IT Market Clock for ERP 2020 — Preparing for the 4th Generation of EBC

Published 28 February 2020 - ID G00465788 - 44 min read

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Initiatives: ERP

Emerging technologies and ERP vendors are bringing new capabilities to the traditional business application landscape. CIOs must collaborate with business leaders to select and adopt technologies at the right time or they risk facing diminishing returns on investment.

Overview

Key Findings

- The business is often reluctant to accept that technology has reached end of life. They must collaborate with IT to evaluate the best replacement for aging technology.
- Software vendors are creating pressure to indirectly force current and new customers to adopt technologies. However, they are failing to provide relevant proof to qualify and quantify the realistic benefits that organizations can hope to achieve through their use.
- Organizations that are weighing their options — between prolonging the life of legacy systems and adopting new technology — are finding that there are more choices to select from.
- Organizations that have stabilized business operational processes are now questioning what else they can do to maximize the value of systems they implemented.
- It is increasingly important for organizations to evaluate and adopt data and analytics and better use cases for artificial intelligence (AI) and machine learning (ML).

Recommendations

As a CIO developing and implementing postmodern ERP strategy, you should:

- Use this IT Market Clock to assess your organization's technological readiness and maturity.
- Create a proper strategic plan and roadmap to adopt technologies as opportunities develop in your existing or emerging market.

- Use postmodern ERP as a technology strategy that enables and empowers your organization to adopt various enterprise business capabilities (EBC). Regardless of whether you opt for a vendor-centric or multivendor-centric strategy, your technology landscape will involve multiplatform deployments and support.
- Identify the right time to adopt technologies based on their maturity, and the priorities and readiness of your organization. Ensure that you have a practical timeline for deployment.

Analysis

What You Need to Know

Postmodern ERP continues to evolve and remains on a significant adoption trajectory. See "CIOs Must Enable Enterprise Business Capabilities by Adopting a Copernican Shift in ERP Strategy" and "2020 Strategic Roadmap for the Future of Applications."

Several market and industry factors are critically impacting this evolution:

- Increasing digital demand for composable business capabilities to increase agility and scalability across the enterprise.
- The rising maturity of innovative technologies such as intelligent robotic process automation (iRPA), intelligent business process modeling (iBPM), Internet of Things (IoT) platforms and AI.
- A seismic shift away from static application job roles that align neatly with older ERP functionality toward more automation and machine-augmented work.
- A diverse, rapidly evolving vendor/product landscape focusing on vertical business domains, and "pervasive integration." Gartner defines "pervasive integration" as the act of integrating on-premises and in-the-cloud applications and data sources, business partners, clients, mobile apps, social networks and "things." See "How to Implement a Hybrid Integration Platform to Tackle Pervasive Integration."

Application leaders must understand these factors in order to improve the agility and measure value provided by their postmodern ERP investments. They need to work closely with, and educate, business leaders to move toward an agreed, business-led postmodern ERP strategy.

Cloud computing has been the enabler of this evolution, as it allows business to procure cloud applications directly through the vendor. Direct involvement from business in the IT procurement process has demonstrated the need to document postmodern ERP strategies and enforce strong governance processes.

The demand for minisuite combinations — for example, to have core financial and human capital management (HCM) solutions combined as a single platform — continues to grow. Organizations are adopting these minisuites as add-on services available from platform as a service (PaaS) vendors and

software as a service (SaaS) vendors. For example, in the case of Workday and Oracle, cloud HCM suites are now often purchased with financial suites from the same vendor.

The underlying and add-on platform technologies supporting postmodern ERP initiatives remain major factors when assessing the capabilities of the provided functionality. Event-driven architecture (EDA) is the latest technology platform to enable business moments and create a shift from data-centric to event-centric processing. The era of service-oriented architecture (SOA) has gradually been replaced by one of microservices architecture, making change and scaling easier. Application leaders must factor in how these new requirements fit into their postmodern ERP strategy.

Application leaders can use this IT market clock to inform a postmodern ERP strategy, determine when to retire aging technology and establish an investment plan for new platforms. This IT Market Clock helps with these decisions by mapping the most important postmodern ERP platform technologies against two considerations:

- The introduction and commoditization of technologies.
- Progress through various technology life cycles.

The IT Market Clock

Gartner monitors many types of IT-related hardware, software and services (see "Gartner's IT Market Clock: Methodology Definition" and "How to Use Gartner's IT Market Clocks"). We apply this model to the postmodern ERP technology, illustrating the relative market maturity and commoditization levels for the major classes of solution.

