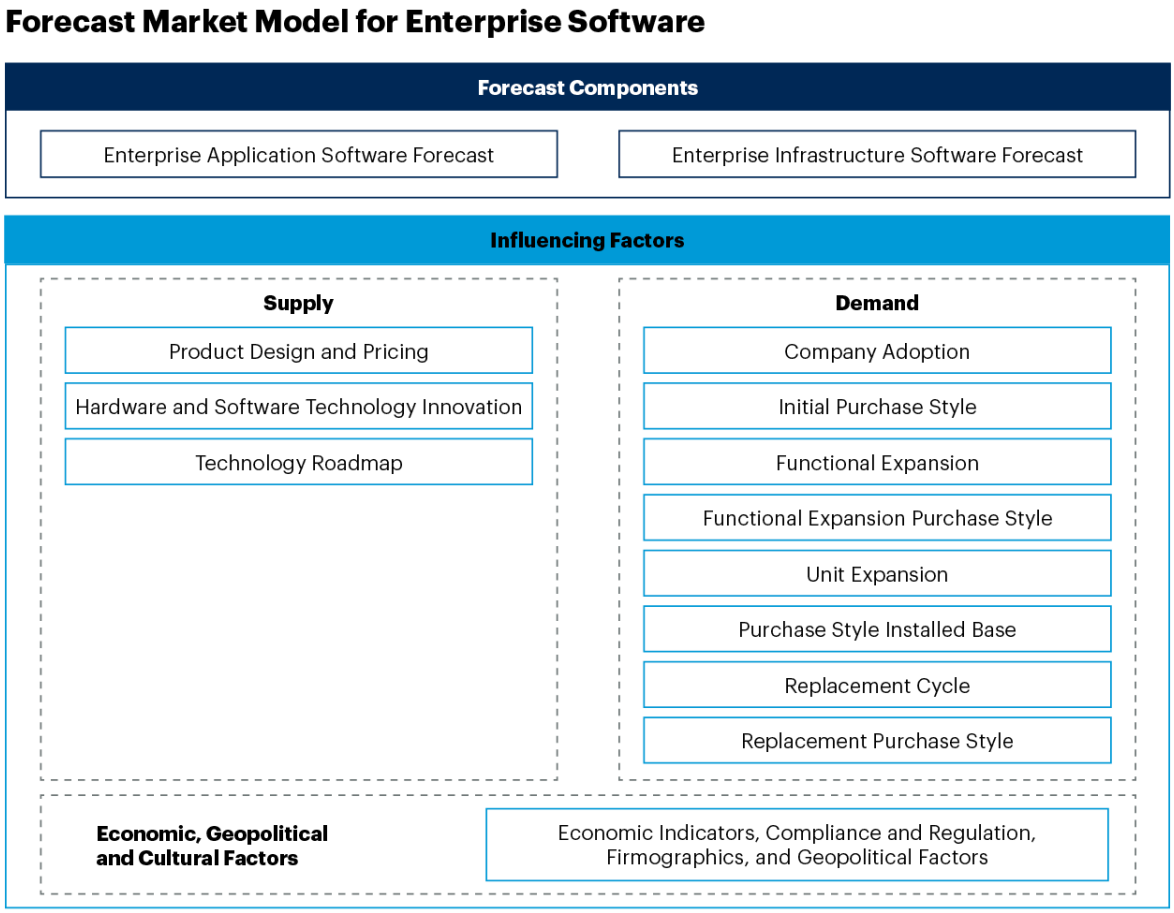
Handling Mergers and Acquisitions

Gartner's software methodology states that, when a merger or acquisition occurs, historical market share data will remain unchanged. Revenue for the merged or acquired entities will be attributed to the new merged entity or acquiring company only from the quarter in which the merger or acquisition closes.

Forecast Market Model

Figure 1 illustrates the market model for the enterprise software forecast, showing how it is based on forecast components and influencing factors.

Figure 1: Forecast Market Model for Enterprise Software



Source: Gartner
764454_C

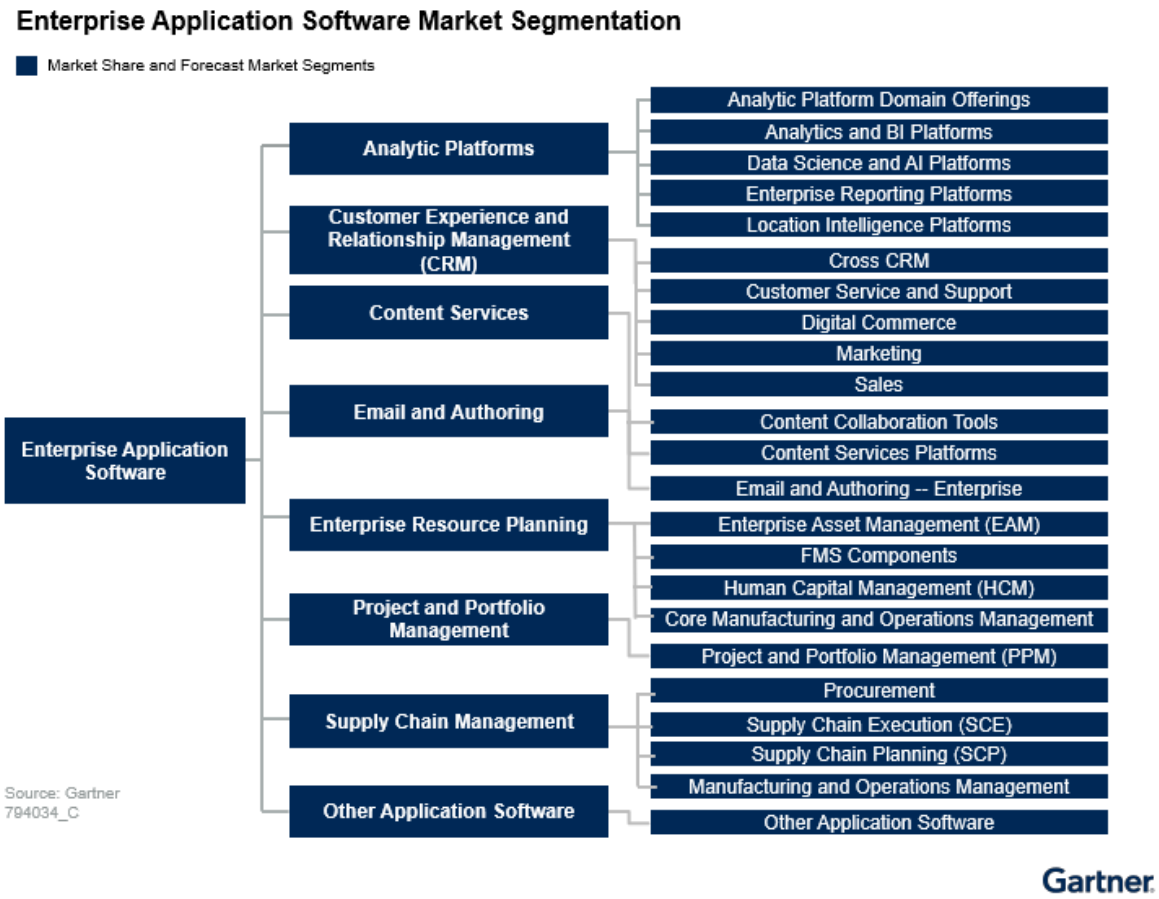
Gartner

High-Level Definitions and Segmentation

Enterprise Application Software Definitions

The focus for application software is to increase the performance of business or personal resources. It enables users to leverage the power of computers toward achievement of their business, professional or personal objectives or goals (see Figure 2).

Figure 2: Enterprise Application Software Market Segmentation



Analytic Platforms

Market Analysts: Alys Woodward, Jim Hare, Eric Hunter, Radu Miclaus and Kevin Quinn

"Analytic platforms" is an umbrella term that includes the applications, tools and best practices that enable access to and analysis of information to improve and optimize decisions and business performance. Analytic platforms include the five market categories as shown in Table 2.

Table 2: Analytic Platforms Market Overview

Analytic Platforms ↓			
BI Platforms	Data Science and AI Platforms	Location Intelligence Platforms	Analytic Platform Domain Offerings
■ Analytics and BI Platforms ■ Enterprise Reporting Platforms			

ABI = analytics and business intelligence; AI = artificial intelligence; BI = business intelligence

Source: Gartner (October 2023)

BI Platforms

Back to top

BI platforms provide the infrastructure and tools to enable users to build applications that facilitate decision making and help organizations learn, understand and improve their business. Gartner defines a BI platform as a software platform that delivers more than one-third of the following capabilities under three overarching categories of functionality: information delivery, analysis and integration. These categories are discussed fully within the following sections. Gartner segments BI platforms to distinguish between two types: analytics and BI platforms and enterprise reporting platforms.

Analytics and BI Platforms

Back to top

ABI platforms allow users to connect to structured and unstructured data across various types of on-premises and cloud-based storage and/or data management platforms. ABI platforms support a decentralized yet governed data discovery approach to BI that is approachable by IT and business users. Self-service is central to these platforms and enables visual data discovery, augmented data discovery, search-based data discovery and data preparation capabilities. The overall development/delivery control and governance is lighter than that associated with enterprise reporting platforms.

For more information, see Magic Quadrant for Analytics and Business Intelligence Platforms.

Enterprise Reporting Platforms

Back to top

Enterprise reporting platforms support the development of IT-produced analytic content that requires specialized tools and skills for systems of records. Significant upfront data modeling via a predefined metadata layer is required to access their analytic capabilities. These platforms are used by both IT and business analysts for creating enterprise reporting and dashboards with additional use cases supporting ad hoc reports/queries, office suite integration and mobile BI.

Data Science and AI Platforms

Back to top

Data science and AI platforms reach across cloud AI developer services and data science and machine learning (ML) platforms. They support the development, operations and life cycle management of predictive models, pipelines, and workflows as well as integration into business processes and applications. The primary users are either data scientists (who use them to build and manage models), citizen data scientists (using workflows or augmented analytics to combine/refine models), or software developers (working on application-resident AI or ML).

Location Intelligence Platforms

Back to top

Location intelligence platforms enable access to and the utilization of geospatial and location data associated with people, objects or landmarks, along with information for location-referenced analysis. These include both geographic information systems and general location intelligence platforms. Capabilities focus specifically on solutions designed to import, analyze, render, present, and manage location and spatial information — excluding specialized storage, database platforms and location/address standardization services (such as a coding accuracy support system [CASS]).

Analytic Platform Domain Offerings

Back to top

Analytic platform domain offerings are packaged domain-specific offerings (vertical or horizontal) that address a particular business problem. They incorporate domain expertise and best practices and can include a user interface (UI) suitable for casual users, predefined integration with standard business process applications, issue-specific data models, and best-practice templates or wizards. These are used by both IT and business analysts as stand-alone solutions (and not embedded as part of a wider enterprise application). These offerings are generally built by leveraging technology represented in one of the other analytic platform segments (e.g., analytics and business intelligence, data science and AI).

Customer Experience and Relationship Management

Market Analysts: Julian Poulter, Alexandre Oddos, Yanna Dharmasthira and Roland Johnson

Customer experience and relationship management (CRM) is a business strategy and collection of technology solutions which optimizes the lifetime value and the relationship with the customer by organizing personalized treatments around customer segments, generating and nurturing prospect and customer engagement behaviors, enabling internal and customer-centric processes and providing digital commerce capabilities. Most enterprises have a CRM strategy, and the majority use software to help achieve this strategy. CRM applications are categorized into five markets: cross-CRM, customer service and support, digital commerce, marketing, and sales.

For an introduction and guide to the breadth of CRM software and Gartner's coverage, see CRM Application Functionality Taxonomy Propeller and The Elusive CRM Magic Quadrant.

See Table 3 for the CRM market taxonomy.

Table 3: Customer Experience and Relationship Management Market Overview

(Enlarged table in Appendix)

Customer Experience and Relationship Management ↓				
Cross-CRM	Customer Service and Support	Digital Commerce	Marketing	Sales
■ Customer Data Platforms ■ Voice of the Customer ■ Personalization ■ Customer Communication Management	■ Digital Customer Service ■ Customer Engagement Center ■ CCaaS and CCI ■ Workforce Engagement Management ■ Field Service Management	■ Digital Commerce Platforms ■ Digital Commerce Search ■ Marketplace Operation Applications	■ B2B Marketing Automation ■ Account-Based Marketing ■ Multichannel Marketing ■ Digital Ad Tech ■ Loyalty Management ■ Digital Asset Management ■ Event Technology Platforms	■ Sales Force Automation ■ Sales Engagement ■ Partner Relationship Management ■ Sales Enablement ■ Configure, Price and Quote ■ Price Optimization ■ Sales Performance Management ■ Customer Success
CCaaS = contact center as a service; CCI = contact center infrastructure				

Source: Gartner (October 2023)

Cross-CRM

Back to top

Cross-CRM solutions embody technologies across the multiple CRM markets of sales, service, marketing and commerce to help companies improve customer experience (CX). The technologies include the following:

- Customer data platforms unify disparate customer data to provide a 360-degree view to optimize the timing and targeting of messages and offers.
- Voice of the customer integrates feedback collection, analysis, distribution, and action into a single interconnected platform.
- Personalization enables marketing teams to tailor and deliver messages, content or experience to support digital commerce, marketing activities and support services.

Customer Data Platforms

Back to top

A customer data platform (CDP) is a system that unifies a company's customer data from all parts of CRM and external systems across channels to provide sellers with a 360-degree view of the customer, as well as optimize the timing and targeting of messages and offers.

Marketers and other CRM users are using a variety of systems to design, orchestrate and measure multichannel customer engagement. Many of those systems also manage customer-level data and audiences for targeting, thus causing a proliferation of overlapping and disparate data silos. CDPs promise to solve this by centralizing data collection, unifying customer profiles from disparate sources, creating and managing segments, and then activating those segments in priority channels. The CDP is not necessarily a substitute for an enterprise's database of record or master data, but it can effectively ensure that customer profile data, transactional events and analytic attributes are available to CRM and other systems and users when needed for real-time interactions.

The market is composed of a disparate group of vendors that share a vision for helping marketers better activate their first-party data to enable more personalized, real-time marketing. Much of the functionality core to the CDP is not new — data integration, identity management, segmentation and activation are familiar features to marketers. Those features already exist across a variety of tools in their stack. Rather, it is the packaging, marketing and productization of these features, and the optimization for real-time use cases, that compels mainly marketers to investigate how this new technology could produce returns for them.

See Market Guide for Customer Data Platforms.

Voice of the Customer

Back to top

A comprehensive voice of the customer (VoC) solution integrates feedback collection, analysis, distribution and action into a single interconnected platform to help you understand and improve customer experience (CX). Feedback sources expand beyond direct surveying to include other, more indirect and inferred feedback sources.

For a solution to be considered a VoC application, it must meet three important criteria:

- **Channels:** Collect customer feedback through multiple channels, such as email, websites, paper, text messaging, voice, a mobile app, in-app, kiosks and computer-assisted telephone interviewing (CATI).

- **Data:** Collect and analyze all three types of VoC data:
  - **Direct feedback —** Feedback that consumers intend to provide directly to the organization, when either asked to do so or motivated by their experience. Typically takes the form of a survey, a complaint, market or user research, or a forum/panel.
  - **Indirect feedback —** Feedback derived from instances where the customer is speaking about an organization without specifically intending to furnish feedback to the organization. Includes collecting insight from review sites, social networks and customer care interactions via phone, email and chat sessions.
  - **Inferred feedback —** Operational and transactional data associated with a CX or customer journey, such as a website's clickstream data, commerce purchase history, mobile app location data or contact center operational data.

- **Insight:** Provide tools that convert customer feedback into actionable insight, such as dashboards, alerts, customer journey maps, workflow for service recovery, and capabilities to predict and prescribe relevant actions.

Personalization

Back to top

Personalization enables marketing teams to tailor and deliver the right message, content or experience to support marketing activities, digital commerce, and service and support:

- **Marketing:** Delivering the right message to the right audience and in the right context to maximize marketing and advertising performance
- **Digital commerce:** Tailoring content, offers, recommendations and experiences across digital sales channels
- **Service and support:** Customizing online and offline experiences across business functions to reduce customer effort or increase customer satisfaction and advocacy.

Customer Communication Management

Back to top

Customer communication management (CCM) technology supports the process of personalizing and distributing transactional and regulated communications from enterprises to their customers and business partners. It is a cross-functional component of a customer experience (CX) technology platform designed to support sales, marketing, customer support and commerce.

Customer Service and Support

Back to top

Customer service and support solutions help organizations deliver consistent, effortless, intelligent and personalized customer service to their customers. The four pillars of great customer service include these attributes: getting connected, process orchestration, resource management, analytics and insights. These four pillars have traditionally represented discrete areas of investment by different business stakeholders; however, the market is shifting in the direction of having more alignment between them. CSS is delivered as cloud and on-premises. CSS includes digital customer service, customer engagement centers (CECs), CCI and CCaaS, workforce engagement management, and field service management.

Digital Customer Service — Process Orchestration

Back to top

Gartner defines the digital customer service market as consisting of software applications that enable CSS to engage customers through their preferred digital communication channels, allowing for the management of persistent dialogues and communications.

A digital customer service solution is built around conversation orchestration and the availability of continuous intelligence. Continuous intelligence is used to enrich customer service interactions within the solution itself or through integration with other systems (such as CRM customer engagement center [CEC], business process management [BPM] and ERP).

Vendors in this market come from various technology origins. They have evolved to support an increasingly diverse set of digital customer interaction types — such as chat, chatbots, messaging, social media and outbound alerts (or push notifications).

Customer Engagement Center — Process Orchestration

Back to top

The orchestration of intelligent customer service processes through a CEC application is built around a case management record and process. Workflow is an important CEC component, in terms of an organization being able to orchestrate the processing of customer engagements for the best outcomes in an effortless, effective and timely way. In addition to case and workflow management, knowledge — and management — of how to enrich and personalize customer engagements is crucial.

AI may be integrated into the workflows, such as recommending solutions to agents or autonomous chatbots.

CCaaS and CCI — Getting Connected

Back to top

The core capability of a CCaaS solution is:

> **Getting connected — Focusing on delivering a channel-agnostic, architected design to create customer service journeys, including intelligent self-service. Services are consumed on a per-seat, per-concurrent-user or transaction basis.**

CCaaS solutions are used by customer service and telemarketing centers, employee service and support centers, help desk service centers, and other types of structured communications operations. CCaaS solutions are typically deployed as an integral part of a broader CSS technology ecosystem, to provide the unified communications and workflows required of call center operations.

The CCI market covers solutions that include the equipment, software and services that enables customer service organizations to manage multichannel customer interactions holistically (using self-service and assisted-service) from a CX and an employee-engagement perspective.

Central to the definition of CCI is that the solutions are dedicated to supporting a single customer or tenant on each instance of the system, even if that customer/tenant supports multiple contact center operations on that dedicated instance. CCI solutions are used by customer service and telemarketing centers, employee service and support centers, help desk service centers, and other types of structured communications operations.

See Magic Quadrant for Contact Center as a Service and Market Guide for Contact Center Infrastructure.

Workforce Engagement Management — Resource Management

Back to top

Workforce engagement management (WEM) solutions expand on the already mature workforce optimization (WFO) market by also accommodating technologies that help drive employee engagement within the customer engagement center.

The emphasis in this market during the past decade has primarily been to help improve the operational performance of the contact center. Key functional domains facilitate the recording and assessment of employee performance, combined with the ability to forecast and schedule staffing levels to ensure operational service-level targets are met. Its core value proposition arises from the tight integration and workflow across these various functional domains.

This need to be operationally "well run" is still an important consideration and is at the heart of a WEM solution. Yet various key market shifts have occurred since the inception of WFO that now need to be factored in. Each of these factors requires much more emphasis to be placed on the employee.

Field Service Management — Process Orchestration

Back to top

Field service management (FSM) is a discrete market within the broader CSS software market and is used by field service providers (FSPs). They typically dispatch technicians to remote locations to provide installation, repair or maintenance services for equipment or systems. They may manage, maintain and monitor these assets under a predefined service or maintenance contract. FSM applications provide capabilities to:

- **Manage demand:** They handle the receipt of work requests from external sources, such as customers (through multiple channels), Internet of Things (IoT) connections and service-brokering networks. They also import work requests from internal systems such as ticketing, maintenance, repair and operations (MRO), product life cycle management, long-cycle project management and enterprise asset management systems.

- **Plan work:** They offer skills-based workload balancing, forecasting of shift requirements, schedule optimization, and routing for short- and long-cycle work requests. They also offer SLAs and cost prioritization, parts demand planning and purchasing, contracted or contingent third-party service provider management, customer approval coordination, and GIS-based planning.

- **Inform and enable technicians:** They do this via apps on mobile and wearable devices for GPS tracking, telematics, equipment work history, service collaboration, customer communication, knowledge management integration and work instruction management, inspections, safety forms, parts sourcing, and customer quoting. Organizations provide remote expert guidance for technicians and customers in the field through multiexperience service support channels such as remote video and augmented reality (AR)-based communications systems, IoT visualizations and chatbots.

- **Debrief work orders:** They enable online or offline mobile collection of time and parts used, tasks completed, updates to equipment records, site evidence, customer recommendations, signoffs, approvals for additional work and satisfaction surveys.

- **Perform analysis and support integration:** They do this using field service performance management reports and dashboards, predictive analytics, alerts and notifications, and APIs.

Digital Commerce

Back to top

Digital commerce enables consumers and businesses to purchase goods and services through an interactive and self-service experience. It includes the people, processes and technologies to execute the offering of development content, analytics, promotion, pricing, customer acquisition and retention, and customer experience at all touchpoints throughout the customer buying journey. Digital commerce is commonly delivered as either multitenant SaaS or single-tenant hosted applications but could also be offered for on-premises implementations in some circumstances.

Segments included are digital commerce platforms, digital commerce search and marketplace operation applications. Other digital commerce ecosystem applications, such as payment and marketing, are not included within the digital commerce definition.

Digital Commerce Platforms

Back to top

Digital commerce platforms are the core technology that enables customers to purchase goods and services through an interactive and self-service experience. The platform provides necessary information for customers to make their purchase decisions and uses rules and data to present fully priced orders for payment. The platform must have out-of-the-box (OOB) capability or the APIs to support a self-service, interactive commerce experience that includes storefront, product catalog navigation, product pages, shopping cart, check-out and customer account.

The commerce platform must support OOB ability to search for a product, add products to a cart, and fully price an order inclusive of product-level, customer-level, and order-level discounts or promotions. In some B2B scenarios, this may involve assistance from sales personnel. Additionally, the commerce platform must support interoperability with customer, product, content, and order functionality and data via APIs.

For more information on digital commerce platforms, see Magic Quadrant for Digital Commerce.

Digital Commerce Search

Back to top

Digital commerce search is defined as the use of search technology products to find relevant product(s) or service(s) for customers. These products also support the browse or catalog navigation journey, enabling end-to-end product discovery, the first step in the commerce customer journey.

Search results can be highly visual, using engaging layouts and multimedia. Content other than products also may be searched to engage, support decisions or inform. Search combines free text/voice and autocomplete with guided query and subsequent navigational options. Sophisticated product discovery solutions include merchandising capabilities, personalization, category and landing pages for SEO and promotions, semantic search technologies, and integrated personalization.

Marketplace Operation Applications

Back to top

Enterprise marketplaces are digital channels operated by B2B or B2C companies that invite third-party sellers to sell directly to end customers. Marketplace operation applications (MOAs) provide the technology to enable enterprise marketplaces by allowing marketplace operators to manage seller onboarding, product catalogs, order routing and management, and seller compliance with marketplace policies. Creating an enterprise marketplace is a different strategy than choosing to sell products on existing marketplaces such as Amazon and Alibaba Group. The technologies used to enable marketplace integration for selling on third-party marketplaces are not included in this definition. App marketplaces, such as those provided by software vendors, are also not covered in this definition.

For more information, see Market Guide for Marketplace Operation Applications.

Marketing

Back to top

CRM marketing helps organizations to deliver the right message to the right audience and in the right context to maximize marketing and advertising performance. The technologies that enable marketing often tailor content, offers, recommendations and experiences across digital sales channels and customize online and offline experiences across business functions to reduce customer effort or increase customer satisfaction and advocacy. The products that provide marketing teams the ability to achieve this include marketing automation systems, account-based marketing (ABM), multichannel marketing (MCM), digital and advertising technologies, loyalty management and digital asset management

B2B Marketing Automation

Back to top

Marketing automation systems help generate and manage leads originating from a variety of sources, including browser registration pages and campaigns, direct mail campaigns, email marketing, multichannel campaigns, database marketing and third-party leased lists, social media, and tradeshows. The leads are then subject to lead management processes that qualify, score, nurture, augment and prioritize leads that are identified and routed to direct, indirect or digital commerce sales channels for action and closure. Lead management integrates business processes and technology to close the loop between marketing and direct or indirect sales channels, and to drive higher-value opportunities through improved demand creation, nurturing and opportunity management.

A marketing automation system can be delivered as a stand-alone lead generation and management technology. But much more commonly, it is delivered as part of a toolset and overall CRM strategy. It is typically integrated with sales execution/sales force automation (SFA) downstream and also with account-based marketing (ABM) platforms.

For more information, see Magic Quadrant for B2B Marketing Automation Platforms.

Account-Based Marketing

Back to top

ABM is an approach to traditional lead management that pursues sales growth by driving broad-based account engagement through holistic sales and marketing efforts, rather than attributing leads to specific contacts and efforts. It typically uses intent data, lead scoring, personalized content and multiple channels including programmatic advertising to target and engage specific identified accounts and individuals across all stages of the buying process. It is used to target unknown buyers in the early stages of the buying process and then nurture the relationships and engagement. Rather than working with individual contacts and leads, ABM approaches will handle all the leads, contacts and opportunities within an account organization, which itself may be made up of many buying units (subsidiaries and sister companies). The ABM market is maturing but still attracting new entrants and there are now vendors that provide more complete solutions or platforms.

ABM could be seen as a subset of B2B marketing automation. There is convergence between these two markets, but it is sized separately in Gartner research.

For more information, see Magic Quadrant for Account-Based Marketing Platforms.

Multichannel Marketing

Back to top

The multichannel marketing (MCM) market comprises vendors that seek to orchestrate and optimize company communications and marketing offer processes, and then engage through both inbound and outbound channels to customer segments across multichannel environments. These include websites, mobile (push, SMS, websites), social, direct mail, call centers and email.

MCM campaign management includes functionality for audience management and segmentation, campaign creation, campaign workflow, campaign execution and activation with multiple channels, and analytics including attribution and customer journey analytics. Advanced execution functionality includes content management, event triggering and real-time decision making/offer management in inbound and outbound environments.

Digital capabilities include advertising management or integration with ad platforms, content marketing, mobile and social marketing, and web and email marketing. MCM extends the marketing process through channels such as the web, email, video, mobile and social applications, point-of-sale terminals, interactive TV, and digital signage and kiosks.

Mobile marketing platforms are also included in our definition.

Digital Advertising Technologies

Back to top

“Digital marketing” is a widely used term, and it would often cover aspects of marketing already defined, such as MCM hubs and lead management. In this taxonomy, we use this digital marketing category for any other class of marketing not already covered. Primarily, we refer to advertising technologies (ad tech).

Ad tech includes all technology that supports advertising activities, both digital and traditional (although most of it is digitally focused). “Programmatic” refers to the automation of buying and trafficking processes for audience-targeted ads. “Programmatic media” is defined as software services that automate, optimize and analyze the buying of slots for ad placement, often spanning multiple marketplaces. Programmatic originally focused on real-time bidding marketplaces (also known as ad exchanges). However, it has recently expanded to include models such as “programmatic direct,” which refers to the application of software to automate and optimize the placement of ads presold directly to advertisers by publishers at a human-negotiated price.

Key categories of digital and advertising tools include:

- **Data management platforms (DMPs)** — Software that ingests data from multiple sources (such as internal CRM systems and external data vendors) and makes it available to marketers to build segments and targets. This tool is essential to designing effective programmatic media campaigns (see How to Navigate the Data Management Platform Endgame).

- **Demand-side platforms (DSPs)** — Software that manages programmatic ad buying by monitoring and bidding on ad placement opportunities, usually based on available audience criteria. This is also an essential tool for executing programmatic media buys. DMPs and DSPs may be purchased together or separately.

- **Dynamic creative optimization (DCO)** — Software that selects and/or composes ads on the fly based on factors such as audience profile criteria, marketplace conditions and ambient circumstances (such as time of day and weather).

Loyalty Management

Back to top

Loyalty management is used to increase wallet share and retention among existing customers as well as attract new customers. Common loyalty marketing platforms help drive retention and acquisition of customers through loyalty cards, membership rewards, discount clubs, advocacy, promotions/offers, referrals and other tactics. These platforms may also enable general-purpose personalization through the construction of a unified customer profile and drive decisioning capabilities around targeted offers. Managed services play a significant role in large enterprises for technology deployment as well as ongoing loyalty operations such as program management and execution.

Digital Asset Management

Back to top

Digital asset management (DAM) technologies incorporate the planning, ingestion, creation, organization, storage, publication and distribution of all types of content used by an organization. Content includes anything used by an organization in communication with an internal or external audience, such as text, graphics, images, videos and audio. DAM can be sold as a hosted service, but most deployments are SaaS-licensed models.

Event Technology Platforms

Back to top

Event technology platform (ETP) market solutions enable marketers to plan, execute and measure virtual and in-person events and hybrid experiences for external audiences. Event offerings include in-person and virtual customer support, attendee management, registration and payment processing, agenda management and reporting, and analytics to plan, produce and analyze events that drive audience engagement. The event technology market does not include pure-play single webinar or meeting solutions.

For more information see Market Guide for Event Technology Platforms.

Sales

Back to top

CRM sales applications support most essential sales activities, processes and administrative responsibilities. The applications enable operational and analytical functions that automate and unite sales processes to provide account insights and to provide rules, alerts and playbooks. These allow sales, service and customer success agents to make timely, sensible and guided decisions to manage the customer relationship. The technologies that support sales activities include sales force automation; sales engagement; partner relationship management; sales enablement; configure, price and quote; price optimization; sales performance management; and customer success.

Sales Force Automation

Back to top

Sales execution (also called sales force automation) applications are foundational applications, implemented to support and automate most essential sales activities, processes and administrative responsibilities for B2B sales professionals. Core functionalities include account, contact and opportunity management, as well as sales forecasting and sales activity tracking. More recently, the use of AI technologies has added more sales engagement and enablement features into the core SFA solution.

For more information, see Magic Quadrant for Sales Force Automation Platforms.

Sales Engagement

Back to top

Sales engagement software automates administrative tasks and streamlines sales processes. These solutions are designed with the goal of increasing sales velocity by helping sales teams execute intelligent, multichannel, multitouch engagement, and are often used by inside sales teams or those businesses with shorter, more transactional sales cycles. They support the efficient creation of engaging and personalized experiences at scale during the various touchpoints between buyers and vendors. In general, sales engagement refers to applications that help organizations, mainly outbound-dedicated resources, to move prospects through the sales pipeline with greater efficiency.

Partner Relationship Management

Back to top

Partner relationship management (PRM) applications support indirect sales channel processes with web-based capabilities to manage distributors, dealers, value-added resellers (VARs) and all types of sales partners in general. Vendors in this segment provide either comprehensive end-to-end solutions or specialized point solutions. Core categories of features include partner life cycle management functionalities, channel partner marketing systems, sales enablement and execution functionalities, and support partner services.

Sales Enablement

Back to top

Sales enablement processes have evolved rapidly in recent years, moving from a narrow focus on sales training into a practice and business discipline that drives sales execution best practices across the sales organization. Sales enablement platforms are tools that unite sales enablement functions with customer-facing sales execution. They predominantly support native content, sales training delivery and reinforcement, and sales coaching. They can be used for direct sales and indirect partner/channel enablement.

For more information, see Market Guide for Revenue Enablement Platforms.

Configure, Price and Quote

Back to top

The configure, price and quote (CPQ) market supports traditional sales quote configuration, as well as self-service, e-commerce, contact center and partner channels. These solutions improve the guidance, governance and efficiencies of selling unique combinations of products or services for different sales situations. At the same time, they reduce the time spent on nonselling work, compress selling cycle times and improve overall sales effectiveness.

For more information, see Magic Quadrant for Configure, Price and Quote Application Suites.

Price Optimization

Back to top

Price optimization and management (PO&M) software solutions enable an organization to efficiently manage and optimize the price of its goods and services in situations where demand, supply or margins can vary rapidly. These offerings also offer a growing range of sales intelligence advice, such as best-next-action recommendations and customer churn warnings.

Some vendors focus on back-office price management and product management roles. Others focus on providing sales intelligence in real time to sales representatives and B2B digital commerce websites. The most successful vendors offer both.

For more information, see Market Guide for B2B Profit Optimization Software.

Sales Performance Management

Back to top

Sales performance management (SPM) is a collection of operational and analytical functions that automate and unite operational sales processes. Capabilities include sales incentive compensation management (ICM), objective/quota management and planning, and territory management and planning. SPM solutions also provide modeling and analytic capabilities for businesses to evaluate sales assumptions and diagnosis trends in sales outcomes.

For more information, see: Market Guide for Sales Performance Management

Customer Success

Back to top

Customer success and life cycle tools integrate data from multiple sources, but primarily the CRM and subscription and usage billing systems. They provide overall health scores of accounts and provide rules, alerts and playbooks to allow sales, service and customer success agents to make informed decisions to manage the customer relationship.

See Market Guide for Customer Success Management Platforms.

Enterprise Resource Planning

Market Analyst: Chris Pang

See Table 4 for an overview.

Table 4: ERP Market Overview

(Enlarged table in Appendix)

Enterprise Resource Planning ↓			
Enterprise Asset Management	Financial Management Systems	Human Capital Management	Core Manufacturing and Operations Management
▪ Core EAM ▪ APM	▪ Core Financial Applications ▪ Cash and Treasury Management ▪ Subscription Billing ▪ Financial Planning and Analytics ▪ Financial Close ▪ Other FMSs	▪ Administrative HR ▪ HR Service Management ▪ Talent Management ▪ Workforce Analytics ▪ Emerging HR ▪ Workforce Management ▪ Employee Expense Management ▪ Other HR Functions	▪ Manufacturing Resource Planning (MRP) ▪ Production Execution and Management ▪ Business Intelligence
FMS = financial management system			

Source: Gartner (October 2023)

ERP is an application strategy focused on several distinct enterprise application suite markets. ERP applications automate and support more administrative and operational processes, including manufacturing and maintenance/overhaul processes. Gartner segments ERP into four major business process areas.

Enterprise Asset Management

Back to top

Enterprise asset management (EAM) solutions provide transactional workflow systems that support data and work processes for business-critical non-IT assets. This includes asset maintenance history data and an asset register catering for linear, hierarchical or fleet assets. The software includes scheduled maintenance tasks based on historical records or OEM vendor guidance. An alternative term used for EAM is “computerized maintenance management system” (CMMS). EAM software is typically used by business managers, maintenance departments and field technicians responsible for reducing downtime and minimizing maintenance spend, but it can also be leveraged by facility/safety/reliability supervisors, inventory managers and machine technicians.

For more information, see: Market Guide for Enterprise Asset Management Software.

Financial Management Systems

Back to top

FMS applications enable visibility into an enterprise’s financial position through automation and process support for any activity that has a financial impact. FMSs are often regarded as the “heart” of ERP systems, providing a repository for the financial systems of record of an organization. The software includes core financial applications, cash and treasury management, subscription billing, financial planning and analytics, and financial close. FMS software is typically used by finance departments, managers and executives.

Human Capital Management

Back to top

Human capital management (HCM) software enables organizations to manage their workforce across the many business processes that span the employee life cycle — from preemployment to offboarding. It includes administrative HR, HR service management, talent management, workforce analytics, workforce management, emerging HR and employee expense management.

Core Manufacturing and Operations Management

Back to top

Core manufacturing and operations management software includes applications with functionality that incorporates manufacturing resource planning (MRP), production execution and management, and business intelligence. It is typically an integrated module within an ERP suite rather than a stand-alone offering. Customers using the module may supplement functionality with third-party applications to fully meet the requirements needed to support manufacturing and operational needs.

Content Services

Market Analyst: Craig Roth

The content services market contains many subsegments — imaging and document workflow, records management, and structured content creation, to name just a few. However, Gartner tracks only two for market share purposes:

- Content collaboration tools (CCTs), an expansion of the enterprise file synchronization and sharing (EFSS) market
- Content services platforms (CSPs), formerly known as enterprise content management (ECM)

Content Collaboration Tools

CCTs enable content-centric productivity and collaboration for individuals and teams, inside or outside an organization. Core functionalities include mobile access to content repositories, file synchronization and sharing, and file search across repositories. In addition, CCTs support collaborative document creation, teamwork, lightweight content management and workflow automation, natively or through integration with third-party tools. Deployments can be in public, hybrid or private clouds, or on-premises.

CCTs originated from the EFSS market, which emerged over a decade ago and evolved through commoditization, forcing vendors to expand their value propositions. From vendors' initial focus on EFSS, offerings were expanded with specialized capabilities to support content-driven collaboration for individuals and teams, secure external collaboration, lightweight content management, and file-centric workflows. In addition, these products increasingly acquired a platform character, adding APIs to access the associated content repository, connectors to external repositories, UI customization and modeling tools. CCTs now also offer support for IT management and administration, as well as security, analytics and governance capabilities.

Content Services Platforms

Enterprises depend on a wide array of software for managing the full life cycle of content — from the first time it is saved, through using it as part of a business process, and ending with archiving or deletion. While this category used to be called “enterprise content management,” that term no longer reflects market dynamics or the organizational needs for content in digital business. Organizations typically seek (and buy) content solutions to support business processes or broader digital workplace initiatives, as opposed to generic platforms and functional capabilities. “Management” has become less important than actually using the content to communicate or make decisions.

Accordingly, Gartner tracks the more broadly defined “content services” market. Content services are a set of services and microservices, embodied either as an integrated product suite or as separate applications that share common APIs and repositories. Their purpose is to exploit diverse content types and to serve multiple constituencies and numerous use cases across an organization.