The patterns we observe are as follows:

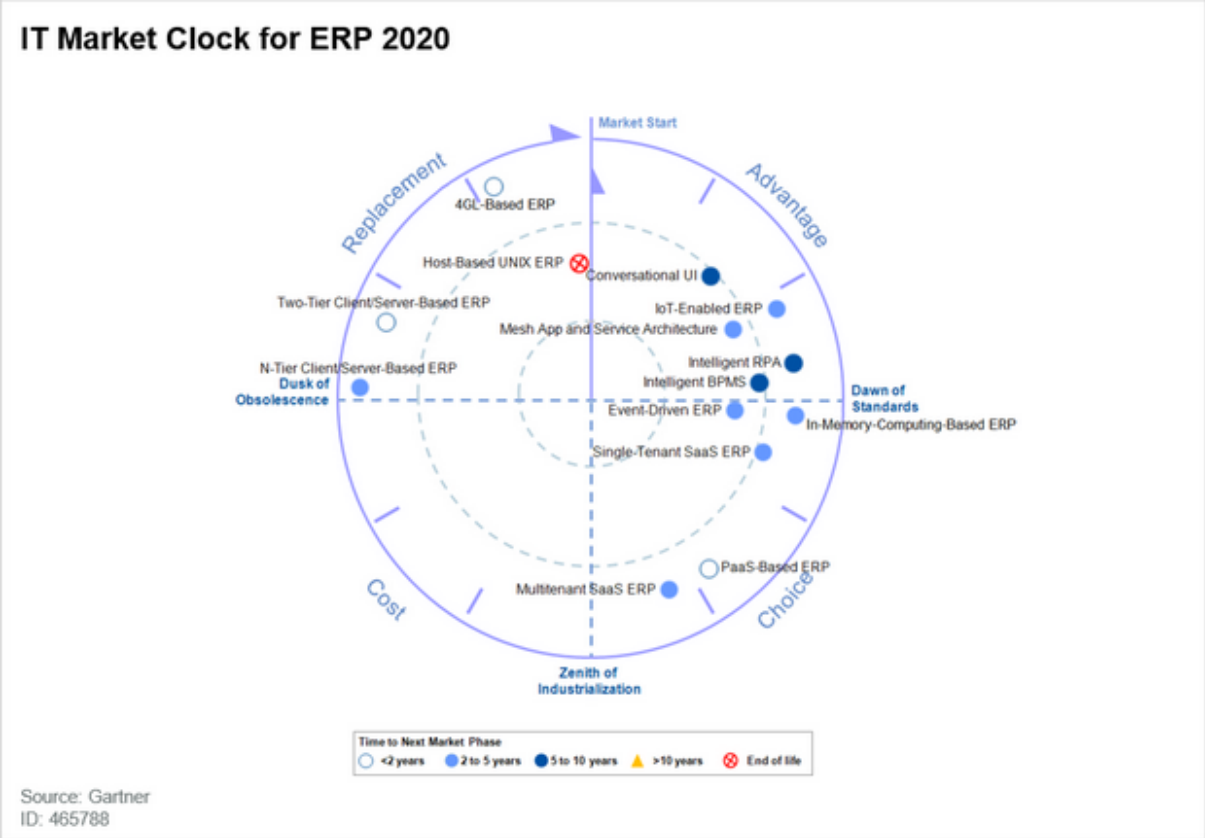
- During the early stages of its market life, an asset class is likely to be used by early adopters. The value of early-stage asset classes will make sense to only a few organizations, which have the resources and appetite to deploy cutting-edge technology. Early-stage asset classes can be highly differentiating, and as a result, they command a higher price than mature technology assets. The rate of innovation, as well as the level of skill needed to fully exploit them, will likely be high.
- As demand and supply grow, processes become more standardized and the skills required to exploit an asset class become more readily available. Hence, costs decrease. The pace of change in standardization and pricing may be high if demand and supply grow rapidly. Enterprises should monitor closely to ensure that they get maximum discounts. During this period of market evolution, a strategic advantage can usually be found through the choice of vendor and/or delivery model.
- As the solutions mature, the range of choice will continue to grow, and the skills required to use them will cease to command premium prices. Solutions from competing niche vendors will become more functionally equivalent, making the switch between them notably manageable. However, as third-party options continue to gain traction, ERP vendors are compelled to enhance their "good enough" native

applications. In the commoditized phase, switching costs reach their minimum levels, as do vendor prices and margins.

- Higher levels of commoditization typically lead to market consolidation, as scale becomes a requirement for profitably delivering products and services under growing price pressure. The result is the final phase of market development, during which the level of commoditization for the asset class decreases. Prices rise because of reduced vendor choice or declining availability of the skills needed to maintain and run the products.

The 2020 IT Market Clock for ERP positions 14 classes of technology assets, according to where they are in their market lives (see Figure 1).

Figure 1. IT Market Clock for Postmodern ERP, 2020



Useful Market Life

For each technology asset class, market life is a relative measure of where the asset class currently sits within its own life cycle. Measures are stated using the metaphor of a 12-hour clock face. The full market lifetime of delivery comprises one complete 12-hour cycle from 12:00 until 12:00.

The market life comprises four phases:

- **Advantage:** From 12:00 to 3:00, during which the market typically moves from emerging status to adolescent status. Levels of demand and competition are typically low, so the technology is procured for what it delivers, not for its placement in its own market.

- **Choice:** From 3:00 to 6:00, during which the market typically moves from adolescent status to early mainstream. This is the phase of highest demand growth, when supply options should grow, and prices fall at their fastest rate.
- **Cost:** From 6:00 to 9:00, during which the market moves from early mainstream to mature mainstream status. During this phase, commoditization is at its highest, and costs will be the strongest motivator in most procurement decisions.
- **Replacement:** From 9:00 to 12:00, during which the market moves from mature mainstream status through legacy and on to "market end." After this, the technology is no longer viable to procure or use. Procurement and operating costs will steadily rise, and enterprises should seek alternative approaches to fulfilling their business requirement.

The market life cycle positions of technology asset classes are based on Gartner's assessments of technology and market maturity. Some asset classes also appear in Gartner Hype Cycles, the span of which covers adoption from 20% to 50% market penetration. This equates to around 5:00 on the IT Market Clock (see, for example, "Hype Cycle for Postmodern ERP, 2019").

Commoditization

Commoditization is shown on the IT Market Clock as the (radial) distance from the center of the clock. The farther toward the outside an asset class is positioned, the more commoditized it is. Commoditization is measured on a scale of 4 to 20, with 20 being the maximum.

Commoditization is the sum of three measures:

- **The level of standardization** determines the potential ease which the product or technology can be interchanged, and therefore the buyer's potential capability to exercise choice.
- **The number of suppliers** defines the range of choice available to buyers. Therefore, their potential ability to take advantage of the interchangeability/interoperability yielded by standardization. This also includes the number of suppliers supporting open-source software (OSS).
- **Access to appropriate skills** measures the availability of the skills needed to use the product or technology. The ease with which these capabilities can be obtained and augmented directly impacts the internal cost of switching suppliers.

Levels of Standardization

Table 1 summarizes the scores corresponding to the different levels of standardization.

Table 1: Summary Measures of Standardization

Score ↓	Categorization ↓	Definition ↓
10	Highly standardized	There is little variation across industries, because the asset class can accommodate most industry needs. Processes, functions and technologies do not differentiate competitively.
8	Mostly standardized	Some variations are likely. Little competitive differentiation is possible.
6	Core standardization	Standardized in core areas, but variations are still likely. Standard practices are emerging, but significant variations are likely based on functional areas. Some competitive differentiation may be possible in the way functionality outside the core processes is deployed, but it is likely to be short term.
4	Increasing standardization	There is some standardization. Core processes, functions and technologies are standardizing, but competitive differentiation can be delivered in the way the asset class is deployed.
2	Low standardization	An asset class with leading-edge or innovative practices is identified. Processes, functions and technologies are highly competitive and differentiating, and can be sustained in the long term.

Source: Gartner (February 2020)

Level of Supplier Choice

Table 2 summarizes the scores corresponding to the levels of vendor choice for each asset class. We consider only vendors actively selling and supporting solutions within the asset classes. Note that this IT Market Clock uses the term “vendor,” instead of “supplier,” as it relates to solution providers. This is done to differentiate them from suppliers of goods and services for buying organizations.

Table 2: Scores for the Number of Available Vendors

Score ↓	Categorization ↓	Definition ↓
5	General availability	It is easy to find vendors in all geographies and market segments.
4	Readily available	There are several mature vendors, with good geographic and market segment spread.
3	Uneven availability	There are several mature vendors, but they are unevenly spread in market segments or geographies.
2	Increasing availability	There are increasing numbers of vendors of varying sizes.
1	Limited availability	There is a limited number of vendors.

Source: Gartner (February 2020)

Ease of Access to Appropriate Skills

Table 3 summarizes the scores corresponding to the levels of skills availability.

Table 3: Evaluating Access to Appropriate Skills

Score ↓	Categorization ↓	Definition ↓
5	General availability	Skill levels are reduced and becoming part of a general skill set.
4	Readily available	Skills are readily available and costs are falling.
3	Uneven availability	Supply and demand for skills are balanced, and costs are stable.
2	Increasing availability	Skills are in short supply, but the situation is improving (demand is falling and/or supply is increasing).
1	Limited availability	Skills are in short supply, and the shortage is set to stay the same or worsen.

Source: Gartner (February 2020)

Market Life and Commoditization Measures

Figure 2 summarizes the market life position and the commoditization scores for each asset class.

Figure 2. Market Life and Commoditization Measures

Market Life and Commoditization Measures

Asset Class	Position in Market Life	Commoditization			
		Standardization	Suppliers	Access To Skills	Total
Conversational UI	1:30	6	5	3	14
IoT-Enabled ERP	2:10	8	5	4	17
Mesh App and Service Architecture	2:10	4	5	4	13
Intelligent RPA	2:40	8	5	4	17
Intelligent BPMS	2:50	6	5	3	14
Event-Driven ERP	3:10	4	5	3	12
In-Memory-Computing-Based ERP	3:10	8	5	4	17
Single-Tenant SaaS ERP	3:35	8	4	3	15
PaaS-Based ERP	4:50	8	5	4	17
Multitenant SaaS ERP	5:15	8	5	4	17
N-Tier Client/Server-Based ERP	9:05	10	5	4	19
Two-Tier Client/Server-Based ERP	9:40	8	5	5	18
4GL-Based ERP	11:10	10	5	4	19
Host-Based UNIX ERP	11:50	8	2	1	11

Source: Gartner
ID: 465788

IT Market Clock Changes for 2020

For 2020, the IT Market Clock for ERP has undergone significant changes reflecting the latest developments in the market. Of the 14 asset classes, five are in the Advantage phase and five in the Choice phase. Due to the aggressive cycle of adoption of new technology for digital transformation, we have 0 in the Cost Phase. For legacy technology, there are four in the Replacement phase.