Under this designation, there are three categories of content services:

- **Content services platforms —** These represent the evolution of the content repository and include the evolution of traditional ECM vendors. A CSP has its own repository and may also integrate external repositories through connectors and APIs or packaged integrations. CSP providers offer integrated sets of content services applications (most, if not all of the horizontal applications listed in the following point) built on content services components. CSPs are available on-premises, in the cloud or in hybrid architectures.

- **Content services applications** — Content services applications are capabilities aggregated by content services platforms that provide a solution to a distinct, content-driven business problem. Both vertical services (designed to serve a particular vertical business problem) and horizontal services (designed to solve problems common across industries) exist. Examples of vertical content services applications include case management, customer communications management, invoice automation, loan origination, claims processing and specialized business process applications. Examples of horizontal content services applications are:
  - **Document management** — For check-in/check-out, version control, security and library services for business documents. Advanced capabilities may include compound document support, digital rights management, metadata-driven views of documents, mobile user experiences (UXs) and integration with common productivity applications.
  - **Records management** — For long-term archiving, automating policies for retention and compliance requirements, e-discovery support, and ensuring legal, regulatory and industry compliance. The minimum requirement is an ability to enforce immutable retention of critical business documents, based on a record retention schedule. More advanced solutions provide certified compliance with standards, such as the Department of Defense (DOD) Directive 5015.2-STD, the Victorian Electronic Records Strategy (VERS) and MoReq2010.
  - **Image-processing applications** — For capturing, transforming and managing images of paper documents. This includes document capture (scanning hardware and software, mobile device capture, optical and intelligent character recognition technologies, and form-processing technology) performed either using native capabilities or through a formal partnership with a third-party solution provider. It also includes the ability to store images of scanned documents as a native (nonrendered or converted) content type in a folder, and to route them through an electronic process.
  - **Content workflow** — For supporting business processes, routing content, assigning work tasks, determining states and creating audit trails. This can range from simple document review and approval workflow capability to graphical process builders with parallel routing and out-of-the-box, industry-specific workflows.

- **Content analytics** — For analyzing file content, discovery or interrogation of enterprise content, tagging patterns and user activity. Calculating document value ("content ROI") is a ripe area for content analytics.
- **Content collaboration tools** — Content collaboration tools provide a modern replacement for the file system and help employees access and use content in their day-to-day activities. Core features include file sharing, device synchronization and the provision of collaborative workspaces. Gartner is shifting to calling these products "content collaboration tools."

- **Content services components** — CSPs have a base set of services and microservices that are combined to build content services applications. Components generally do not have their own repositories, but rather manipulate content in repositories owned by content services platforms and applications.

Gartner market share data tracks CSPs and CCTs. Other types of content services applications and components are not tracked or included in the revenue totals.

For more information, see Market Guide for Content Services Platforms.

Email and Authoring

Market Analyst: Craig Roth

This market consists of two product categories that are used as part of a collection — often customer-assembled — of personal and team productivity applications that Gartner calls the "new work hub." Email and authoring are generally purchased together as part of an "office suite" or a "productivity suite." Gartner tracks only email and authoring software targeted at enterprises. Where a single price is paid for a suite containing email and authoring, an allocation has been made to assign a portion to cover email and general-purpose content creation applications to this category. Calendaring is included as part of email as well.

Authoring software is a collection of general-purpose content creation applications for tasks such as word processing, spreadsheet manipulation and presentation graphics. Subscription models for office suites are now the norm.

Project and Portfolio Management

Market Analyst: Neha Gupta

Project and portfolio management (PPM) tools support integrated planning, decision making, and tracking and reporting of workstreams and resources. They also support automation of PPM-related processes at different altitudes, such as strategic portfolio management (SPM) and adaptive project management (PM). This segment aggregates a wide variety of PPM submarkets and array of use cases requiring capabilities ranging from detailed project task scheduling and resource utilization to portfolio-level budgeting and investment planning.

Using a combination of PPM technologies for SPM and adaptive PM and reporting enables users to support and optimize strategy definition and investment planning through to continuous delivery and project execution. It also improves their ability to deliver valuable business outcomes at an accelerated pace.

The use cases for PPM can vary significantly, resulting in a PPM market comprising several submarkets. All PPM submarkets are included in Gartner PPM market reporting, and there is no segregation of revenue by PPM submarket. Revenue-based PPM Market Share research provides aggregate PPM revenue only, across any PPM subsegment, regardless of where the PPM provider operates in the PPM space or how it counts PPM revenue. Revenue leadership in PPM overall in Gartner PPM share reports does not indicate leadership in any PPM submarket.

Supply Chain Management

Market Analyst: Balaji Abbabatulla

See Table 5 for an overview.

Table 5: Supply Chain Management Market Overview

(Enlarged table in Appendix)

Supply Chain Management ↓			
Supply Chain Planning	Supply Chain Procurement	Manufacturing and Operations Management	Supply Chain Execution
■ Demand Planning	■ Buy-Side Contract Life Cycle Management	■ Production Planning and Scheduling	■ Distributed Order Management
■ Inventory Optimization	■ E-Procurement	■ Manufacturing Operations and Quality Management	■ Warehouse Management Systems
■ Strategic Network Design	■ E-Sourcing	■ Manufacturing Analytics	■ Transportation Management Systems
■ Supply Chain Performance Management/Analytics	■ External Workforce Management		■ Global Trade Management
■ Production and Distribution Planning	■ Spend Analytics		
■ Sales and Operations Planning	■ Supplier Management		
■ Service Parts Planning	■ Accounts Payable Invoice Automation		
	■ Supplier E-Invoicing		

Source: Gartner (October 2023)

Supply chain management software applications enable enterprise leaders to plan, procure, produce and provide products and services. Supply chain management software is increasingly delivered on the cloud as a service, although several existing customers continue to use on-premises software.

Supply Chain Planning

Back to top

Supply chain leaders balance supply and demand for products and services through multi-time-horizon planning, modeling, and scenario analysis. This requires capabilities such as:

- **Demand planning** — Forecasting and planning to fulfill the demand for products and services by end users, as well as by intermediate supply chain members.

Back to top

- **Inventory optimization** — Determining the optimal levels of inventory across the network, based on demand and supply variability.

Back to top

- **Strategic network design** — Historically, solutions were used strategically (one to five years) to determine the overall optimal physical supply/demand network (for example, plants, distribution centers and warehouses), considering costs and service goals and objectives. More recently, network design/planning tools have been enhanced for use in tactical business planning scenarios (less than one year). An example would be to answer such questions as what the company's channel strategies should be, or what the impact would be of switching suppliers or global sources of supply. Most recently, environmental factors, such as carbon footprint, have been added to these types of solutions to enable optimization around environmental parameters.

Back to top

- **Supply chain performance management/analytics** — A technology-enabled discipline that includes:
  - The performance-driven processes used to help manage "assets" (such as customer service, orders, costs, inventory, physical assets, operational plans, tasks and activities) across an end-to-end supply chain.
  - The methodologies that drive some processes (such as the balanced scorecard, value-based management or root cause analysis [RCA]).
  - The metrics used to measure performance against strategic, operational and tactical performance objectives (for example, using the Supply Chain Operations Reference Model).

Back to top

- **Production and distribution planning** — Planning the required supply, production and distribution capacity to fulfill the forecast demand and supply planning.

Back to top

- **Sales and operations planning (S&OP) planning** — Harmonizing operational plans across sales and enterprise operations business processes.

Back to top

- **Service parts planning (SPP)** — Planning to store optimal quantities in appropriate locations to fulfill the aftermarket demand.

Back to top

Supply Chain Procurement

Back to top

Procurement and sourcing leaders improve efficiency of transactional spend and effectiveness of sourcing decisions and external workforce management using capabilities such as:

- **Buy-side contract life cycle management** — Storage, retrieval authoring, review, negotiation and obligation management of buy-side contracts.

Back to top

- **E-procurement** — Users search for products and services, create B2B purchase orders, place orders with suppliers, and perform receipts. These systems provide spend visibility, enforce spend policy compliance, and receive products and services through enterprise-centric and network-centric supply chains.

Back to top

- **E-sourcing** — Business users need to create requisitions, and sourcing users need to identify appropriate suppliers, create and execute requests for information (RFIs) and requests for proposal (RFPs), solicit and evaluate bids from suppliers, negotiate contractual terms, select suppliers and place orders, and optimize sourcing spend.

Back to top

- **External workforce management** — Find, onboard, pay, manage and offboard temporary workers; often includes procurement and management of deliverables/milestone-based services. These applications are also known as vendor management system or contingent workforce management.

Back to top

- **Spend analytics** — E-sourcing spend visibility and reporting, identifying exceptions such as noncompliant spend and fraudulent transactions, and triggering approval workflows. It includes processes required to extract, cleanse and manage data, as well as associated ML algorithms.

Back to top

- **Supplier management** — Supplier discovery, supplier information management (approvals, document management), supplier risk management, supplier performance management, supplier enrichment supported by survey tools and scorecards.

Back to top

- **Accounts payable invoice automation** — B2B supplier invoice approval, discrepancy resolution, auditing, payment period approval and initiation of payment transaction.

Back to top

- **Supplier e-invoicing** — Receive, validate and archive B2B invoices received from suppliers in an electronic format that may include managed file transfer (MFT), electronic data interchange (EDI), portal-based stand-alone invoices, PDF documents, XML transfers and other forms of automated data exchange.

Back to top

Manufacturing and Operations Management

Back to top

Production leaders plan, manage and control processes to transform raw material into intermediate or finished products and services and gain differentiation by using capabilities such as:

- **Production planning and scheduling** — Short-term planning of production capacity required to fulfill near-time and real-time forecast demand for products and services, as well as optimal scheduling of resources — both internal and external — required to produce appropriate products and services.

Back to top

- **Manufacturing operations and quality management** — Manage, monitor and synchronize production-oriented processes to produce goods and services of the quality required to fulfill customer promise.

Back to top

- **Manufacturing analytics** — Visibility across internal and external resources that impact production, analyze performance against plan and initiate prescriptive actions to improve productivity, efficiency and effectiveness or production.

Back to top

Supply Chain Execution

Back to top

Supply chain leaders use these capabilities to provide the most appropriate products and services to manage and fulfill orders from customers and supply chain trading partners.

Typical modules and applications include:

- **Distributed order management** — A customer-centric order management framework and commercial models to capture, decompose, and fulfill customer orders across multiple channels.

Back to top

- **Warehouse management systems** — A set of software capabilities to manage the core operations of a warehouse or distribution center such as receiving, put-away, storing, inventory management, picking, packing and shipping.

Back to top

- **Transportation management systems** — Planning and optimization, execution, visibility, analytics, payment and sourcing for operational and strategic management of movement of goods across supply chain networks.

Back to top

- **Global trade management** — Comprises the knowledge, processes and technologies used to support the often complex and unique logistical, regulatory and financial aspects of the import and export processes associated with international (such as cross-border) shipments.

Back to top

Other Application Software

Market Analyst: Neha Gupta

Other application software includes, but is not limited to, virtual assistants (including chatbots), document capture or intelligent document processing (IDP) software, computer-aided application (CAx) and architecture, engineering and construction (AEC) software, collaboration, digital content creation (DCC), e-discovery, enterprise IM, web conferencing, engineering applications, enterprise search, and stand-alone mobile and wireless applications. The segment also includes other application software that is reported in vendors' income statements but is not reported in our Market Share publications.

For Gartner market share purposes, "other application software" covers the categories previously listed. However, it does not include vertical-specific software, which is defined as software applications that are unique to a vertical industry and which are stand-alone applications that are not modules or extensions of horizontal applications.

Collaboration Services

Collaboration is goal-focused and often centered on documents and other forms of content, processes and projects. General purpose, enterprise social software suites provide shareable virtual workspaces that contain artifacts such as documents, pages of text, images and tools for activities, such as shared discussions or project calendars. Wikis and team sites are common types of collaboration spaces.

Workspace-oriented products and services often include or integrate with additional services, such as presence awareness. Synchronization services are often included in workspace-oriented offerings in order to facilitate offline work and flexible workspace distribution.

Workstream collaboration (WSC) creates a persistent, shared conversational workspace that assists teams with initiating, organizing and completing work. The core capabilities of WSC include persistent messaging, alerts, notifications, search, archiving, activity streams and content-sharing functionalities. WSC tools typically connect with other business and consumer applications via APIs and bots.

Enterprise social software applications are an offshoot of collaboration suites that are focused on people. They facilitate, capture and organize open conversations and information sharing between individual workers and groups within an organization. They have capabilities that support conversations and information sharing. These applications help people find out about each other, have discussions, share information and generally interact.

Enterprise IM

IM is a communications service in which short messages appear in pop-up screens as soon as they are received, thereby commanding the recipient's immediate attention. Most IM services offer presence information that indicates if the user is online and available to send and receive messages. These services also provide "buddy lists" that are groups of people who have been selected by the user for frequent access, as well as group-based chat services. Enterprise IM provides real-time message passing within private and public networks.

Web Conferencing

Web conferencing represents one form of real-time collaboration. It consists of real-time electronic meeting and content delivery, desktop and application sharing, IM, and group document markup with electronic whiteboarding. It is augmented by audio, data and video, security (encrypted data transfer, password protection), and remote control (a participant can control applications of another device). More advanced features include native mobile applications, HTML5 support, integrated voice over Internet Protocol (VoIP) audio, file sharing, videoconferencing, content archiving, media streaming, feedback, polling and replay. Real-time collaboration technologies not included in the web-conferencing category are stand-alone IM, audioconferencing and videoconferencing.

Infrastructure Software Definitions

The focus of infrastructure software is to build, run and manage the performance of IT resources. In this category, we gather software primarily for use by IT professionals (see Figure 3 and Figure 4).

Figure 3: Enterprise Infrastructure Software Market Segmentation (Part 1 of 2)

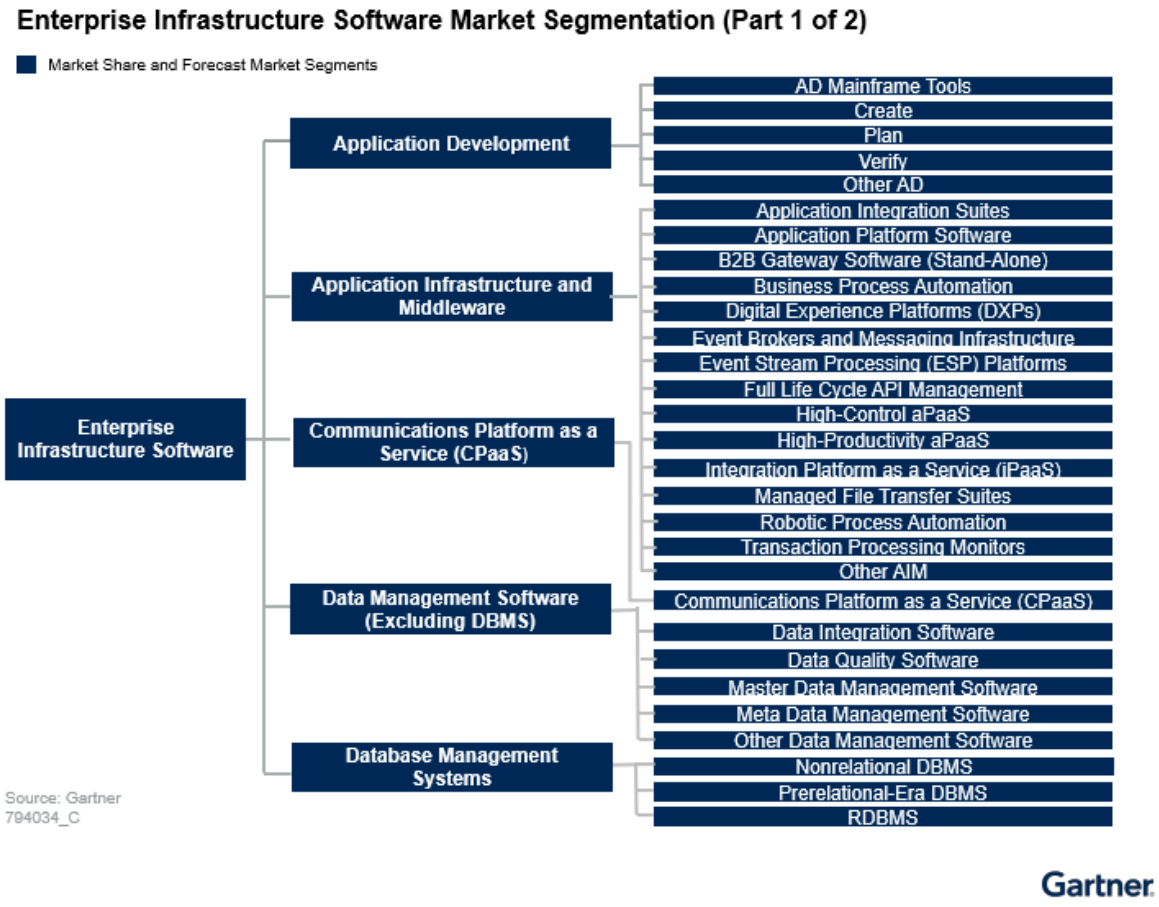
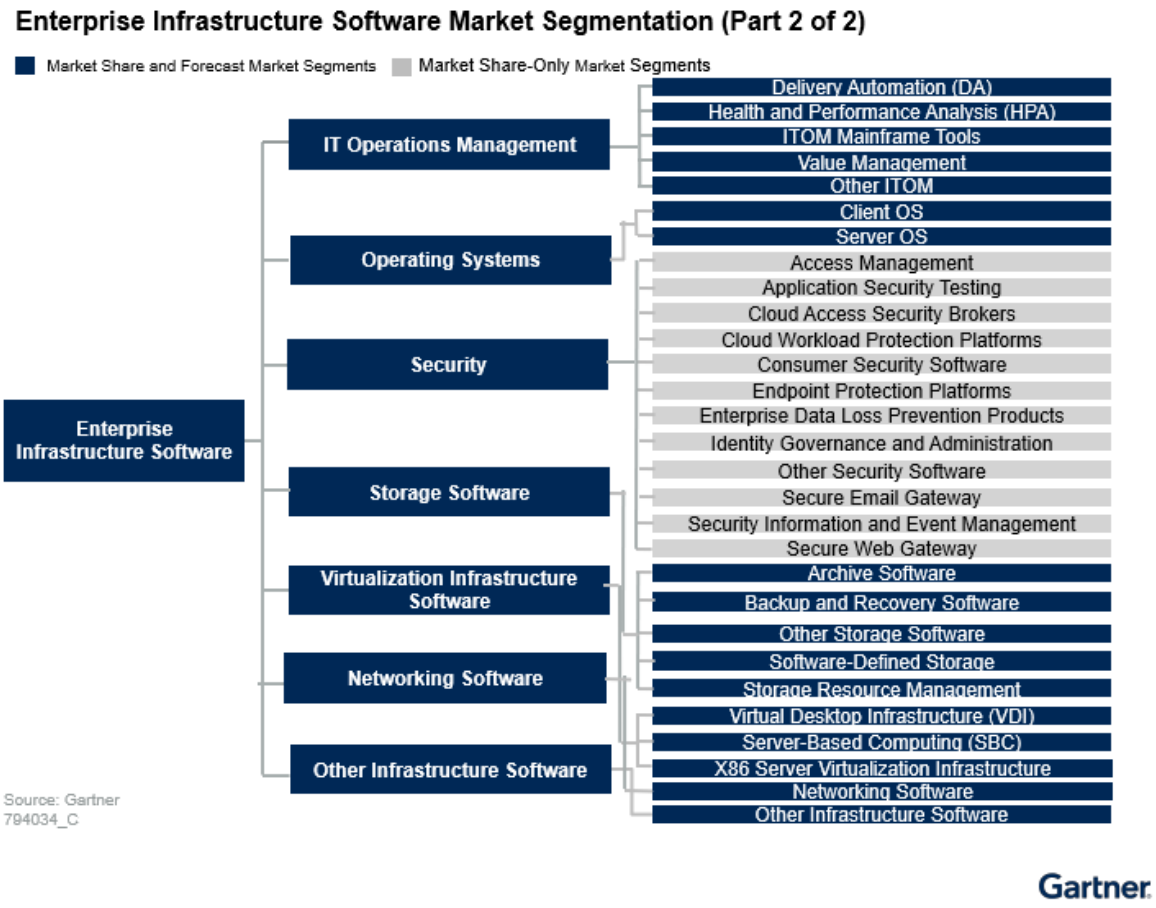


Figure 4: Enterprise Infrastructure Software Market Segmentation (Part 2/2)



Application Development

Market Analyst: Laurie Wurster

See Table 6 for an overview.