New for 2020

We have added the following asset classes to the Market Clock for 2020:

- Intelligent business process management suites (iBPMS) — Customers are increasingly adopting iBPMS to provide a low-code-to-no-code development tool. Adoption of iBPMS allows customer to extend functions and features to existing business application landscapes.
- Intelligent robotic process automation — We excluded this asset class from the 2018 IT Market Clock. We have decided to add this asset back due to high demand in adoption. iRPA offers a quick way to increase cost savings and intelligent automation.
- Conversational UI — Gartner expects chatbots to become popular within the next two to three years due to natural language processing (NLP) advancement with ML. This will lead to opportunities to

deploy virtual assistants (VAs), virtual customer assistants (VCAs) and virtual enterprise assistants (VEAs).

- Mesh app and service architecture (MASA) — Gartner identifies MASA as one of the three top trends in application architecture that enable digital business in 2020.

Off the IT Market Clock

We have dropped (or consolidated) the following asset classes from the previous version of the IT Market Clock:

- RPG-based ERP — This asset has reached end of life. From 2016 through 2019, Gartner received only two inquiries related to RPG-based ERP replacements.
- Distributed minicomputer ERP — From 2016 through 2019, Gartner did not receive any inquiry requests related to distributed minicomputer ERP.
- Model-driven ERP — We have consolidated this asset class under PaaS-based ERP.
- Service-oriented architecture and microservice ERP — This asset class is replaced by MASA and iBPMS, as businesses are increasingly demanding multiexperience, ecosystem integration and rapid delivery of capabilities.

Phase Changes

Two asset classes changed phases since 2018:

- N-tier client/server-based ERP moved from Cost to Replacement.
- Event-driven ERP moved from Advantage to Choice.

IT Market Clock Recommendation Summary

The summary in Figures 3 and 4 is a companion to the 2020 IT Market Clock for ERP. It maps each asset class by its current market life status and its expected change. Each element is color-coded according to the priority of the action required:

- Recommendations that should be acted on within the next 12 months.
- Recommendations that should be acted on within 24 months.
- Recommendations that are less urgent.

Figure 3. IT Market Clock Recommendation Summary (Part 1)

IT Market Clock Recommendation Summary (Part 1)

Recommendation should be acted on in 12 months | Recommendation should be acted on in 24 months | Recommendation is less urgent

Item	Focus Now	Next Change	Recommendations
Mesh App and Service Architecture	Advantage	Choice in 5 to 10 years	MASA enables an application to provide multiple fit-for-purpose experiences for different types of users working with different types of devices and interaction modalities (such as web, mobile, voice, and immersive experiences). MASA enables development teams to incrementally add new capabilities (services) and new experiences (apps) to an existing application and to build new applications and integrations that consume existing services. MASA encourages development teams to encapsulate business capabilities as multigrained services that are exposed via APIs. The API mediation layer also ensures strong security and resiliency. API mediators can be configured to authenticate and authorize all interactions, to encrypt and validate all messages, to block malware and to filter sensitive information.
Conversational UI	Advantage	Choice in 5 to 10 years	Over the next one to two years, the "smartness" of chatbots and CUI will continue to improve significantly, but the time frame for mainstream adoption of CUI is further out (three to five years). Respond to rapidly growing business user acceptance of virtual assistant technology and expectations for voice interfaces by incorporating CUI as a must-have transactional or informational feature in software roadmaps planned after 2020.
IoT-Enabled ERP	Advantage	Choice in 2 to 5 years	This asset class is emerging, with some vendors providing better access to Internet of Things (IoT) data streams, and others building early workflow applications. It will take several years for any form of standardization to occur. Look for IoT opportunities, and request roadmaps and vision from the vendors in your environment, so that you can plan.
Intelligent RPA	Advantage	Choice in 5 to 10 years	Technology innovation leaders should use robotic process automation (RPA) to automate predictable, rule-based tasks by mimicking the ways humans interact with the user interface (UI) of applications. RPA is a tactical tool that is most effective when applications that are used in a manual task lack or have incomplete APIs. Maximize ROI by prioritizing and selecting an RPA suite that has broader functional capabilities to support the primary business use cases.
Intelligent BPMS	Advantage	Choice in 5 to 10 years	An intelligent business process management system (iBPMS) plays an important role in facilitating the creation of a digital twin for your business operations. It seamlessly brings together several of the core components of a business operating system — most commonly the operating model of the business, enterprise performance management, operational intelligence, and business decisions. Adopting iBPMS allows organizations to manage the reinvention of existing business processes and the creation of novel business processes in support of both digital optimization and digital transformation efforts. They allow an organization to support top-down and bottom-up redesign of its business operations and processes, and to improve the business outcomes of all types of work, not just structured and repeatable business processes
Event-Driven ERP	Choice	Cost in 2 to 5 years	Evaluate your current application portfolio to determine whether you already have the required middleware and business rule management to support near-term, real-time event processing needs. Schedule regular discussions with your ERP vendors to monitor their products' technology roadmap and the evolving capability of the solutions to support message broker integration and other quick data exchange platforms.

Source: Gartner
ID: 465788

Figure 4. IT Market Clock Recommendation Summary (Part 2)

IT Market Clock Recommendation Summary (Part 2)

Recommendation should be acted on in 12 months | Recommendation should be acted on in 24 months | Recommendation is less urgent

Item	Focus Now	Next Change	Recommendations
In-Memory-Computing-Based ERP	Choice	Cost in 2 to 5 years	IMC has become a differentiator as vendors continue to grow this area. "IMC washing" is still taking place, and there is a fine line between IMC and fast analytics, hot caching and partial IMC. Use pace layers to identify innovative and differentiating business process needs, and review those in terms of IMC platform adoption plans. Be aware of the differences between true IMC and fast data handling.
PaaS-Based ERP	Choice	Cost in 2 to 5 years	Investigate your ERP vendor's PaaS platform and roadmap. Understand how they not only support postmodern ERP needs, but also how they can support digital business initiatives. Look at PaaS more for extending applications than for integration. PaaS can be used to support innovative or differentiating application needs.
Multitenant SaaS ERP	Choice	Cost in 2 to 5 years	Complex on-premises installations and very large-scale ERP environments remain slow movers to cloud SaaS. Some vendors have been supporting more complex cloud-delivered options, and we expect to see these options increase. Cloud ERP is a viable alternative for administrative, regional and departmental instances, for specific domain functionality, and for some midsize (up to $1 billion) organizations as a full replacement suite. Work with domain leaders to avoid "shadow IT" shocks.
Single-Tenant SaaS ERP	Choice	Cost in 2 to 5 years	Single-tenant SaaS offers private hosting version of ERP with higher security and dedicated support from vendors. With this option customer have access to additional integration capabilities including APIs that usually are not available with the public cloud hosting of SaaS. Organizations should consider single-tenant SaaS ERP if they prefer to delegate software update to the vendors but retain control over the release cycles.
N-Tier Client/Server-Based ERP	Replacement	Replacement in 2 to 5 years	Assess your ERP footprint to ensure its architecture can support new use cases (such as multienterprise applications and mobile deployments). Ensure that it provides the functional footprint needed. Pay attention to the requirement for advanced analytics.
Two-Tier Client/Server-Based ERP	Replacement	End of life in 0 to 2 years	Reassess the capabilities of applications on this platform to determine whether they can still support the execution of the business strategy. Do not make major investments in this ERP architecture or its applications.
Host-Based UNIX ERP	Replacement	End of life	Assess the current maintenance and support costs, as well the level of support (if still available). Plan to replace these systems soon, unless they support an important niche application.
4GL-Based ERP	Replacement	End of life in 2 to 5 years	Begin examining alternative supply options now. Investigate price reductions with incumbent suppliers.

Source: Gartner
ID: 465788

Market Background

ERP (encompassing all delivery methods) continues to be the largest and most mature enterprise application segment in the IT market. The ERP software market grew by 10% to a global market value of $35 billion in 2018 (see "Market Share: Enterprise Resource Planning, Worldwide, 2018"). In our 2019 CEO Survey, CEOs were divided on whether digital giants such as Amazon and Google are an opportunity or an indirect threat that is influencing their industries. [1] It is important for CIOs to develop a strategic technology plan that demonstrates how digital giants can be partners or enablers that provide value to their industries.

Monolithic ERP has not been the predominant deployment method for years, but outdated thinking persists. ERP is not a massive, inflexible systems. This thinking inhibits organizations from unlocking the value that ERP can deliver. For decades, monolithic thinking has led organizations to seek a single vendor for a single-instance solution that aims to support all business objectives in the company strategy. The only difference is that today, sometimes users want it "in the cloud," without having a clear understanding of why or what is meant by "cloud."

The reality is ERP today is radically changing, and the rate of that change is accelerating. The capabilities and speed required to support digital business are evolving constantly. ERP applications are evolving to become more open and flexible to support these changes. Now, enterprise resource planning is no longer solely focused on "resources" or "planning." It is slowly changing focus away from "the enterprise." It is evolving to be something much more expansive. The move to postmodern ERP capabilities means that new solutions will emerge more frequently with regular functional innovation delivery through the cloud model. The fourth generation of ERP changes the way people and organizations think, which can take tremendous effort and time. Organizations will achieve a proper EBC architecture at widely differing rates based on their cultural agility and tolerance for risk.

Nevertheless, investing in new technology without insight into changes in industry and consumer trends will result in wasted resources and investment, and impractical intelligence capabilities that your organization is not ready to adopt. Application leaders must work with business leaders to decide on the following:

- Should we adopt a "cloud-first" or a "hybrid on-premises" strategy?
- Should we focus on one or multiple vendors to balance the need for best-fit solutions with the need to minimize integration requirements?
- How should we address integration requirements for ERP?
- Which cloud-based add-on applications (that is, extensions) bring value, despite requiring some degree of integration?
- Which vendors will provide the backbone of the needed business applications?
- How will we assess and prepare the business for the journey of learning, adopting and continuously exploring new functionalities? Are the chosen functionalities the right choice to support or enable the organization to grow — either through optimization or new sources of revenue?