Table 6: Application Development Market Overview

(Enlarged table in Appendix)

Application Development ↓				
AD Mainframe Tools	Plan	Create	Verify	Other AD
■ LODE Products (Proprietary Mainframe, Mini- and Midrange) ■ Software Change and Configuration Management Products (Mainframe) ■ Testing Products (Mainframe)	■ Enterprise Agile Planning Tools ■ Requirements Definition and Management ■ Value Stream Management Platforms ■ Other Plan Tools	■ Build Tools ■ Code Tools ■ Other Create Tools	■ API Testing Tools ■ Performance Testing Tools ■ Test Automation Tools ■ Test Management Tools ■ Other Testing Tools	
AD = application development; ADLM = application development life cycle management; adPaaS = application development platform as a service				

Source: Gartner (October 2023)

The application development (AD) software market comprises tools that represent each phase of the software development life cycle (plan, create and verify, as well as AD development mainframe tools, and other AD software).

AD Mainframe Tools

Back to top

Included here are tools for mainframe development. A roll-up of mainframe categories captured here are:

- Language-oriented development environments
- SCCM
- Testing

Plan

Back to top

This section includes the tools used in the design and planning stages of application development, regardless of methodologies used — waterfall development, agile development and rapid application development.

Enterprise Agile Planning Tools

Back to top

Enterprise agile planning (EAP) tools help organizations make use of agile practices at scale to achieve enterprise-class agile development and includes collaboration, product roadmapping, and program- or portfolio-level planning

Requirements Definition and Management

Back to top

Requirements definitions and management tools encompass a broad set of solutions designed to aid in the gathering and management of documents supporting the definition and development of a software product. Tools may be delivered as either on-premises or cloud solutions.

Value Stream Management Platforms

Back to top

Value stream management platforms (VSMPs) optimize end-to-end product delivery lead time and provide greater visibility and traceability into the flow of all product delivery processes, from ideation to release and operation.

For more information, see Market Guide for Value Stream Management Platforms.

Other Plan Tools

Back to top

Other new or legacy planning tools that are not actively identified/tracked under specific categories but represent revenue remaining in this category.

Create

Back to top

The create section includes the tools used to build, code and configure software applications.

Build Tools

Back to top

Build tools support continuous integration and delivery (CI/CD) with a focus on build automation and support for multilanguage development.

Code Tools

Back to top

Code tools include multi experience development platforms (MXDPs), behavior-driven development (BDD), hypothesis-driven development (HDD), dynamic web application tools, intelligent device development tools, languages, such a Perl, Python, PHP, Ruby, Microsoft .NET, Java, Appeon (PowerBuilder), and Microsoft Visual Basic.

Other Create Tools

Back to top

Other legacy create tools that are not actively identified/tracked under specific category.

Verify

Back to top

This category includes tools for verification (the evaluation of whether or not a product/application or a service complies with regulations, requirements, specifications or imposed conditions), and validation (the assurance that a product/application meets the needs of the customer, which typically involves acceptance and suitability with external customers).

- API Testing Tools
- Performance Testing Tools
- Test Automation Tools
- Test Management Tools
- Other Testing Tools

Other AD

Back to top

This segment includes a roll-up of any AD tool not covered within named categories detailed above. Included in the category are products for software design and construction, as well as tools for gaming and embedded software development.

Application Infrastructure and Middleware

Market Analysts: Fabrizio Biscotti, Nicholas Carter, Kelli Smith, Varsha Mehta and Tarun Rohilla

See Tables 7, 8 and 9 for an overview.

Table 7: Application Infrastructure and Middleware Market Overview (1)

Application Infrastructure and Middleware (1) ↓				
Transaction Processing Monitors	**Application Platform Software**	Event Stream Processing Platforms	High-Productivity Application Platform as a Service	High-Control Application Platform as a Service
	■ Application Servers ■ Cloud-Enabled Application Platforms			■ Function PaaS

Source: Gartner (October 2023)

Table 8: Application Infrastructure and Middleware Market Overview (2)

Application Infrastructure and Middleware (2) ↓				
Application Integration Suites	B2B Gateway Software (Stand-Alone)	Integration Platform as a Service	Full Life Cycle API Management	Event Brokers and Messaging Infrastructure
				■ High-Performanc Message Infrastructu ■ Cloud Message Broker Services

Source: Gartner (October 2023)

Table 9: Application Infrastructure and Middleware Market Overview (3)

(Enlarged table in Appendix)

Application Infrastructure and Middleware (3) ↓				
MFT Suites	Business Process Automation	Robotic Process Automation	Digital Experience Platforms	Other AIM
▪ Cloud Managed File Transfer Services	▪ Cloud Business Process Management Services	▪ RPA PaaS	▪ Cloud Digital Experience Platform Services	▪ Adapters ▪ BPA Tools ▪ BPM Platforms ▪ BRE Software ▪ IoT Platforms ▪ Cloud IoT Platform Services (IoT PaaS) ▪ Object Request Brokers ▪ EDI/B2B Value-Added Networks ▪ Process Mining ▪ Task Mining ▪ Miscellaneous Middleware Components
AIM = application infrastructure and middleware; BPA = business process analysis; BPA = business process automation; BRE = business rule engine; RPA = robotic process automation				

Source: Gartner (October 2023)

The AIM market includes full life cycle API management, integration middleware, platform middleware, MFT suites, BPM-enabling technologies, portals and digital engagement technologies.

Integration middleware is software that enables independently designed applications, software components or services to work together, by supporting data consistency, composite application and multistep process styles of integration. It includes multienterprise (B2B) integration capabilities and internal integration, as well as those products that enable existing applications to become part of a new multistep process. The Gartner market segments we consider to be integration middleware include adapters, application integration suites, B2B middleware software and message-oriented middleware (MOM).

Gartner defines platform middleware as system software that provides the runtime hosting environment for application program logic. It uses embedded or external communications middleware to help programs interact with other programs. It also provides resource management services for hosting application program logic at runtime. Platform middleware further provides interfaces with one or several forms of communications middleware (one-way messaging and request/reply). The full collection of all interfaces provided by a platform middleware product represents a programming model. Thus, platform middleware defines the style and capabilities of the applications that are developed for it. Platform middleware comes in the form of transaction processing monitors (TPMs), object request brokers (ORBs), application platform as a service (aPaaS) — including high-control aPaaS and high-productivity aPaaS — in-memory data grids (IMDGs) and enterprise application servers.

BPM-enabling technologies include BPM pure-play software, business process analysis (BPA) products, BREs and BPA. We also see RPA as part of the wider AIM family of offerings.

Portals and digital engagement technologies include user-facing technologies and user-interaction-enabling middleware.

Transaction Processing Monitors

Back to top

From a definitional standpoint, TPMs are part of the large family of on-premises application platforms. However, in our Market Share reports, for a better view of the competitive landscape, we split them apart.

The earliest form of platform middleware was the mainframe TPM. Products such as IBM's Customer Information Control System (CICS) and IBM Information Management System (IMS), and Unisys' TIP have been used on mainframes since the late 1960s. UNIX-based distributed TPMs, such as IBM's Encina, originated in the 1980s. Through the years, these products added support for distributed servers, intelligent desktop clients (rather than dumb terminals) and web browser clients, and component support using Common Object Request Broker Architecture (CORBA) or Java Platform, Enterprise Edition (Java EE) architecture.

Application Platform Software

Back to top

Application platforms include predominantly application servers but also cloud-enabled application platforms (CEAPs) and IMDGs.

Application Servers

Back to top

An application server is a modern form of platform middleware. It is system software that resides between the OS on one side, the external resources (such as a DBMS, communications and internet services) on another side, and the user's applications on the third side. The function of the application server is to act as host (or container) for the user's business logic, while facilitating access to — and performance of — the business application. The application server must perform despite:

- The variable and competing traffic of client requests
- Hardware and software failures
- The distributed nature of the larger-scale applications
- The potential heterogeneity of data and processing resources required to fulfill the business requirements of the applications

A high-end online transaction processing (OLTP)-style application server delivers business applications with guaranteed levels of performance, availability and integrity. An application server also supports multiple application design patterns, according to the nature of the business application and the practices in the particular industry for which the application has been designed. It typically supports multiple programming languages and deployment platforms, although most have a particular affinity to one or two of these. Some application servers that implement standard application interfaces and protocols, such as Java EE, are entirely proprietary. At present, the proprietary application servers are typically built into OSs, packaged applications (such as portals and e-commerce solutions) or other products, and are not offered as stand-alone products. Proprietary and Java EE-compliant application servers are estimated in our Market Share and Forecast reports.

As the application server market matures, high performance becomes a stronger criterion. Thus, where vendors now incorporate extensions to application servers, such as extreme transaction processing and event-based processing capabilities, these are also included in this market segment. As the choice of where to create and deploy new applications evolves, we have seen the emergence of aPaaS offerings, which are comparable to application servers and are also included within the application server market.

Cloud-Enabled Application Platforms

Back to top

CEAPs are software products that deliver, at a minimum, the core functionality of an application server. They can be extended to support multitenancy, horizontal scaling and, optionally, other capabilities — directed at the role of enabling technology for private or public application infrastructure services (also known as PaaS) or business application services (also known as SaaS).

Event Stream Processing Platforms

Back to top

Event stream processing (ESP) platforms (also known as “event stream processors”) are software systems that perform real-time or near-real-time calculations on event data “in motion.” The input is one or more event streams containing data about customer orders, insurance claims, bank deposits/withdrawals, tweets, Facebook postings, emails, financial or other markets, or sensor data from physical assets such as vehicles, mobile devices or machines. The platforms process the input data as it arrives (hence “in motion”), before optionally storing it in some persistent store. They retain a relatively small working set of stream data in memory, just long enough to perform calculations on a set of recent data for the duration of a time window. (For more information, see Market Guide for Event Stream Processing).

Application Platform as a Service

Back to top

This is a combination of the hpaPaaS and hcaPaaS sections. An aPaaS offers an application execution environment and associated development and management tools — as a cloud service. It is one of many specialized types of PaaS, although it is often erroneously seen as synonymous with all of PaaS. An aPaaS is always integrated or linked with a database system, which may or may not be also offered as a cloud database service (database PaaS [dbPaaS]) in its own right. High-productivity aPaaS and high-control aPaaS have been evolving independently toward integration.

The functional aim of an aPaaS is similar to that of an application server in the traditional on-premises software architecture — application infrastructure functionality, enriched with cloud characteristics and offered as a service.

Gartner refers to it more precisely as cloud application infrastructure services. Application platform as a service is a form of PaaS that provides a platform to support application development, deployment and execution in the cloud. It is a suite of cloud services designed to meet the prevailing application design requirements of the time and includes mobile, cloud, IoT and big data analytics innovations. In short, an aPaaS is an integrated platform that delivers end-to-end functionality for a modern application engineering project — in the form of a software service.

An aPaaS that is designed to support the enterprise style of applications and application projects (high availability, disaster recovery, security and technical support) is an enterprise aPaaS.

This market includes only companies that provide public aPaaS offerings (vendors providing aPaaS-enabling software alone are not considered). See Key PaaS Disruptions Every Product Manager Must Understand for an expanded form of the definition of aPaaS and other forms of cloud application infrastructure services (various types of platform as a service [xPaaS]).

High-Productivity Application Platform as a Service

Back to top

High-productivity aPaaS (hpaPaaS) is a foundational technology behind low-code application platform (LCAP) and is designed for projects that:

- Need ease of use, fast results, high productivity and a low cost of entry
- Can accept proprietary design models and give up much of the technology control

High-productivity aPaaS offerings encode the custom logic in metadata; use graphical, model-driven application design; and in most cases, interpret the metadata at runtime. They are popular with teams (lines of business or central IT) that need to build less technically advanced or unique applications quickly. The vendors tend to gradually add capabilities to expand their scope, including support for embedded programming or scripting and access to libraries of accelerators.

High-Control Application Platform as a Service

Back to top

High-control aPaaS (hcaPaaS) is suitable for development of more advanced cloud software solutions, where the architects seek maximum control of the technology context and the organization has the necessary professional skills. Some control of underlying technology is exposed to subscribers, and programming practices follow standards through familiar languages and development tools. These platforms are popular with more technically sophisticated IT teams and those that build web-scale cloud applications. High-control aPaaS requires professional IT skills and is more often used in central IT, although some lines of business have sufficient IT expertise to build on these platforms as well.

Function PaaS

Back to top

This segment includes cloud function platform services also known as function PaaS (fPaaS). An fPaaS provides a serverless execution environment for small, event-triggered functions. (“Functions” in this context is a reference to software components designed to be operated by an fPaaS. Functions are microservices with specific constraints imposed by fPaaS.) Function platforms enable you to deploy and run code without provisioning or managing servers, container instances or other system infrastructure, and they automatically scale to support increasing or decreasing load. An fPaaS function is not a complete application; it implements a step in a larger process. fPaaS is an opinionated platform for professional developers that constrains design choices and eases the development of decoupled, event-driven architectures.

Application Integration Suites

Back to top

Formerly named “enterprise service bus (ESB) suites,” application integration suites are defined as a set of software functionality, founded on an ESB, that can support optional mediation functions, particularly for API/SOA scenarios, and also can support traditional, heterogeneous application integration projects. To be an application integration suite, a middleware subsystem must:

- Implement program-to-program communication (always supporting SOAP/HTTP and almost always supporting other protocols, such as SOAP/MOM, plain MOM and REST)
- Support other core web services standards (always including XML/SOAP and REST/JSON)
- Be capable of service discovery, binding and virtualization (transparently switching to alternative service components), and intelligent (header-based) routing
- Provide message mapping and transformation capabilities
- Support service orchestration to enable multistep process integration requirements
- Have an extensible, intermediary-based architecture so that additional features can be plugged in
- Be aware of message schemas, through the use of metadata, so that functions that require an understanding of the message contents can be supported
- Provide adapters to technology environments (such as databases, MOM and legacy application platforms) and business applications (like Oracle E-Business Suite, Salesforce, SAP S/4HANA, ServiceNow and Workday)

An application integration suite may also provide additional services, such as B2B gateway, IoT integration or RPA integration.

B2B Gateway Software

Back to top

B2B gateway software (BGS) is integration middleware that is used to consolidate and centralize data and process integration and interoperability between a company’s internal applications/systems and external endpoints, such as business partners or ecosystems.

BGS is a composite market that includes pure-play BGS solutions and BGS that is embedded or combined with a wide range of other IT solutions. Examples include application integration suites that support BGS features as extensions to the suite, infrastructure for API/SOA, integration brokerage services, e-invoicing software and networks, application servers, application platform suites, EDI translators, and MFT technology. B2B-enabled integration middleware is also available in collections (such as the Oracle SOA Suite and SAP Process Orchestration) that are designed to complement a vendor's packaged applications. However, to avoid double counting, in our market share studies, we consider only pure-play BGS solutions.

Integration Platform as a Service

Back to top

An integration platform as a service (iPaaS) is a vendor-managed cloud service that enables end users to implement integrations between a variety of applications, services and data sources.

iPaaS connects disparate applications, services, and data sources to enable information to flow between them.

iPaaS enables end users of the platform to connect a variety of applications, services and data sources for at least one of the three main uses of integration technology:

- Data consistency, to ensure applications are operating with the right information
- Multistep process, to automate business processes and workflows
- Composite services, to create services exposed as APIs or events

These integration processes, data pipelines, workflows, automations and services are most commonly created via intuitive low-code or no-code developer environments, though some vendors provide more complex developer tooling.

Mandatory capabilities of iPaaS services are:

- Be a cloud service
- Be fully managed by the vendor for all software patches and updates
- Provide developer tooling to enable end users to implement integration use cases

- Provide software development life cycle (SDLC) tooling to enable SDLC management, including versioning, testing and deployment
- Provide operational tools to enable operational monitoring, alerting, reporting and auditing of running integrations/processes/pipelines/services in production environments.
- Enable at least one of the following use cases for integration technology
  - Data consistency: Ability to monitor or be notified by applications, services, and data sources for changes and to propagate those changes to the appropriate applications and data destinations (for example, “synchronize customer data” or “ingest into data lake”).
  - Multistep process: Ability to implement multistep processes between applications, services, and data sources (for example, “onboard employee” or “process insurance claim”)
  - Composite service: Ability to create composite services exposed as APIs or events, composed from existing applications, services and data sources (for example to create “credit check” service or create “generate fraud score” service)

See Magic Quadrant for Integration Platform as a Service, Worldwide.

Full Life Cycle API Management

Back to top

Full life cycle API management products support the planning, design, implementation, publication, operation, versioning and retirement of APIs. They include an API portal to help developers who use APIs to build solutions. They also include runtime management, typically provided by an API gateway that governs access to APIs, including security, and gathers analytics for use by API providers. They also provide administrative tools for defining policies and managing API life cycles, and business-related tools to support monetization and customer support.

It is important to distinguish between basic API management and full life cycle API management. Basic API management typically focuses on just the deployment and runtime aspect. Architecturally, full life cycle API management includes a customizable API developer portal to support developer outreach and enablement. Basic API management typically provides only API gateways.

Cloud-based full life cycle API management services are useful for organizations developing APIs on cloud platforms and exposing APIs to channels (including mobile channels), while taking advantage of scale (for seasonal businesses with spikes in API traffic, for example). On-premises API management is often used by organizations that cannot deploy APIs to the cloud — for privacy reasons, for example. In discussions with users of Gartner's client inquiry service, we often hear of requirements for hybrid architecture for full life cycle API management, with APIs deployed through cloud services but linked to on-premises systems. Full life cycle API management vendors can differentiate themselves by supporting sophisticated hybrid architectures.

API management is also available from cloud providers, as well as vendors that also provide iPaaS, some of which provide cloud-based API management.

See: Magic Quadrant for Full Life Cycle API Management

Event Brokers and Messaging Infrastructure

Back to top

An event broker is middleware software, appliance or SaaS used to transmit events between event producers and consumers in a publish-subscribe pattern. Publish-subscribe (pub-sub) pattern is now mainstream. It is an asynchronous messaging service that decouples services that produce events from services that process events. Pub-sub can be used as messaging-oriented middleware or event ingestion and delivery for streaming analytics pipelines. Pub-sub offers durable message storage and real-time message delivery with high availability and consistent performance at scale.

Additionally, messaging infrastructure technologies (part of it is traditionally referred to as "message-oriented middleware") provides connectionless program-to-program communications services for intra-application and interapplication (that is, integration) purposes. Interactions implemented with messaging infrastructure may be fully asynchronous (one way, store and forward) or partially synchronous (immediate, one-way delivery or two-way request/reply exchanges). Messaging infrastructure strengths are in connectionless (loosely coupled) communications, store and forward (queuing), guaranteed delivery, broad platform support (run on many OSs), and in some cases, content- or subject-based addressing (for example, publish and subscribe). Unlike remote procedure calls (RPCs), messaging products also support one-to-many, many-to-one or many-to-many delivery.

Messaging products complement application servers by providing features that are missing or not well-supported through RPC and other connection-oriented communications mechanisms, such as Microsoft Component Object Model (COM+), CORBA and, more recently, Advanced Message Queuing Protocol (AMQP). All major Java application servers and most integration suites now include a bundled MOM service, often based on the Java Message Service (JMS) standard, but stand-alone (unembedded) messaging products are also still sold.

This segment also includes kinds of messaging emerging from the industry, including low-latency messaging.

High-Performance Message Infrastructure

Back to top

High-performance message infrastructure consists of software or appliances that provide program-to-program communication with high quality of service, including assured delivery and security. These products use innovative design concepts and in-memory computing. They support higher throughput (hundreds of thousands of messages per second), lower latency (less than 10 microseconds for local message delivery), or many orders of magnitude more message producers and consumers than traditional messaging products.

Cloud Message Broker Services

Back to top

Cloud message broker services provide program-to-program communication with a variety of optional message delivery patterns and features for data integrity. Messaging is used in preference to plain HTTP and other communications technologies when:

- The message producers (senders) and consumers (receivers) run asynchronously
- The integrity of the messages is important (for example, messages can be temporarily stored on disk to prevent them from being lost in the event of a system failure)
- The same message must be delivered to multiple consumers (generally using publish-and-subscribe messaging)

Cloud message broker services are relatively new and their usage is limited. However, they are growing faster than conventional noncloud forms of messaging. As more applications and data move to the cloud, the need for reliable, high-volume cloud messaging will continue to rise. Cloud messaging services are especially appropriate for wide-area messaging over the internet, such as for B2B or for connecting components of mobile applications and branch-office applications to a data center in the same company. They are not suited for messaging applications within one data center or one machine.

MFT Suites

Back to top

MFT solutions enable organizations to manage and monitor their file transfers. MFT on-premises offerings usually comprise four discrete functionalities that organizations can deploy separately. However, organizations often deploy them as a suite. The functionalities basic to MFT are:

- **Server** — This manages all aspects of the file transfer and supports multiple communications and security protocols and mechanisms, workflow, provisioning, some transformation, automation APIs and adapters, and streaming I/O.
- **Client** — This is a subset of server technologies, mainly for integration with the MFT server. Applications (via APIs) and humans (via a GUI) use clients for collaboration, such as large file transfers using email or collaboration systems.
- **Proxy** — These technologies abstract other elements of the infrastructure, such as a proxy deployed in a demilitarized zone that conceals the true IP addresses and ports of senders and recipients.
- **Plug-in** — This interoperates or integrates with applications, enabling them to communicate natively with MFT servers, or enabling ad hoc file transfers.

Cloud Managed File Transfer Services

Back to top

Gartner bases its definition of cloud managed file transfer platform as a service (MFTPaaS) on the same functional criteria applied to on-premises MFT. These include server (including data transfer and security), client, proxy and plug-in capabilities that can be deployed separately, but are usually deployed as a suite.

The fundamental job of an MFT service is to facilitate efficient management of bulk data transfer from a source to one or more target endpoints. The source and target endpoints can be in the same enterprise or external to the enterprise.

Cloud-enabled MFT functionality can be delivered as a public cloud service, or as MFT software deployed in a public or private cloud. The software can be deployed on-premises or in the cloud using infrastructure as a service (IaaS), for example, Amazon Web Services (AWS) or Rackspace Technology. Cloud service offerings in the MFT market continue to grow, with most new offerings addressing scheduled, triggered and ad hoc file transfers.

An evolving deployment scenario is a hybrid model consisting of an on-premises MFT solution to address internal file transfers, and cloud MFT services for transferring files to and from external endpoints.

- Internal file transfer examples include application-to-application or scheduled and unscheduled file transfers.
- Cloud MFT service transfer examples include B2B integration, email attachment offload, cloud integration, scheduled and unscheduled file transfer, and file-sharing usage scenarios.

Business Process Automation

Back to top

Business process automation (BPA) tools comprise software that supports organizational transformation by orchestrating, automating and monitoring end-to-end business processes. Key features of BPA tools include process modeling, process orchestration, decision automation, integration with applications, continuous intelligence via real-time analytics, collaboration and task management, document handling, and low-code workflow automation. Available as cloud, hybrid and on-premises offerings, BPA tools are used by business users working across operations, process and project management domains.

Cloud Business Process Management Services

Back to top

The term “business process management platform as a service” (bpmPaaS) refers to a basic BPM platform, a BPMS or an iBPMS delivered via PaaS. IT developers or citizen developers use basic BPM platforms to develop and compose “code-free” applications to automate work. Business outcome owners and IT use BPMSs to accelerate process change and improve business outcomes. Business transformation leaders and business outcome owners use iBPMSs to radically reinvent how the business operates with its value chain partners. To qualify as a bpmPaaS, a BPM platform must be available as a one-to-many service and include at least one of the following BPM runtime capabilities — flow management, rule management, optimization and simulation, or BAM.

Robotic Process Automation

Back to top

RPA tools perform “if, then, else” statements on structured data, typically using a combination of UI interactions, or by connecting to APIs to drive client servers, mainframes or HTML code. An RPA tool operates by mapping a process in the RPA tool language for the software “robot” to follow, with runtime allocated to execute the script by a control dashboard.

See: Magic Quadrant for Robotic Process Automation

RPA PaaS

Back to top

RPA PaaS is a set of public cloud-hosted services to create and execute RPA scripts against customer applications. The service consists of web-based RPA development environments, orchestrators and a performance dashboard. The orchestrator interacts with lightweight agents installed in the client environment that execute “bots.” Unlike RPA SaaS options that offer a ready to use business capability service, RPA PaaS is intended for developers to create a new business function/service.

Digital Experience Platforms

Back to top

Gartner defines a digital experience platform (DXP) as “an integrated set of core technologies that support the composition, management, delivery and optimization of contextualized digital experiences.” DXPs place a high degree of emphasis on interoperability and cross-channel continuity across the entire customer journey.

The purpose of a DXP is to be the central technological foundation for the digital customer experience aspect of a digital business.

DXPs act as an interaction and experience layer in a complex, extensive and interconnected technology landscape. Beyond simple websites and mobile apps, organizations need to deliver, via APIs, highly contextualized digital experiences to an increasing variety of modalities (chatbots, digital assistants, voice assistants and others), channels and devices (web, mobile web, mobile apps, kiosks, IoT/smart devices, and more) across the customer journey. The DXP software market overlaps with other adjacent application technologies. These include marketing automation, personalization, digital commerce, customer communications management, web content management (WCM) and portals. (For more information, see Defining the Digital Experience Platform).

Cloud Digital Experience Platform Services

Back to top

With DXPs being the main technological driver behind CX initiatives, application leaders responsible for DXPs are under pressure to provide an agile and scalable infrastructure and empower their business partners to innovate faster. A cloud-first approach prevails because it gives organizations the advantage of a faster pace of innovation, greater scalability and agility.

Other AIM

Back to top

Other AIM is a miscellaneous subsegment. It includes technologies that are mature commodities (such as adapters and ORBs), in their infancy, or currently relatively small in revenue size (such as BRE software, business process modeling tools and BPA tools). It also includes technologies that are close to segments we track but that do not yet fulfill the requirements to be classified within those segments. An example is BPM pure-play software that includes products that do not meet the full characteristics of BPA.

Adapters

Back to top

Adapters are small, focused programs that expose functionality and/or data in a legacy application. Our use of this term includes not only the programs, but also the framework for designing and developing adapter programs. Adapters can be deceptively complex, with “thick” adapters performing a variety of functions that include recognizing events, collecting and transforming data, and exchanging data with platform, integration suite or other middleware. However, “thin” adapters may only “wrap” a native application interface, exposing another more standard version for application access. Adapters can also handle exception conditions, and they can often dynamically (or with minor reconfiguration) accommodate new revisions of source or target applications.

Adapters are often sold in conjunction with integration middleware products, such as ESBs, integration suites or portal servers, or are offered as a stand-alone product, such as an adapter suite. Among the different adapters, high-level categories include technical and application adapters.

A comprehensive suite should include adapters for:

- Common technologies, such as Component Object Model (COM), Jakarta Enterprise Beans (formerly Enterprise JavaBeans) and web services
- Industry protocols, such as EDI, SWIFT and RosettaNet
- Common applications, such as SAP or Oracle’s PeopleSoft
- Proprietary applications, such as an adapter development kit

BPA Tools

Back to top

These tools are primarily intended for use by business end users looking to document, analyze and streamline complex processes, thereby improving productivity, increasing quality, and becoming more agile and effective. These tools also support the roles of business process architect and business process analyst, and enable them to better understand business processes, events, workflows and data, using proven modeling techniques. BPA tools permit users to:

- Diagram their processes, noting (generally abstracted) rules or specifications to promote understanding

- Validate this information using standard methodologies and best practices enabled by the software
- Automate the models, ideally, into deployable applications that leverage their analytical efforts and comply with the business process rules

BPA tools feature the following functionality:

- Business model drawing and development
- Ease of use in operation, development and administration
- Business model analysis
- Integration and automation
- Multiuser support/versioning and extensibility
- Methodology and use
- Performance and scalability
- Vertical-industry and horizontal cross-industry template support

BPM Platforms

Back to top

BPM platforms describe tools that deliver an application-independent approach to coordinating business. BPM platforms provide a set of services and tools for explicit process management (that is, process analysis, definition, execution, monitoring and administration), including support for human- and application-level interaction. BPM platforms include commercially available software products that have all these features:

- Process orchestration engine
- Modeling environment
- Human-to-human workflow
- Monitoring and analysis capabilities
- Offline simulation

- System-to-system integration
- Business process performance reporting

Only general-purpose, cross-industry BPM platforms are included in this category. There are many vertical-industry-specific BPM platform products that are not covered here.

BRE Software

Back to top

A BRE is a specific collection of design-time and runtime software that allows an enterprise to explicitly define, analyze, execute, audit and maintain a wide variety of business logic, collectively referred to as "rules." A BRE allows IT and/or business staff to define rules using decision trees, decision tables, pseudo-natural language, programming like code or other representation techniques. Unlike traditional AD approaches, a BRE isolates the rule representation from the executing business logic — providing for explicit rule management. A BRE provides features to analyze rules for rule conflicts, rule consistency and other quality issues. A BRE allows auditing of the rule execution path and firing order, and it provides a rule repository and related features to maintain and enhance the rule base. A BRE may simply provide rule externalization capabilities (separating rules from programming code), or it may provide higher-level rule-processing capabilities, such as inferencing (forward chaining, goal-directed backward chaining), case-based reasoning and advanced heuristics. Many BRE vendors are increasing their business rule management technologies and ecosystems, and are creating comprehensive business rule management systems that add capabilities to the basic BRE technology.

Only general-purpose, cross-industry BRE software is included in this category. There are many vertical-industry-specific BRE software products that are not covered here.

IoT Platforms

Back to top

IoT platforms are a set of integrated software capabilities that span efforts to improve asset management decision making, as well as operational visibility and control for plants, depots, infrastructure and equipment within asset-intensive industries. These efforts also occur within related operating environments of those industries. The IoT platform may be consumed as a technology suite or as an open and general-purpose application platform, or both in combination. The platform is engineered to support the requirements of safety, security and mission-criticality associated with industrial assets and their operating environments. The IoT platform software that resides on devices — such as controllers, routers, access points, gateways and edge computing systems — is considered part of a distributed IoT platform.

Cloud IoT Platform Services

Back to top

An IoT PaaS is a cloud service that facilitates operations involving IoT endpoints (sensors, devices, multidevice systems and fleets of systems), cloud services and enterprise resources. The platform ingests and monitors IoT event streams, enables specialized analysis and application development, engages back-end IT systems, and may help control the endpoints to support IoT solutions.

Object Request Brokers

Back to top

ORBs are an enriched middleware platform — compared to their predecessors, RPC middleware — that include program activation, which most RPCs did not offer. Full-featured CORBA ORBs are transactional platforms, with a special affinity for the object-oriented programming model, including the activation and communications services that are particularly geared to the object-oriented software model. ORB vendors added transaction management, security and other features to their ORBs to enable demanding production applications. Object Management Group (OMG) CORBA emerged as the widely shared standard programming model for ORBs.

EDI/B2B Value-Added Networks

Back to top

This technology has existed for more than 20 years and is associated with traditional e-commerce (supply chain integration) projects. Providers of e-commerce platforms were generally called value-added networks (VANs), trading networks, internet VANs and so forth. However, in recent years, traditional EDI vendors have evolved, and new vendors have introduced new types of integration platforms to address various forms of e-commerce.

IT providers have labeled their various offerings as VANs, integration brokerages, transaction delivery networks, web services networks, business process networks, business integration networks, business process hubs, integration service providers, marketplaces, EDI SaaS and so on. Nearly 100 IT services providers worldwide offer some form of integration platform, but other than that point of commonality, they are exceptionally diverse in their overall portfolios of IT services and industries served.

Process Mining

Back to top

Process mining is designed to discover, monitor and improve real processes (specifically, not assumed processes) by extracting knowledge from event logs readily available in today's information systems. Process mining includes automated process discovery (like extracting process models from an event log); conformance checking (namely, monitoring deviations by comparing model and log); social network/organizational mining; automated construction of simulation models; model extension; model repair; case prediction; and history-based recommendations. (See Magic Quadrant for Process Mining Tools).

Task Mining

Back to top

Task mining is a technique by which enterprises can infer meaningful information by scraping desktop-level event data. This data may be from individual users or a cohort of individuals (as, for example, in a call center) and takes the form of screen recordings, keystrokes, mouse clicks and data entries. Additional mining capabilities interpret the data by applying natural language processing and optical character recognition to correlate data in different ways. Task mining helps an enterprise identify inefficiencies and automation potential, improve service, and enhance the employee experience. (See Market Guide for Task-Mining Tools).

Miscellaneous Middleware Components

Back to top

Other categories of middleware, not directly covered in our market research, include:

- **RPCs** — Communications middleware products that provide synchronous, request/reply communications via a remote procedure call.
- **Data management middleware** — Products that enable programs to read from and write to databases or files on other computers. Open database connectivity drivers, database gateways, products for remote file access, and other products oriented toward providing communications of queries and data to and from a DBMS are examples of data management middleware.
- **Web-to-host middleware** — Products that facilitate the support of HTML or Java-based clients from host-based applications.
- **Componentware** — Reusable business objects, application templates, models and technical components.
- **Miscellaneous middleware components** — Screen scrapers, integration servers, transformation engines, enterprise information integration tools and transaction delivery networks.

Also included is any form of PaaS pertaining to AIM technologies — not already counted under any specific AIM segment.

Communications Platform as a Service (CPaaS)

Market Analysts: Lisa Unden Farbound and Daniel O'Connell

CPaaS offers application leaders a cloud-based middleware platform on which they can develop, run and distribute communications software. The platform offers APIs and software development kits (SDKs) that enable custom development and simplify the integration of communications capabilities (for example, voice, SMS, chat/OTT messaging and video) into apps, services or business processes. This accelerates time to market and reduces the development costs of applications.

Developers can write applications on the platform using web languages and libraries (such as Ruby, Node.js, Python and C#). Drag-and-drop visual builders are available as well that remove the need for coding CPaaS providers offer tools and documentation — either complete SDKs, or individual libraries, APIs and IDEs — to simplify the development process.

In addition to communication APIs, CPaaS vendors may also offer modules/wrappers and visual builders for enterprise roles that may have limited coding capabilities or for fast and easy access. These act as software development shortcuts and help accelerate the cycle time to develop apps. They may originate from the platform owner or from third parties, and can be purchased from an online marketplace.

Some CPaaS providers are moving in the area of programmable SaaS. This involves offering highly customizable versions of solutions such as CCaaS and unified communications as a service (UCaaS). In this case, the PaaS capabilities are embedded in the SaaS offering. Please note that embedded platform services are not considered in this report because they are offered as features of SaaS, not as an independently standing platform service.

CPaaS provider platforms are primarily deployed on a public cloud infrastructure, and can be consumed by developers, on a self-service basis using a pay-as-you-go model. Some providers also offer highly regulated enterprises, such as banks, CPaaS for private cloud deployment.

As the CPaaS approach is better understood and accepted, enterprises are rethinking how they offer services to their customers and their employees. They are developing highly interactive and automated service experiences that allow them to compete in the digital workplace. Today, CPaaS platforms are evolving to address this new class of enterprise communication requirements.

Gartner now sees CPaaS being deployed throughout enterprise use cases (both internally and externally to drive operational and customer experiences and customer engagement) and different organization-type user bases both internally and externally:

- **Digital natives** — CPaaS is known as the cornerstone for providing a programmable communications platform to digital-native businesses such as Airbnb, Delivery Hero (foodpanda), Grab, Lyft and Uber; app economy over-the-top (OTT) players; and hyperscalers. These enterprises are focusing on building web- and mobile-based digital businesses. They are interested in rapid deployment, low startup costs and flexible scaling, and they leverage CPaaS to introduce innovative features, accelerate time to market and reduce costs. Programmable communications are a foundational part of the CPaaS business, and growth through digital-native businesses is poised to continue its expansion.

- **Traditional enterprises/brick-and-mortar organizations** (Duke University, Harrods Group, Hilton and Sony Group, among others) now seek to become more operationally efficient. These digital adopters now have an internal developer workforce to digitalize the brick-and-mortar business in a composable manner. Enterprise developers integrate mobility, communication and collaboration functionality within applications and business processes, often to enable new functionality that leads to specific business outcomes. This can include augmenting the customer experience (for example, through alerts, notifications and multichannel customer service), driving new revenue streams (for example, through digital marketing), driving operational efficiency (for example, through service automation), and improving employee engagement and collaboration.

- **Midmarket sector** — The midmarket sector is increasingly automating and digitalizing its processes from a customer-outreach perspective. Many businesses now seek new ways to communicate with their customers through CPaaS APIs using low-code and visual builders or developer tools. Many vendors are targeting this market as well (for example, Infobip, Sinch, MessageBird, Twilio, Vonage, and others).