With so many applications moving to the cloud, organizations need to understand the platform capabilities of cloud application providers and work to address any gaps. Organizations should evaluate the capabilities their vendors bring to market to enable the use of services delivered through multiple platforms (as with PaaS and MASA integration capabilities). The need for a platform strategy that supports fourth-era-ERP capabilities is more pressing now than ever before.

Supplier Landscape

Gartner predicts that, by 2022, 25% of new applications will be delivered, priced and consumed as libraries of packaged business capabilities, up from less than 3% in 2019. By 2022, over 75% of midsize SaaS vendors will use product-style delivery and packaged business capabilities to compete with less agile mega-SaaS providers.

The technology market is clearly focused on cloud adoption as vendors seek to push clients to new-generation cloud ERP solutions. Vendors may announce a long term end of life for their legacy software. In the short term, vendors may end maintenance of critical components that made up the landscape earlier (such as third-party vendor data bases, operating systems and add-ons).

Fortunately, service-centric and product-centric cloud ERP solutions are maturing and have been adopted by many midsize companies and large enterprises. The focus now is very clearly on cloud delivery.

Reluctance to shift to cloud ERP is particularly prevalent in larger, more complex, product-centric companies. They have manufacturing operations managed through a variety of on-premises manufacturing execution systems (MESs) that work "well enough." Adoption of cloud among product-centric organizations lags that of service-centric organizations, which tend to have more back-office business requirements and fewer legacy systems in play. Gartner's 2018 MESA survey found that organizations with less than five years of experience running their MES deployment are more likely to pursue hybrid cloud deployments (see "Survey Analysis: The Business Value of Manufacturing Execution Systems"). [2] The initial concerns about cloud deployment, latency, availability and security have faded for the most part, in all but the most conservative industries.

While vendors are aggressively offering discount pricing and announcing end-of-life support for legacy solutions, application leaders should monitor the roadmaps for their on-premises solutions carefully. In almost all cases, new functionality is only delivered as cloud services, and customization has been replaced by building extensions using the vendor's PaaS. In SaaS ERP, business app extensions will replace custom developments. This will require support teams to develop new skills and knowledge.

Approximately 24 major ERP vendors are active globally. Several dozen more focus on national or regional markets. For example, 1C in Russia, TOTVS in Brazil, Ramco Systems in India, OBIC in Japan, and Kingdee International Software Group and Yonyou Network in China. Others — like Sage, Epicor Software, and Oracle-NetSuite — are now focusing on expanding their market share beyond North America, to EMEA and APAC.

Gartner

Asset Class Profiles

Advantage

Conversational UI

Definition: Conversational user interface (CUI) is a high-level design model in which user and machine interactions primarily occur in the user's spoken or written natural language. End users can interact with their business applications more intimately with human terms instead of programming commands. CUI includes chatbots, virtual assistants, virtual customer assistants and virtual enterprise assistants. ERP vendors such as Oracle, Infor and SAP are bundling CUI into their ERP suites to enhance user experience and adoption. Application leaders can also add CUI to their ERP with third-party add-ons.

Trend Analysis: According to Gartner client inquiry and Peer Insights review data, client interest in CUI and chatbots increased by 135% in 2018. The most common uses of CUI and chatbots today are in customer support, social media, HR, self-service and e-commerce.

Time to Next Market Phase: Five to 10 years

Business Impact: Conversational user interface technology is fundamentally shifting how technology providers build and how people use software and applications. The rise in popularity of CUIs means the software value proposition is changing from technology helping people, to people helping technology or software get work done. For example, a series of routine orders for supply may only need a verbal approval from end users to execute — saving hours of review work.

User Advice:

- Respond to rapidly growing business user acceptance of virtual assistant technology. Set expectation for a voice interface by incorporating CUI as a must-have transactional or informational feature in all ERP software roadmaps.
- Reduce the risk of failure by sourcing your chatbots from external providers, unless your organization already has the right data science and machine learning assets. See "Governance and Best Practices for Chatbot Development."
- Speed up the time frame for incorporating voice into your software solution by using natural language processing (NLP) and speech APIs from leading technology providers. This is essential to compete with innovative competitors.

Selected Vendors: Google, Amazon, Microsoft, Avaamo, Eudata, IBM, IPsoft, Kore.ai, Oracle, Rulai, OneReach.ai, Rasa, Openstream, SAP, SmartBotHub

Intelligent RPA

Definition: iRPA is a digital enablement technology that uses a combination of UI and surface-level features to create scripts that automate routine, predictable data transcription work. RPA solutions are

generally third-party tools that application leaders deploy alongside their ERP suite.

Trend Analysis: The RPA software market grew by 63.1% in 2018 to $846 million, making it the fastest-growing segment in the enterprise software market (see "Market Share Analysis: Robotic Process Automation, Worldwide, 2018"). Gartner predicts that, by 2022, application integrations delivered with robotic process automation (RPA) will grow by 40% year over year.