- **SaaS platforms** — CPaaS plays a key wholesale role, often for cloud applications such as Salesforce, ServiceMax, Workday, Zendesk and Zoho. In addition developers can build application-to-person (A2P) communications or build new features to augment their SaaS products. CPaaS enables SaaS vendors to accelerate their time to market, reduce the complexity and load of daily operations and future-proof capabilities by avoiding having to “reinvent the wheel,” leaving them time to focus on the core functionality. It can also help SaaS companies differentiate their products versus competitors and generate new revenue streams.

See Market Guide for Communications Platform as a Service.

Data Management Software (Excluding DBMS)

Market Analysts: Sharat Menon and Robin Schumacher

See Table 10 for an overview.

Table 10: Data Management Software (Excluding DBMS)

Data Management Software (Excluding DBMS) ↓				
Data Integration Software	Data Quality Software	Master Data Management	Metadata Management Software	Other Data Management Software

Source: Gartner (October 2023)

Data Integration Software

Data integration software is used to enable access, delivery and transformation of data across independently designed data structures and deployed systems to support analytical and operational use cases. It enables multiple data delivery mechanisms such as batch movement, data replication, messaging, streaming and data virtualization. It is delivered as a software or as a service. It is meant for both nontechnical users and technical users, as the UX can be self-service or code-based.

See Magic Quadrant for Data Integration Tools.

Data Quality Software

Data quality software is used to identify, understand and correct flaws in data to support effective data and analytics governance across operational business processes and decision making. It enables profiling, parsing, standardization, cleansing, matching, monitoring, rule creation and analytics, as well as built-in workflow, knowledge bases and collaboration. It is delivered as a software or as a service. It is meant for both nontechnical users and technical users, as the UX can be self-service or code-based.

Master Data Management

Master data management software is used to enable the business discipline of ensuring the uniformity, accuracy, stewardship, semantic consistency and accountability of an enterprise's official, shared master data assets. It manages the modeling, business process capture, data governance, semantic handling, and synchronization of master data. It is delivered as a software or as a service and used by nontechnical users who both help in administering and defining master data and use master data assets through applications, and technical users who design and manage master data repositories.

Metadata Management Software

Metadata management software is used to capture, manage and activate metadata on data semantics, location, access, trust and utilization to support effective data and analytics governance and data analysis. It enables the building of data catalogs, monitoring data lineage, performing impact analysis, creating data valuation models, semantic modeling, workflow management and bidirectional metadata exchange with other tools. It is delivered as a software or as a service. It is meant for both nontechnical users and technical users, as the UX can be self-service or code-based.

Other Data Management Software

Other data management software refers to software that is partly used for data management purposes, but cannot be represented as a truly stand-alone data management software. If an enterprise application such as an ERP or a data science platform needs to manage data through this application in order to support its core functionality (which is not data management), then a part of the revenue made by that application/software is shown within the other data management software segment.

Database Management Systems

Market Analysts: Robin Schumacher and Sharat Menon

A DBMS is a complete software system used to define, create, manage, update and query a database. A database is an organized collection of data that may be in multiple formats and may be stored in some form of storage medium (which can include hard-disk drives, flash memory, solid-state drives and/or DRAM). Additionally, DBMSs provide interfaces to independent programs and tools that both support and govern the performance of a variety of concurrent workload types. There is no presupposition that DBMSs must support the relational model or that they must support the full set of possible data types in use today. Further, there is no restriction that the DBMS must be a commercial product. Commercially supported open-source DBMS products are included in this market.

The DBMS market is segmented into three categories:

- Relational DBMS (RDBMS)
- Nonrelational DBMS (NRDBMS)
- Prerelational-era DBMS (PRDBMS)

See Table 11 for an overview.

Table 11: Database Management Systems

Database Management Systems ↓		
RDBMS	Nonrelational DBMS	Prerelational-Era DBMS

Source: Gartner (October 2023)

Relational Database Management System

Back to top

An RDBMS is software used to manage and query a database using the relational data model and SQL. It can be deployed as software, as a service and as a hardware appliance. It is used by a business for operational and decision-making purposes as well as technical staff for building data-driven applications.

Nonrelational DBMS

Back to top

An NRDBMS is software used to manage and query a database using data formats other than the relational data model and is accessed through various APIs. It is typically deployed as software and as a service and used by a business for operational and decision-making purposes as well as technical staff for building data-driven applications.

Prerelational-Era DBMS

Back to top

A PRDBMS is software used to manage and query a database using a network or hierarchical data format that predates the relational model. It is managed and accessed on mainframe computers through the Data Language Interface (DL/I) API and used by a business for operational and decision-making purposes as well as technical staff for building data-driven applications.

IT Operations Management Software

Market Analyst: Laurie Wurster

ITOM represents software tools needed to manage the provisioning, capacity, performance and availability of computing, networking, and application resources — as well as the overall quality, efficiency and experience of IT delivery. Gartner divides the ITOM market into three submarkets — delivery automation, value management, and health and performance analysis (HPA) — in addition to mainframe and other nonspecified tools.

See Table 12 for an overview.

Table 12: IT Operations Management Software

(Enlarged table in Appendix)

IT Operations Management Software ↓	
Level 4 — Submarket	Level 5 — Category (Available Only in ITOM Market Share Report)
Delivery Automation	Cloud Management Tooling
	Container Management
	Value Stream Delivery Platforms
	Infrastructure Automation
	Network Automation and Orchestration
	Service Orchestration and Automation Platforms
	Digital Employee Experience (DEX)
	Digital Platform Conductors (DPC)
	Other Automation Tools
Value Management	IT Financial Management
	IT Service Management Platforms
	IT Asset Management and Software Asset Management
	Other Value Management Tools
Health and Performance Analysis	Artificial Intelligence for Operations Platforms (AIOps)
	Application Performance Monitoring and Observability Platforms (APM&O)
	Digital Experience Monitoring
	IT Infrastructure Monitoring
	Network Performance Monitoring
	Other Monitoring Tools
ITOM Mainframe Tools	(No breakdown)
Other ITOM	(No breakdown)

Source: Gartner (October 2023)

Delivery Automation

Back to top

Delivery automation (DA) tools automate, supplement or augment manual deployment or update processes. These tools perform changes to a system (hardware or software) or provide a mechanism to integrate across (disparate) systems and management tools to execute a single or multiple process workflows.

Cloud Management Tooling

Back to top

This provides governance, life cycle management, brokering and automation for managed cloud infrastructure resources with support across multicloud environments and migration into or between clouds.

For more information, see Market Guide for Cloud Management Tooling.

Container Management

Back to top

These tools provide orchestration and scheduling of container management tasks, as well as other resource management, including storing container runtimes.

For more information, see Magic Quadrant for Container Management

Value Stream Delivery Platforms

Back to top

Value stream delivery platforms (VSDPs) enable continuous delivery of software including project or product planning, build automation, continuous integration, test automation, continuous deployment and rollback, release orchestration, and automated security policy enforcement.

For more information, see Magic Quadrant for DevOps Platforms.

Infrastructure Automation

Back to top

These tools enable design and implementation of self-service, automated delivery services to manage service life cycle from creation through retirement. On-demand, self-service access to standardized environments is provided via a centralized administration console.

Network Automation and Orchestration

Back to top

Network automation and orchestration (NA/O) tools automate tasks for controlling configuration, deployment and maintenance of network devices or public cloud network services. These also include incident management functionality for fault isolation, classification, workflow and vulnerability remediation.

For more information, see Market Guide for Network Automation Tools.

Service Orchestration and Automation Platforms

Back to top

Service orchestration and automation platforms (SOAPs) enable design and implementation of business services through a combination of workflow orchestration, run book automation and resource provisioning across hybrid digital infrastructure. They must include a unified administration console and mobile apps for scheduling batch processes, monitoring task statuses and alerting users when new events are triggered.

For more information, see Market Guide for Service Orchestration and Automation Platforms.

Digital Employee Experience (DEX)

Back to top

Digital employee experience (DEX) tools help IT leaders measure and continuously improve the technology experience that companies offer to their employees.

For more information, see Transform the Digital Employee Experience with an Evolving Digital Workplace.

Digital Platform Conductor (DPC)

Back to top

Digital platform conductor (DPC) tools coordinate the various infrastructure tools used to plan, implement, operate and monitor underpinning technology and services for applications and digital products.

For more information, see Market Guide for Digital Platform Conductor Tools.

Other Automation Tools

Back to top

These tools are not specifically identified but represent revenue remaining in this category, including IT service dependency mapping tools, heuristic infrastructure and operations (I&O) automation, and server automation.

Value Management

Back to top

Value management tools focus on improving the quality, efficiency and costs of the delivery and support of digital customer experiences. Digitalization's impact is focused on providing a greater variety of support channels. However, the disruptive impacts of SaaS delivery models and advanced analytical technologies (such as artificial intelligence for operations [AIOps]) are also included.

IT Financial Management

Back to top

IT financial management (ITFM) tools aggregate and allocate all IT spend and consumption data from disparate systems against a cost model designed to provide transparency into IT spending for purposes of budgeting and planning.

For more information, see Market Guide for IT Financial Management Tools.

IT Service Management Platforms

Back to top

IT service management (ITSM) platforms provide the following foundational capabilities:

- IT incident management
- Problem management
- Change management
- Configuration management
- Release governance
- IT user self-service (for knowledge and request management)
- IT knowledge management

- IT service support analytics and reporting
- SLA management regarding incident and service requests

Optionally, more advanced tools may provide ITOM functionality or integrate with third-party ITOM tools.

For more information, see Magic Quadrant for IT Service Management Platforms.

IT Asset Management and Software Asset Management

Back to top

IT asset management (ITAM) tools provide inventory, management, and optimization of technology assets through the use of processes and tools throughout an asset's life cycle. This includes managing software licenses and SaaS consumption.

For more information, see Market Guide for Software Asset Management Tools.

Other Value Management Tools

Back to top

These include other legacy value management tools that are no longer actively identified/tracked but represent revenue remaining in this category.

Health and Performance Analysis

Back to top

HPA software tools are used to monitor and manage the availability and performance of applications and infrastructure and include enterprisewide consoles and management platforms.

Artificial Intelligence for Operations Platforms

Back to top

Artificial intelligence for IT operations (AIOps) tools ingest operations data generated by IT systems to aggregate, analyze, identify issues and aid problem resolution, as well as provide transparency and reporting.

For more information, see Market Guide for AIOps Platforms.

Application Performance Monitoring and Observability

Back to top

Application performance monitoring and observability (APM&O) tools collect and analyze the performance and behavior of end-user interactions with applications by discovering applications and their relationships.

For more information, see Magic Quadrant for Application Performance Monitoring and Observability and Hype Cycle for Monitoring and Observability, 2023.

Digital Experience Monitoring

Back to top

Digital experience monitoring (DEM) tools monitor the availability, performance and quality of experience an end user or digital agent receives when interacting with an application and the supporting infrastructure.

For more information, see Market Guide for Digital Experience Monitoring.

IT Infrastructure Monitoring

Back to top

IT infrastructure monitoring (ITIM) tools monitor and collate availability and resource utilization metrics of physical and virtual entities, including servers, containers, network devices, database instances, hypervisors and storage.

For more information, see Market Guide for Infrastructure Monitoring Tools.

Network Performance Monitoring

Back to top

Network performance monitoring (NPM) tools monitor and collect data to provide a holistic view of corporate network performance, including network-device-generated traffic data, raw network packets, network-device-generated health metrics and events. This data can be analyzed to identify the root causes of performance degradations and insight into the quality of the end-user experience.

Other Monitoring Tools

Back to top

These tools that are no longer actively identified but revenue remains in this category include log monitoring, capacity planning and management tools, dynamic optimization technology, network packet brokers, and unified communications monitoring tools.

ITOM Mainframe Tools

Back to top

ITOM mainframe tools are used for managing and monitoring mainframe implementations. A roll-up of mainframe categories captured here include application performance monitoring, monitoring, DBMS management, automation, workload automation and IT process automation (ITPA).

Other ITOM

Back to top

Other ITOM includes any management tools and/or integrated functionality not specifically covered within the named categories detailed previously. Tools in this category include, but are not limited to, output management software used to manage hardware peripherals, such as printers. Emulators are windows/portals into mainframe, mini- and other platforms. Database administration automation and support tools automate routine administration of databases, schema development and management, query analyzers, reorganization utilities, space tuners, and bulk data loading/unloading technologies.

Operating Systems

Market Analyst: Arunasree Cheparthi

See Table 13 for an overview.

Table 13: Operating Systems Market Overview

Operating Systems ↓	
Client OS	**Server OS**
■ Apple macOS ■ Microsoft Windows Client	■ Linux (Server) ■ UNIX ■ Other OSs ■ Windows (Server)

Source: Gartner (October 2023)

Operating systems manage a computer's resources and tasks, including orchestrating workloads, memory management, control of displays and other I/O peripheral devices, user interface, networking, and file management.

Client operating systems run on consumer or business end users' stand-alone devices, such as desktops and laptops, and are designed to be used by a single individual on a single device. These OSs support relatively simple operations, such as scheduling, generating requests and controlling peripherals. They include macOS and Windows (client).

Server operating systems run on more-powerful hardware, often with multiple CPUs or multicore CPUs, and are designed to be accessed by many users in a shared environment simultaneously. These are capable of handling complex operations, such as management of network resources and large volumes of datasets. Categories include Linux (server), UNIX and other OSs, and Windows (server).

Security Software

Market Analysts: Shialendra Upadhaya and Rahul Yadav

See Tables 14 and 15 for an overview.

Table 14: Security Software Market Overview (1)

Security Software (1) ↓				
Integrated Risk Management	Application Security	Consumer Security Software	Infrastructure Protection	Identity Access Management
■ Integrated Risk Management Solutions	■ Application Security Testing ■ Vulnerability Assessment ■ Web Application Firewalls	■ Consumer Security Software	■ Endpoint Protection Platforms (Enterprise) ■ Secure Email Gateway ■ Security Information and Event Management ■ Secure Web Gateway ■ Threat Intelligence	■ Identity Governance and Administrat ■ Access Manageme ■ Privileged Access Manageme ■ User Authenticat

Source: Gartner (October 2023)

Table 15: Security Software Market Overview (2)

Security Software (2) ↓			
Data Security	Cloud Security	Network Security Equipment	Other Security Software
■ Enterprise Data Loss Prevention ■ Encryption ■ Tokenization	■ Cloud Access Security Brokers ■ Cloud Workload Protection Platforms	■ Firewalls ■ Intrusion Detection and Prevention Systems ■ Network Access Control ■ Network Detection and Response ■ Zero Trust Network Access	

Source: Gartner (October 2023)

Integrated Risk Management

Integrated Risk Management Solutions

Back to top

Integrated risk management (IRM) solutions provide capabilities such as risk and control documentation/assessment, incident management, risk mitigation, key risk indicator reporting/monitoring, and risk quantification and analytics. The IRM market consists of vendors that address one or more of these use-case domains:

- **Digital risk** — Digital risk management technology integrates the management of the risks of digital business components associated with digital products and services — such as cloud, mobile, social and big data — and third-party technologies.

- **Environmental, social and governance (ESG) risk** — ESG risk refers to a collection of corporate performance evaluation criteria that assess the robustness of a company's governance mechanisms and its ability to effectively manage its environmental and social impacts.
- **Vendor/third-party risk** — Vendor/third-party risk management technology enables adequate controls for business continuity management, performance, viability, security and data protection across an array of third parties and vendors. Controls address risks to regulatory compliance, information security and vendor performance arising from enterprises' increased use of, and reliance on, suppliers, service providers and IT vendors.
- **Quality risk** — Quality risk management technology (also known as quality management systems) provides the business information management system that houses quality policies and standard operating procedures (SOPs).
- **Business continuity** — Business continuity is the practice of coordinating, facilitating and executing activities to identify risks of business disruptions, implement disaster recovery solutions and recovery plans, respond to disruptive events, and recover mission-critical business operations. Business continuity technology automates processes such as risk assessment; business impact analysis (BIA); and recovery plan development, implementation and invocation.
- **Internal audit** — Internal auditors independently and objectively evaluate, analyze and assess the effectiveness of an organization's system of internal control, governance processes and risk management capability. The audit management solution market automates internal audit operations, such as audit planning, scheduling, work paper management, time and expense management, reporting, and issue management.
- **Environment, health and safety (EH&S)** — EH&S applications are designed to help manage employee health, reduce safety incidents, manage the environmental footprint, and help to ensure regulatory compliance and operational continuity. The applications can be broadly divided into several categories: occupational health/industrial hygiene and incident management, product safety and compliance, health and safety applications, environmental monitoring and control, and industrial operational risk management.

- **Ethics and compliance** — Ethics and compliance technology includes code of conduct and corporate policy management, employee compliance training and certification, whistleblower hotline and investigative case management, conflict of interest disclosure management, gifts and entertainment approval workflow, and compliance risk assessment.
- **Privacy risk** — Privacy risk management tools help organizations conduct privacy impact assessments, check processing activities against requirements from privacy regulations, and track incidents that lead to unauthorized disclosures of personal data (investigation, remediation, reporting). They analyze and document data flows of personal information (nature of data, purpose of processing, data controller), support authoring and distribution of privacy policies (for which they provide templates) and track user awareness (users acknowledge having read the policies).
- **Legal risk** — Legal risks are more effectively managed through better documentation, spend management, information availability and collaboration via an integrated set of applications, broadly referred to as enterprise legal management. These applications can include matter management, e-billing, financial/spend management, legal document management, legal contract management and BPM.

Application Security

Application Security Testing

Back to top

Gartner defines the application security testing (AST) market as the buyers and sellers of products and services designed to analyze and test applications for security vulnerabilities. Gartner identifies four main styles of AST:

- **Static AST (SAST)** technology analyzes an application's source, bytecode or binary code for security vulnerabilities, typically at the programming and/or testing SLC phases.
- **Dynamic AST (DAST)** technology analyzes applications in their dynamic, running state during testing or operational phases. It simulates attacks against an application (typically web-enabled applications and services), analyzes the application's reactions and, thus, determines whether it is vulnerable.

- **Interactive AST (IAST)** technology combines elements of SAST and DAST simultaneously. It is typically implemented as an agent in the test runtime environment (for example, instrumenting the Java Virtual Machine [JVM] or Microsoft .NET Common Language Runtime [CLR]) that observes operation or attacks and identifies vulnerabilities.
- **Mobile AST** performs SAST, DAST, IAST and/or behavioral analysis on byte or binary code to identify vulnerabilities in mobile applications.

Vulnerability Assessment

Back to top

The vulnerability assessment market is composed of vendors that provide capabilities to identify, categorize and manage vulnerabilities, such as unsecure system configurations or missing security updates in network-attached devices.

Web Application Firewalls

Back to top

A web application firewall (WAF) is a shielding safeguard positioned in front of web servers, intended to protect web applications. WAFs focus primarily on web server protection at Layer 7 — the application layer — which includes classes of "self-inflicted" vulnerabilities in configured commercial applications or in custom-developed code and may also include safeguards against some attacks at other layers.

Consumer Security Software

Consumer Security Software

Back to top

This category includes stand-alone suites of endpoint security products, including antivirus, anti-spyware, personal firewalls and host-based intrusion prevention systems (HIPSs). Desktop and subscription antivirus sold or rented only to the small office/home office (SOHO) segment and consumers are included in this subsegment.

Infrastructure Protection

Endpoint Protection Platforms (Enterprise)

Back to top

This category comprises centrally managed suites of endpoint security products, including endpoint-delivered anti-malware, personal firewalls, data loss prevention (DLP), whole-disk encryption, web filtering and host intrusion prevention. Endpoint protection platform (EPP) suites also include emerging capabilities for advancing threats, such as exploit prevention, device control, malicious script detection and application control.

As the market has evolved, our EPP segment also includes endpoint detection and response (EDR) capabilities. These include detecting malicious activities more broadly, including live analysis, containment, threat investigation, threat hunting and incident response capabilities to recover from an endpoint security threat.

Secure Email Gateway

Back to top

This category comprises solutions (software, appliances or managed services) that scan or block inbound email at the SMTP gateway for viruses, spam and malicious code. Increasingly, these boundary solutions may also scan outbound email for compliance with internal policies.

Security Information and Event Management

Back to top

This category includes security information and event management (SIEM) software products providing:

- **Log collection and retention** — The ability to collect and provide long-term storage of relevant events and logs
- **Security event management** — The ability to process near-real-time data from security devices and systems to determine when security events of interest have occurred
- **Security information management** — Reporting, investigation and historical analysis to support security policy compliance management and the generation of security metrics

Secure Web Gateway

Back to top

Secure web gateway (SWG) solutions protect users from web threats and enforce company internet usage policies. SWG blocks unwanted software/malware from user-initiated web/internet traffic and enforces corporate internet and regulatory policy compliance. These gateways must, at a minimum, include URL filtering, malicious-code detection and filtering, and application controls for popular web-based applications (such as IM and Microsoft Skype). Zero trust network access (ZTNA), remote browser isolation (RBI), sandbox, firewall as a service (FWaaS) and DLP are increasingly included. This category includes SWG cloud-based service and appliance products.

Threat Intelligence

Back to top

Threat intelligence (TI) is evidence-based knowledge, including context, mechanisms, indicators, implications and action-oriented advice, about an existing or emerging menace or hazard to assets. This intelligence can be used to inform decisions regarding the subject's response to that menace or hazard. TI is made available through portals, online delivered feeds, subscription-based analyst personnel support and platform software.

There is an increasing involvement and availability of TI capabilities from nontraditional TI providers coming from markets such as endpoint, network and email security. A significant number of vendors remain in the TI service and product market supporting a wide range of use cases. The larger vendors typically offer multiple products and capabilities, while smaller vendors offer boutique, focused solutions. Some managed security providers sell the TI they use in their managed service offerings as stand-alone offerings. Digital risk protection services (DRPS) are still offered by specialist vendors, but there is a gradual increase in the number of conventional TI service and managed security vendors offering DRPS as an add-on.

DRPS and external attack surface management (EASM) are emerging markets, as noted in Hype Cycle for Security Operations, 2023. Mature organizations are seeking access to data lakes of DRPS and EASM data to conduct their own operations.

TI point solutions enable organizations to collect, curate, process and disseminate TI within the organization. However, operationalizing and automating intelligence is where organizations begin to see value.

Identity Access Management

Identity Governance and Administration

Back to top

Identity governance and administration (IGA) solutions aggregate and correlate disparate identity and access rights data across the IT landscape to provide admin-time controls over user access. Core functionality includes identity life cycle management, entitlement management, policy and role management, workflow, access request management and access certification, fulfillment via automated connectors and service tickets, auditing, and identity analytics and reporting. Additional capabilities often included in IGA systems are password management, self-service capabilities for profile management, and case management for auditing and remediating policy violations, such as segregation of duties.

Access Management

Back to top

Access management refers to technologies that use access control engines to provide centralized authentication, single sign-on (SSO), session management and authorization enforcement for target applications in multiple use cases (such as B2E, B2B and B2C). Target applications may have traditional web application architectures, native mobile architectures or hybrid architectures. Increasingly, target systems include APIs. Smart or constrained devices with or without human operators may be incorporated as well. Applications may run on the customers' premises or in the cloud.

Privileged Access Management

Back to top

Privileged access management (PAM) technologies are a foundational security technology to protect accounts, credentials and operations that offer an elevated ("privileged") level of access. PAM tools control privileged access for machines (systems or applications) for internal or machine-to-machine communication, and for people who administer or configure systems and applications. Core functionality includes discovery of privileged accounts, credential management for privileged accounts, delegation of access to privileged accounts, session monitoring and recording, and controlled elevation of commands. Additional capabilities for secrets management, privileged task automation and management of remote privileged access are also often included.

User Authentication

Back to top

Gartner defines user authentication as “the real-time corroboration of a person’s claimed digital identity with an implied or notional level of trust.” It is foundational to network, application and data security, because it reduces fraud, mitigates account takeover (ATO) and other identity risks, and addresses regulatory requirements. User authentication capabilities are delivered via discrete software, hardware or cloud-based services, or are embedded in other offerings such as OSs and access management tools.

Data Security

Enterprise Data Loss Prevention

Back to top

Enterprise DLP products incorporate sophisticated detection techniques to help organizations address their most critical data protection requirements. Products are packaged in agent software for desktops and servers, physical and virtual appliances for monitoring networks and agents, or soft appliances for data discovery. Leading characteristics of enterprise DLP products include a centralized management console, support for advanced policy definition, event management workflow and reporting. Enterprise DLP functions as a comprehensive system to discover sensitive data within an organization and mitigate the risk of its loss at the endpoints, in storage and over the network. This segment does not include DLP integrated as part of another product such as secure email gateways (SEGs), SWGs or cloud access security brokers (CASBs).

Encryption

Back to top

Encryption is a method used to secure data while it is at rest and when being transmitted. Encryption uses algorithms to transform plain text into ciphertext and requires keys to decrypt the information back to its original plain text. Encryption can be used together with tokenization or individually. For example, a database with tokenization applied can be further protected using encryption. The encryption products we track in this market include file, folder and database encryption, and the key management systems that support them. It excludes hardware security modules (HSMs), CASB encryption licenses, encryption found on endpoints and native encryption with SaaS applications.

Tokenization

Back to top

Tokenization is a method used to secure data while it is at rest and when being transmitted. Tokenization turns plain text into a random string of characters derived from a database called a “token vault” versus a key vault or key management system used in encryption. Tokenization can be used together with encryption or individually.

Cloud Security

Cloud Access Security Brokers

Back to top

CASBs provide cloud governance controls for visibility, data security, threat protection and compliance assessment in SaaS and IaaS. CASB platforms consolidate multiple types of security policy enforcement, such as cloud service discovery, cloud provider risk ratings, authentication, SSO, authorization, device profiling, encryption, tokenization, sensitive data monitoring, user behavior monitoring and logging.

Cloud Workload Protection Platforms

Back to top

CWPPs provide visibility and control for physical machines, virtual machines (VMs), containers and serverless workloads in hybrid, multicloud environments. CWPP offerings protect the workload using a combination of system integrity protection, application control, behavioral monitoring, intrusion prevention and optional anti-malware protection.

Network Security Equipment

Firewalls

Back to top

Firewalls offer bidirectional controls (both egress and ingress) for securing corporate networks. These networks can be on-premises, hybrid (on-premises and cloud), public cloud or private cloud. The product has the capability to support one or more firewall deployment use cases, such as perimeter, small and midsize businesses (SMBs), data center, cloud and distributed offices.

Firewalls can also offer additional capabilities, such as application awareness and control, intrusion detection and prevention, advanced malware detection, and logging and reporting.

Our estimates include the following types of firewalls:

- Purpose-built physical appliances
- Virtual appliances
- Embedded firewall modules
- Dedicated FWaaS

FWaaS is a service directly hosted and sold by the vendor. It is not a hosted firewall service offered by managed security service providers (MSSPs), telcos or any other partner.

Intrusion Detection and Prevention Systems

Back to top

The network intrusion detection and prevention system (IDPS) market is composed of stand-alone physical and/or virtual appliances that inspect network traffic, either on-premises or in virtualized/public cloud environments. They are often located in the network to inspect traffic that has passed through perimeter security devices, such as firewalls, SWGs and SEGs. While detection only (specifically, intrusion detection system [IDS]) is still often used, a large number of appliances are still deployed in-line to allow for blocking capabilities. They provide detection via several methods. For example, signatures, protocol anomaly detection, analytics, behavioral monitoring and heuristics, advanced threat defense (ATD) integration, and TI are used to uncover unwanted and/or malicious traffic and report or take action on it.

Network Access Control

Back to top

Gartner defines network access control (NAC) as technologies that enable organizations to implement policies for controlling access to corporate infrastructure by both user-oriented devices and IoT devices. Policies may be based on authentication, endpoint configuration (posture) or users' role/identity. NAC can also implement postconnect policies based on integration with other security products. For example, NAC could enforce a policy to contain the endpoint based on an alert from a SIEM.

Network Detection and Response

Back to top

Network detection and response (NDR) was previously referred to as network traffic analysis (NTA) by Gartner.

NDR uses AI, including a combination of ML, advanced analytics and rule-based detection, to detect suspicious activities on enterprise networks. NDR tools continuously analyze raw traffic and/or flow records (for example, NetFlow) to build models that reflect normal network behavior. They also have extensive workflows to aid security analyst hunting and analysis of network forensics. When the NDR tools detect abnormal traffic patterns, they raise alerts and can optionally respond to it. In addition to monitoring north/south traffic that crosses the enterprise perimeter, NDR solutions can also monitor east/west communications by analyzing network traffic or flow records that they receive from strategically placed network sensors.

Zero Trust Network Access

Back to top

Gartner defines zero trust network access as products and services that create an identity-based and context-based, logical-access boundary encompassing a user and an application or set of applications. The applications are hidden from discovery, and access is restricted via a trust broker to a collection of named entities. The broker verifies the identity, context and policy adherence of the specified participants before allowing access, and minimizes lateral movement elsewhere in the network. ZTNA removes excessive implicit trust that often accompanies other forms of application access.

Other Security Software

Back to top

This category contains miscellaneous security software only, and it is meant to include all software not mentioned in the detailed listing. Services and any equipment for these purposes are not included.

Storage Software

Market Analyst: John L Harrel, Chandra Mukhyala

See Table 16 for an overview.

Table 16: Storage Software Market Overview

Storage Management Software ↓				
Archive	Backup and Recovery	Software-Defined Storage	Storage Resource Management	Other Storage Management Software

Source: Gartner (October 2023)

This market includes all software products sold as value-added options to run on a server, storage network device or storage device, or as a web service to aid in managing the device or managing, retaining and protecting the data. Revenue is for new license sales, service subscriptions, and maintenance and support services that include new version license sales to update an existing license to a new version, telephone support and on-site remedial support. Revenue does not include professional services. For products to be included in this coverage, they must represent a revenue stream for the company that is separately tracked and not simply part of a bundled product or service. Hosted storage management solutions, such as hosted backup or hosted archiving, are included in this market.

Storage software coverage is primarily targeted at enterprise data management, including mainframe storage, but not for data on endpoint devices like desktops and tablets. The storage software market is divided into five segments. Storage software is the sum of all the segments. It represents all the tools needed to manage the capacity, performance, availability, retention and compliance of data stored in all types of on-premises and cloud storage, as well as the networking devices that the data may pass through.

Archive

Back to top

Archiving products operate on defined retention policies often providing for the storage of a point-in-time version of data for historical reference. Archive data can be migrated to a secondary storage repository or have retention tags applied to hold in place. Active archiving products provide special technology for searching and viewing archived data, and they are generally deployed for purposes of storage efficiency and performance; compliance, governance and data management; e-discovery support; and application performance optimization and retirement.

Backup and Recovery

Back to top

Backup and recovery software products are designed to:

- Capture a copy (backup) of data
- Write it out to a secondary device, such as tape, disk or an optical device, and/or to a public or private cloud
- Provide recovery of that data when needed

This segment also includes software products focused specifically on supporting the recovery process, such as the software components of virtual tape libraries and other disk-based backup solutions. Additional software offerings include media management, deduplication and backup reporting products, as well as archiving that is built into the backup application without additional charge.

Software-Defined Storage

Back to top

Software-defined storage (SDS) creates and provides data center services to replace or augment traditional storage arrays. It can be deployed as a VM, as a container or as software on a bare-metal x86 industry standard server, allowing organizations to deploy a storage-as-software package. These products create a storage solution that can be accessible by file, block or object protocols. It can be deployed as an out-of-band technology with robust policy management, I/O optimization and automation functions to configure, manage and provision other storage resources. SDS products enable abstraction, mobility, virtualization, storage resource management (SRM) and I/O optimization of storage resources to reduce expenses, making external storage virtualization software products a subset of the SDS category.

Storage subsystems and storage area network (SAN) infrastructure component software products provide configuration utilities and agents that collect capacity, performance and status information — usually for a single device type or a set of devices from a single vendor.

Storage Resource Management

Back to top

SRM products provide data collection and automation agents that consolidate and operate on information from multiple platforms supporting storage management tools on multiple OSs, storage devices and SAN devices. Key functions include:

- Reconciliation of application, server and storage usage
- Capacity reporting, forecasting and analysis
- Performance reporting and analysis
- Capacity and performance management automation
- Resource availability
- Storage provisioning
- Storage management product integration
- Application and database integration
- Hardware integration

Basic network and system management (NSM) integration should provide the ability of the SRM product to externalize events to other management products. Product-specific integration includes the ability to launch the SRM product from the NSM console. Integration with device resource management products and media management products should include launch of hardware configuration utilities from the SRM console, collection and reporting of agent information, and integration of logical-level data. Typical SRM tools require a SAN management tool to manage and collect data from heterogeneous devices on the SAN. Stand-alone SAN management tools are also included in the SRM segment. Products that provide for discovery, topology mapping and monitoring of SAN components are also included in this segment because many are being included with SRM suites or are expanding to include SRM functionality. SRM tools may offer real-time or historical views into one or several of the physical, volume/virtual, file or database levels and/or point-in-time copy views.

Other Storage Management Software

Back to top

The other storage software subsegment includes storage software products for managing mainframe implementations and file analysis and other storage software products that are not tracked in the named segments.

Virtualization Infrastructure Software

Market Analyst: Brandon Medford

See Table 17 for an overview.

Table 17: Virtualization Infrastructure Software Market Overview

Virtualization Infrastructure Software ↓		
x86 Server Virtualization Infrastructure	Virtual Desktop Infrastructure	Server-Based Computing

Source: Gartner (October 2023)

x86 Server Virtualization Infrastructure

Back to top

x86 server virtualization infrastructure includes the hypervisor, VM and virtual machine monitors (VMMs) for the x86 processor family. The key to "virtualizing" a server is the hypervisor, whereas the virtualization management software provides the ability to administer and operate at scale. A hypervisor is a layer of software that runs directly on hardware and allows the definition of fixed partitions with predefined priorities for accessing hardware resources. (The term "software" can mean including preloaded software that may run in a protected area or microcode/firmware, depending on the implementation.) These partitions are incomplete VMs because they prioritize, but do not share, all hardware resources. To support flexible configuration, a hypervisor in general is implemented with a VMM. The VMM virtualizes all hardware needed for VMs to run. Most x86 server virtualization products currently labeled as hypervisors bundle a VMM and create added value, as well as differentiation, within the virtualization management layer.

OS virtualization was added to this document in 2014, but it is not formally forecast at this time, nor are VM-integrated containers. Containers are an OS virtualization technology that enables multiple applications to share an OS kernel. It is different from virtualization using a hypervisor, sometimes known as partitioning virtualization.

Virtual Desktop Infrastructure

Back to top

Virtual desktop infrastructure (VDI) is a full, thick-client user environment run as a VM on a server and accessed remotely. VDI implementations comprise:

- Server virtualization software to host desktop software (as a server workload)
- Brokering/session management software to connect users to their desktop environments
- Tools for managing the provisioning and maintenance (for example, reimages) of the virtual desktop software stack

This category does not include associated hardware, such as thin clients or infrastructure required to manage the environment.

Server-Based Computing

Back to top

Server-based computing is remote, shared-server OS execution of Windows applications and/or desktops that can be delivered to numerous device types, including tablets, using dedicated software agents or via web browser technologies. It is also known as remote desktop services, terminal services and presentation virtualization.

Other Infrastructure Software

Other infrastructure software includes, but is not limited to, clustering and remote-control software, IT resilience orchestration automation software, directory servers, OS tools, Java license fees, mainframe infrastructure, and mobile and wireless infrastructure. It also includes other infrastructure software that is reported in vendors' income statements but is not reported in our Market Share publications.

IT Resilience Orchestration Automation

IT resilience orchestration automation solutions provide improved IT service availability, recovery and integrity through the automation of application workload failover and failback. They also provide improved data integrity and consistency between a primary production data center and a secondary recovery site, which may be an internal data center, a provider-managed data center or a virtual data center in a public cloud.

Networking Software

Market Analyst: Christian Canales

This market includes software licensing and subscriptions, that broadly add management, security and other capabilities to network equipment, which can be hardware-based or virtualized.

See Table 18 and 19 for an overview.

Table 18: Networking Software Market Overview (1)

Networking Software (1) ↓				
Enterprise Campus Ethernet Switches	Data Center Ethernet Switches	Cloud Networking Software	Application Delivery Controllers	SD-WAN Equipment

Source: Gartner (October 2023)

Table 19: Networking Software Market Overview (2)

Networking Software (2) ↓			
WLAN Access Points	Branch Office and Core Routers	Firewall as a Service	Virtual Firewalls

Source: Gartner (October 2023)

Enterprise Campus Ethernet Switches

Back to top

This includes revenue tied directly to switching software, which includes network operating system (NOS), NOS licenses and licensed features specific to switching/NOS. For campus switches, software revenue estimates include:

- Mandatory OS licenses

- Separate licenses for additional features (for instance, specific routing protocols, advanced quality of service [QoS], virtual chassis functionality and real-time performance monitoring)
- SaaS revenue for cloud-managed switches (for example, solutions such as Cisco Meraki and Hewlett Packard Enterprise's [HPE's] Aruba Networking Central)

Data Center Ethernet Switches

Back to top

This comprises revenue tied directly to switching software, which includes NOS, NOS licenses and licensed features specific to switching/NOS. However, we exclude:

- Fabric management software — software to manage a collection of physical switches as a single construct that goes beyond basic device management.
- Cloud networking software — software used to move packets (beyond just automation and visibility), which enables operation of a network in multiple cloud environments. This is covered under our "cloud networking software" estimates.
- Optional licensing for separate network management/monitoring solutions — solutions that primarily manage/monitor the switching infrastructure (for example, Cisco Nexus Dashboard and VMware vRealize Network Insight).

Cloud Networking Software

Back to top

Cloud networking software (CNS) enables the design, deployment and operation of a network within cloud environments. Organizations using CNS can deploy it in one, or multiple, cloud environments, including public cloud(s), private cloud(s) and distributed cloud/edge locations. These products ensure consistent networking policy, network security, governance and network visibility across multiple cloud environments via a single point of management. They also address traffic routing, secure ingress/egress and integrate with available services. These products are delivered as software, which can be self-managed and/or delivered as a service, and are accessible via APIs and user interfaces. They can utilize overlays and agents and/or orchestrate native cloud provider capabilities.