Time to Next Market Phase: Five to 10 years

Business Impact: RPA is designed to automate human tasks by emulating the same human transaction steps. It uses a combination of user interface (UI) interaction or descriptor technologies to automate repetitive human tasks.

User Advice: Adopt intelligent RPA to:

- Automate high-volume, standardized and repetitive human tasks to achieve higher productivity, improved accuracy and cost savings.
- Automate standardized tasks that do not have many exception paths or adjustments.
- Deliver quick prototyping of a new process.
- Automate secondary tasks within a process hierarchy in a business process management program.

Sample Vendors: UiPath, Blue Prism, Automation Anywhere, SAP

Intelligent BPMS

Definition: Gartner defines the iBPMS market as group of vendors offering an integrated set of technologies to coordinate people, machines and things. iBPMSs allows "citizen developers" — commonly business analysts, but also business end users — and professional developers to collaborate on the improvement and transformation of business processes.

An iBPMS is a technology that can be used to build new business processes that integrate with the core ERP. For example, an application leader could use an iBPMS to build an app that tracks employee overtime hours and compares them with available work orders. In this example, the iBPM app can connect to both the HR and the plant maintenance solutions to provide the data. Technically, an application leader could build an entire HCM or procurement suite with an iBPMS.

Trend Analysis: Business process management systems (BPMSs) have now become the most widely adopted model-driven application infrastructure stack. These products are morphing into iBPMSs as they are adding new features capitalizing on the Nexus of Forces (that is, mobile, social, cloud and information). However, it will take at least a few years before iBPMSs are broadly adopted.

Time to Next Market Phase: Five to 10 years

Business Impact: Intelligent BPMSs are an evolution of traditional BPMSs. The differentiating characteristic of an iBPMS is the consolidation of integration services, decision management, process orchestration and advanced analytics into a single platform. This allows the processes you create using iBPMS to consider a broad set of contextual data gathered through its integrations services. Those processes can then apply decision services and advanced analytics to contextualize relevant insight as to the best next step to execute processes.

User Advice:

- Use an intelligent business process management system to discover the details of undocumented processes. Seek to optimize the sequencing of process steps, especially where human tasks are involved, and the process spans multiple business functions.
- Engineer and orchestrate complex cross-organizational business processes and ecosystem boundaries to provide detailed reporting and metrics for key performance indicators and continuous improvement efforts.

Sample Vendors: Pegasystems, Salesforce, Appian, IBM, SAP NetWeaver Business Process Management (BPM), Oracle Business Process Management Suite, Software AG

Mesh App and Service Architecture

Definition: A mesh app and service architecture is an agile architecture for enterprise applications. MASA enables effective customer experience by means of seamless interactions across multiexperience apps, devices and channels, supported by mediated APIs, multiple enterprise applications and a mesh of services. MASA may support event-driven architecture. It provides an evolutionary approach that enables development teams to iteratively modernize their applications in direct response to business priorities. See "Adopt a Mesh App and Service Architecture to Power Your Digital Business."

Trend Analysis: MASA depends heavily on the use of APIs. According to the 2019 Gartner API Usage and Strategy Survey, 98% of participating respondents either use APIs now, are implementing APIs or plan to use APIs in the coming year. Of participating respondents, 88% say that they are using or plan to use internal APIs.

Time to Next Market Phase: Five to 10 years

Business Impact: MASA provides the fundamental architectural capabilities to enable multiple experiences and respond rapidly to digital business demands. MASA provides the architecture for individual applications as well as a strategy for modernizing the entire application portfolio. APIs are at the center of digital business. Your organization needs APIs that enable access to the services that implement your business capabilities and data. APIs enable integration. They are an essential part of

MASA, and they enable multiexperience. They also enable creation and participation in ecosystems. An API platform strategy ensures that these APIs are governed, well managed and easily accessible.

User Advice:

- Adopt MASA for all new application development efforts. Provide training or mentorship to help development teams gain competency.
- Take a pragmatic approach to modernizing existing applications. Let business requirements drive the priority list. If it has not been done already, start modernizing an application by separating the user interface functionality from the back-end functionality to enable multiexperience. Build APIs that encapsulate and enable access to critical business capabilities. Although many modern applications now come with APIs, not all of them provide what application leaders want. Some APIs have authentication rules and schema that too complex to adopt. Over time, deconstruct the monolithic back end to implement new business features (see "Use Continuous Modernization to Build Digital Platforms From Legacy Applications").
- Be pragmatic about purchased packaged and SaaS applications. Let business needs drive your priority list for building APIs and adapters into these applications. When possible, upgrade to the latest versions of these applications to get the most out of the APIs supplied by your vendors. Build abstraction layers (outer APIs) over the applications' native APIs to ensure more flexibility and to mitigate vendor lock-in and versioning disruptions.
- Ensure flexibility, security and resiliency by building an API mediation layer that monitors interactions, manages traffic flow, enforces security policies and mediates outer and inner APIs.