Application Delivery Controllers

Back to top

Software licensing estimates include:

- Software-based ADCs, including both commercial and open-source options with increasing support for containers and microservices
- IaaS cloud provider-integrated ADC functionality
- Over-the-top ADC-as-a-service offerings that are software-centric

SD-WAN Equipment

Back to top

This includes SD-WAN software licenses/subscriptions, virtual appliances, and software that allows already deployed traditional routers to be upgraded to support SD-WAN functionality.

WLAN Access Points

Back to top

This includes access point (AP) licenses, including cloud management licensing (for solutions such as Cisco Meraki and HPE's Aruba Central), and AP licensing for additional functionality such as locationing, automation and richer analytics.

Branch Office and Core Routers

Back to top

This includes router software license revenue for features such as advanced routing functionality and protocols, high availability, automation, web content filtering, firewalling, IDS, traffic load balancing and more. Revenue/spending from sales of virtual routers is included in this segment.

Firewall as a Service

Back to top

Firewall as a service (FWaaS) consists of cloud-based security solutions that are hosted by a vendor and provide firewall features, traffic tunneling and centralized policy management. FWaaS tends to be deployed to protect small branch offices and mobile users. This segment does not include hosted firewall services offered by managed security service providers (MSSPs), telecom providers or any other partner.

Virtual Firewalls

Back to top

Virtual firewalls are composed of network firewalling technologies that have the ability to enforce access policy between virtual machines (VMs) that reside within a hypervisor. They can be deployed in IaaS and virtualized data center environments (whether in the cloud, private and public, or on-premises running on servers). Multiple sourcing methods apply for buyers, including software licensing, as well as emerging bring your own license (BYOL) and pay as you go (PAYG) models for the public cloud.

Our estimates exclude firewall revenue derived from the native cloud security controls offered by IaaS providers. This revenue is included in Gartner's Market Share and Forecast reports for public cloud services but is not reported separately.

Channel Definitions

This section describes the channel definitions used by Gartner, where analyzed. Our software distribution channel research is intended to cover at least the two top segments (direct channel and indirect channel).

Direct Channel

This is a channel through which hardware, software and peripherals are sold by the manufacturer directly to the end user:

- **Direct sales force** — This is a channel through which products move directly from the manufacturer or vendor to the end user, usually by a professionally trained field sales force.

- **Internal sales/sales development representative (SDR)** — This is a channel through which manufacturers sell their own products directly to end users through the use of the telephone, web, fax, fax-back and mail, including email and catalog.

- **Direct retail —** This channel includes storefront operations owned and managed by the vendor, typically a manufacturer of computer systems. This channel includes transactions through online properties. Direct stores are more common in Europe and Japan than in other parts of the world. Sales through direct stores are not reported separately by Gartner's worldwide services. They are grouped under direct sales force or one of the indirect channels.

Indirect Channel

This is a channel through which independent third-party organizations resell products. In software markets, VARs and systems integrators are two typical examples of the indirect channel:

- **Dealer/distributor —** Dealers are a group of resellers, including independent, regional and national organizations, that normally sell products and services to the business, education and government sectors. Client meetings are typically scheduled ahead of time and are most often solicited by an outbound sales force. Dealers usually provide a low level of service, training and customer assistance, as well as other value-added services.

- **Vendor-specific agent —** This is a reseller dedicated to selling one vendor's products. The reseller store will carry the logo and products of that vendor but is not owned by the vendor (for example, some Xerox copier resellers in the U.S.).

- **Indirect fax/phone/web —** This is a channel through which resellers sell a variety of products to end users through the use of the telephone, web, fax, fax-back and mail, including catalog sales. This is different from the direct fax/phone/web channel in that the products are sold by resellers rather than direct from the vendor.

- **VAR or solution provider —** This is a reseller that usually is not a storefront operation and typically acts as a consultant to clients. To qualify as a VAR, a reseller must have developed or configured some type of software package targeted at a particular market or offer significant integration expertise to the customer.

    - VARs typically generate 40% or more of their revenue from custom products, service and support. VARs do not apply their label to the product and may not own the hardware or software.

- **Systems integrators** — These are system vendors and independent service providers that supply professional services to apply, migrate and integrate technology into business processes.

- **Service provider** — Provides total support and services for customers' projects but is less inclined to resell the technology and service provider's (TSP's) products.

- **Cloud service provider** — A provider of services hosted remotely from the customer and delivered via the internet.

Acronym Key and Glossary Terms

ABI	analytics and business intelligence
ABM	account-based marketing
AD	application development
ADLM	application development life cycle management
adPaaS	application development platform as a service
AI	artificial intelligence
AIM	application infrastructure and middleware
AIOps	artificial intelligence for operations
AP	access point
aPaaS	application platform as a service
APM	application portfolio management
AST	application security testing
ATDD	acceptance-test-driven development
B2B	business-to-business
B2C	business-to-consumer
B2E	business-to-employee
BAM	business activity monitoring
BDD	behavior-driven development
BGS	B2B gateway software
BI	business intelligence
BPA	business process analysis
BPM	business process management
bpmPaaS	business process management platform as a service
BPMS	business process management suite
BRE	business rule engine

CASB	cloud access security broker
CCaaS	contact center as a service
CCI	contact center infrastructure
CCT	content collaboration tool
CDP	customer data platform
CEAP	cloud-enabled application platform
CEC	customer engagement center
CORBA	Common Object Request Broker Architecture
CPaaS	communications platform as a service
CRM	customer relationship management
CSP	content services platform
CSS	customer service and support
CUI	conversational user interface
CX	customer experience
DAM	digital asset management
DAST	dynamic application security testing
DBMS	database management system
DLP	data loss prevention
DMP	data management platform
DOM	distributed order management
DRP	distribution requirements planning
DRPS	digital risk protection service
DSP	demand-side platform
DXP	digital experience platform
EAM	enterprise asset management
EAP	enterprise agile planning

ECM	enterprise content management
EDI	electronic data interchange
EFSS	enterprise file synchronization and sharing
EH&S	environment, health and safety
EPP	endpoint protection platform
ESB	enterprise service bus
ESG	environmental, social and governance
FMS	financial management system
fPaaS	function PaaS
FSM	field service management
FWaaS	firewall as a service
GIS	geographic information system
GPS	Global Positioning System
GTM	global trade management
GUI	graphical user interface
HDD	hypothesis-driven development
HPA	health and performance analysis
I/O	input/output
IAST	interactive application security testing
iBPMS	intelligent business process management suite
IDE	integrated development environment
IDS	intrusion detection system
IGA	identity governance and administration
IM	instant message
IMDG	in-memory data grids
IoT	Internet of Things

iPaaS	integration platform as a service
IRM	integrated risk management
ITOM	IT operations management
Java EE	Java Platform, Enterprise Edition
JCP	Java Community Process
MARTE	Modeling and Analysis of Real-time and Embedded
MCM	multichannel marketing
MFT	managed file transfer
ML	machine learning
MOM	message-oriented middleware
NAC	network access control
NDR	network detection and response
NOS	network operating system
NSM	network and system management
OOA&D	object-oriented analysis and design
OOB	out-of-the-box
ORB	object request broker
OS	operating system
OSS	operations support system
PaaS	platform as a service
PAM	privileged access management
PM	project management
PPM	project and portfolio management
RDBMS	relational database management system
REST	Representational State Transfer
RF	radio frequency

RFI	request for information
RFP	request for proposal
RPA	robotic process automation
RPC	remote procedure call
S&OP	sales and operations planning
SaaS	software as a service
SAN	storage area network
SAST	static application security testing
SCCM	software change and configuration management
SCE	supply chain execution
SCM	supply chain management
SCP	supply chain planning
SD-WAN	software-defined WAN
SDK	software development kit
SDS	software-defined storage
SEC	Securities and Exchange Commission (U.S.)
SEG	secure email gateway
SFA	sales force automation
SIEM	security information and event management
SLC	software life cycle
SOA	service-oriented architecture
SPM	sales performance management
SPP	service parts planning
SRM	storage resource management
SSO	single sign-on

SWG	secure web gateway
SWIFT	Society for Worldwide Interbank Financial Telecommunication
TDD	test-driven development
TI	threat intelligence
TMS	transportation management system
TPM	transaction processing monitor
UI	user interface
UX	user experience
VAN	value-added network
VAR	value-added reseller
VDI	virtual desktop infrastructure
VM	virtual machine
VMM	virtual machine monitor
VoC	voice of the customer
WAF	web application firewall
WAN	wide-area network
WEM	workforce engagement management
WFO	workforce optimization
WMS	warehouse management systems
WSC	workstream collaboration
ZTNA	zero trust network access

Document Revision History

Market Definitions and Methodology: Software - 28 October 2022

Market Definitions and Methodology: Software - 29 June 2021

Market Definitions and Methodology: Software - 21 July 2020

Market Definitions and Methodology: Software - 11 April 2019

Market Definitions and Methodology: Software - 13 February 2018

Market Definitions and Methodology: Software - 24 January 2017

Market Definitions and Methodology: Software - 18 February 2016

Market Definitions and Methodology: Software - 20 January 2015

Market Definitions: Software - 23 January 2014

Market Definitions: Software - 21 December 2012

Market Definitions: Software - 12 January 2012

Market Definitions: Software - 22 December 2010

Dataquest Guide: Software Market Research Definitions - 23 December 2009

Recommended by the Authors

Some documents may not be available as part of your current Gartner subscription.

How Gartner Forecasts a Market

How Gartner Estimates Market Share

Market Definitions and Methodology: Servers

Market Definitions and Methodology: IT Services

Market Definitions and Methodology: Integrated Systems

Market Definitions and Methodology: Public Cloud Services

Market Definitions and Methodology: Vertical Industries

Table 1: License-Type Matrix

	Length of Term	Include Updates?
Perpetual	Forever	No
Term	Term	No
Appliance	Forever	Varies
Open Source	Forever	Varies

Note: If the vendor's licensing model, managerial accounting and investor reporting practices do not match up to Gartner's definitions, then additional adjustments may need to be made to estimate the software and hardware revenue according to those definitions. To better serve clients, Gartner is constantly seeking to provide the best and most current software industry analysis possible. As vendors modify and evolve licensing and pricing models to achieve a competitive edge, Gartner reviews and revises its models and rules to keep up with industry practices.

Source: Gartner (October 2023)

Table 2: Analytic Platforms Market Overview

Analytic Platforms ↓			
BI Platforms	Data Science and AI Platforms	Location Intelligence Platforms	Analytic Platform Domain Offerings
■ Analytics and BI Platforms ■ Enterprise Reporting Platforms			

ABI = analytics and business intelligence; AI = artificial intelligence; BI = business intelligence

Source: Gartner (October 2023)

Table 3: Customer Experience and Relationship Management Market Overview

Customer Experience and Relationship Management ↓				
Cross-CRM	**Customer Service and Support**	**Digital Commerce**	**Marketing**	**Sales**
■ Customer Data Platforms ■ Voice of the Customer ■ Personalization ■ Customer Communication Management	■ Digital Customer Service ■ Customer Engagement Center ■ CCaaS and CCI ■ Workforce Engagement Management ■ Field Service Management	■ Digital Commerce Platforms ■ Digital Commerce Search ■ Marketplace Operation Applications	■ B2B Marketing Automation ■ Account-Based Marketing ■ Multichannel Marketing ■ Digital Ad Tech ■ Loyalty Management ■ Digital Asset Management ■ Event Technology Platforms	■ Sales Force Automation ■ Sales Engagement ■ Partner Relationship Management ■ Sales Enablement ■ Configure, Price and Quote ■ Price Optimization ■ Sales Performance Management ■ Customer Success

CCaaS = contact center as a service; CCI = contact center infrastructure

Source: Gartner (October 2023)

Table 4: ERP Market Overview

Enterprise Resource Planning ↓			
Enterprise Asset Management	**Financial Management Systems**	**Human Capital Management**	**Core Manufacturing and Operations Management**
■ Core EAM ■ APM	■ Core Financial Applications ■ Cash and Treasury Management ■ Subscription Billing ■ Financial Planning and Analytics ■ Financial Close ■ Other FMSs	■ Administrative HR ■ HR Service Management ■ Talent Management ■ Workforce Analytics ■ Emerging HR ■ Workforce Management ■ Employee Expense Management ■ Other HR Functions	■ Manufacturing Resource Planning (MRP) ■ Production Execution and Management ■ Business Intelligence

FMS = financial management system

Source: Gartner (October 2023)

Table 5: Supply Chain Management Market Overview

Supply Chain Management ↓			
Supply Chain Planning	**Supply Chain Procurement**	**Manufacturing and Operations Management**	**Supply Chain Execution**
■ Demand Planning ■ Inventory Optimization ■ Strategic Network Design ■ Supply Chain Performance Management/Analytics ■ Production and Distribution Planning ■ Sales and Operations Planning ■ Service Parts Planning	■ Buy-Side Contract Life Cycle Management ■ E-Procurement ■ E-Sourcing ■ External Workforce Management ■ Spend Analytics ■ Supplier Management ■ Accounts Payable Invoice Automation ■ Supplier E-Invoicing	■ Production Planning and Scheduling ■ Manufacturing Operations and Quality Management ■ Manufacturing Analytics	■ Distributed Order Management ■ Warehouse Management Systems ■ Transportation Management Systems ■ Global Trade Management

Source: Gartner (October 2023)

Table 6: Application Development Market Overview

Application Development ↓				
AD Mainframe Tools	**Plan**	**Create**	**Verify**	**Other AD**
■ LODE Products (Proprietary Mainframe, Mini- and Midrange) ■ Software Change and Configuration Management Products (Mainframe) ■ Testing Products (Mainframe)	■ Enterprise Agile Planning Tools ■ Requirements Definition and Management ■ Value Stream Management Platforms ■ Other Plan Tools	■ Build Tools ■ Code Tools ■ Other Create Tools	■ API Testing Tools ■ Performance Testing Tools ■ Test Automation Tools ■ Test Management Tools ■ Other Testing Tools	
AD = application development; ADLM = application development life cycle management; adPaaS = application development platform as a service				

Source: Gartner (October 2023)

Table 7: Application Infrastructure and Middleware Market Overview (1)

Application Infrastructure and Middleware (1) ↓				
Transaction Processing Monitors	**Application Platform Software**	Event Stream Processing Platforms	High-Productivity Application Platform as a Service	High-Control Application Platform as a Service
	■ Application Servers ■ Cloud-Enabled Application Platforms			■ Function PaaS

Source: Gartner (October 2023)

Table 8: Application Infrastructure and Middleware Market Overview (2)

Application Infrastructure and Middleware (2) ↓				
Application Integration Suites	B2B Gateway Software (Stand-Alone)	Integration Platform as a Service	Full Life Cycle API Management	Event Brokers and Messaging Infrastructure
				■ High-Performance Message Infrastructure ■ Cloud Message Broker Services

Source: Gartner (October 2023)

Table 9: Application Infrastructure and Middleware Market Overview (3)

Application Infrastructure and Middleware (3) ↓				
MFT Suites	Business Process Automation	Robotic Process Automation	Digital Experience Platforms	Other AIM
■ Cloud Managed File Transfer Services	■ Cloud Business Process Management Services	■ RPA PaaS	■ Cloud Digital Experience Platform Services	■ Adapters ■ BPA Tools ■ BPM Platforms ■ BRE Software ■ IoT Platforms ■ Cloud IoT Platform Services (IoT PaaS) ■ Object Request Brokers ■ EDI/B2B Value-Added Networks ■ Process Mining ■ Task Mining ■ Miscellaneous Middleware Components

Application Infrastructure and Middleware (3) ↓
AIM = application infrastructure and middleware; BPA = business process analysis; BPA = business process automation; BRE = business rule engine; RPA = robotic process automation

Source: Gartner (October 2023)

Table 10: Data Management Software (Excluding DBMS)

Data Management Software (Excluding DBMS) ↓				
Data Integration Software	Data Quality Software	Master Data Management	Metadata Management Software	Other Data Management Software

Source: Gartner (October 2023)

Table 11: Database Management Systems

Database Management Systems ↓		
RDBMS	Nonrelational DBMS	Prerelational-Era DBMS

Source: Gartner (October 2023)

Table 12: IT Operations Management Software

IT Operations Management Software ↓	
Level 4 — Submarket	**Level 5 — Category (Available Only in ITOM Market Share Report)**
Delivery Automation	Cloud Management Tooling
	Container Management
	Value Stream Delivery Platforms
	Infrastructure Automation
	Network Automation and Orchestration
	Service Orchestration and Automation Platforms
	Digital Employee Experience (DEX)
	Digital Platform Conductors (DPC)
	Other Automation Tools
Value Management	IT Financial Management
	IT Service Management Platforms
	IT Asset Management and Software Asset Management
	Other Value Management Tools
Health and Performance Analysis	Artificial Intelligence for Operations Platforms (AIOps)

IT Operations Management Software ↓	
	Application Performance Monitoring and Observability Platforms (APM&O)
	Digital Experience Monitoring
	IT Infrastructure Monitoring
	Network Performance Monitoring
	Other Monitoring Tools
ITOM Mainframe Tools	(No breakdown)
Other ITOM	(No breakdown)

Source: Gartner (October 2023)

Table 13: Operating Systems Market Overview

Operating Systems ↓	
Client OS	**Server OS**
■ Apple macOS	■ Linux (Server)
■ Microsoft Windows Client	■ UNIX
	■ Other OSs
	■ Windows (Server)

Source: Gartner (October 2023)

Table 14: Security Software Market Overview (1)

Security Software (1) ↓				
Integrated Risk Management	**Application Security**	**Consumer Security Software**	**Infrastructure Protection**	**Identity Access Management**
■ Integrated Risk Management Solutions	■ Application Security Testing ■ Vulnerability Assessment ■ Web Application Firewalls	■ Consumer Security Software	■ Endpoint Protection Platforms (Enterprise) ■ Secure Email Gateway ■ Security Information and Event Management ■ Secure Web Gateway ■ Threat Intelligence	■ Identity Governance and Administration ■ Access Management ■ Privileged Access Management ■ User Authentication

Source: Gartner (October 2023)

Table 15: Security Software Market Overview (2)

Security Software (2) ↓			
Data Security	Cloud Security	Network Security Equipment	Other Security Software
■ Enterprise Data Loss Prevention ■ Encryption ■ Tokenization	■ Cloud Access Security Brokers ■ Cloud Workload Protection Platforms	■ Firewalls ■ Intrusion Detection and Prevention Systems ■ Network Access Control ■ Network Detection and Response ■ Zero Trust Network Access	

Source: Gartner (October 2023)

Table 16: Storage Software Market Overview

Storage Management Software ↓				
Archive	Backup and Recovery	Software-Defined Storage	Storage Resource Management	Other Storage Management Software

Source: Gartner (October 2023)

Table 17: Virtualization Infrastructure Software Market Overview

Virtualization Infrastructure Software ↓		
x86 Server Virtualization Infrastructure	Virtual Desktop Infrastructure	Server-Based Computing

Source: Gartner (October 2023)

Table 18: Networking Software Market Overview (1)

Networking Software (1) ↓				
Enterprise Campus Ethernet Switches	Data Center Ethernet Switches	Cloud Networking Software	Application Delivery Controllers	SD-WAN Equipment

Source: Gartner (October 2023)

Table 19: Networking Software Market Overview (2)

	Networking Software (2) ↓		
WLAN Access Points	Branch Office and Core Routers	Firewall as a Service	Virtual Firewalls

Source: Gartner (October 2023)