Sample Vendors: Oracle, SAP, Microsoft, Salesforce, Appian, IBM

IoT-Enabled ERP

Definition: IoT is a network of physical objects that contain embedded technology to communicate, sense, or interact with their internal or external environment. IoT workstreams have traditionally focused on dedicated hardware and systems, with little general interfacing to ERP systems.

Trend Analysis: Gartner's 2019 CIO Survey reveals that IoT is the fourth most important game-changing technology, and 15% of enterprises are growing their budget for IoT (see "2019 CIO Survey: CIOs Have Awoken to the Importance of AI"). [3] Organizations must realize IoT is not only proliferating, but it is employed for more and more use cases, many of which are generic. Use cases include, for example, plant maintenance, building environment control and smart agriculture. Linking the associated IoT endpoints to the business processes flowing through ERP systems represents a new opportunity for both users and vendors. Initiatives such as Industry 4.0 and the Smart Manufacturing Leadership Coalition will help to accelerate the development of new use cases.

Time to Next Market Phase: Two to five years

Business Impact: Digitalization of processes requires assignment of supporting or enabling technologies (hardware and software). In order to derive solutions or services, these processes must be cut into slices or process steps. One or more process steps can be formulated as a use case requiring specific data inputs and outputs. The use case may be executed autonomously or may involve human interaction. Hence, supporting technology is required. This technology is usually a combination of hardware devices, infrastructure and software required to process or distribute data. The core element is IoT, which connects multiple other technologies — such as business applications (for example, ERP and MES), analytics solutions, cyberphysical systems (CPSs), 3D printers and autonomous forklifts.

User Advice:

- Define the scope of your IoT portfolio by highlighting process areas in a reference process model to visualize the manufacturing value chain and functional areas. Examples include manufacturing IoT, Industry 4.0 and smart factory.
- Assign use cases and supporting (IoT) technologies to the defined process scope.
- Map your own capabilities and the needs of your business functions to use cases and (IoT) technologies that are in scope. Derive measures to fill identified gaps.

Sample Vendors: Infor, Software AG, Oracle, IBM, Atos, GE Digital

Choice

Event-Driven ERP

Definition: This asset class refers to event processing architectures, which use event notifications as a primary mechanism for asynchronously communicating information and triggering application processing. They treat events as first-class objects, and they use a push/pull interaction model rather than request/response. People, processes, applications and analytics systems can subscribe to and process events. Event processing architectures include simple notifications, event-driven architecture, digital twins, event sourcing and event stream processing.

This means the ERP solution is able to take “work” from event queues and place results in event logs and outbound event queues. Common events include customer orders, insurance claims, bank deposits/withdrawals, or sensor data from physical assets such as vehicles, mobile devices or machines. Events can be processed discretely (every event is an order to be processed) or as an input into an event stream processor that analyzes data to identify specific outcomes (such as an order to be drop-shipped from a third party) or detect patterns (like duplicate shipments).

Many ERP vendors offer native, add-on modules to accept events as input and send events as output. Application leaders can also use third-party solutions to event-enable an ERP. Vendors such as Microsoft (Azure Event Grid and Event Hubs), Google Cloud Pub/Sub, Amazon MQ, and Salesforce (Platform Events) have made strategic investments in event-driven technology. Multiple pure-play vendors —

including Confluent, Solace, Streamlio, TIBCO Software and VANTIQ — are also actively innovating to support advanced and prevailing business use cases for EDA.

Trend Analysis: The modern world of digital business is increasingly powered by event-centric processing rules. The increasingly dynamic business environment will require companies to process data in the form of events from various sources to enable business moments. Many ERP vendors have recently equipped their SaaS and PaaS to handle service requests through message brokers to take immediate action. Gartner predicts that, by 2022, support of event notifications in low-code application platforms and API management tools will make EDA common in new application design.

Application leaders can deliver more automation and data-driven decisions by using the new capability. For example, a manufacturing company might use EDA and event processing to identify potential quality issues at scale. Manufacturing automation at speed relies on the increased automation of intervention procedures in case of production planning issues. Event-driven architecture allows a high volume of business events to be analyzed. This capability drives machinery decisions in real time, resulting in a higher consistency of quality in products.

Time to Next Market Phase: Two to five years

Business Impact: The fast pace of modern business requires that organizations improve their real-time awareness and decision making. Intelligent insights, gleaned from patterns in business operations, have become a significant differentiator for leaders in digital business. By applying event-driven architecture, organizations can efficiently accept, process and distribute inbound transaction data, such as orders and banking transactions. Modular calls (such as real-time credit checks) are supported by rules and conditions, or exceptions to stream events. Using event stream processing, EDA enables a business moment — a transient opportunity that is exploited dynamically. A business moment is a brief moment when something changes (that is, an event occurs) within a business ecosystem that has a ripple effect on other entities within the ecosystem. EDA therefore creates new opportunities for the business to compete or serve.

User Advice:

- Identify and harness existing pockets of EDA expertise and technology (such as message-oriented middleware) in your organization. Harvest what you find and use it within your development, integration and analytics teams.
- Develop scenarios and business cases where services do not require dependencies on other services. Deploy events where services can operate independently, without knowledge of other services (including their implementation details and transport protocols).
- Engage business analysts to understand the actual and potential roles that real-time awareness of business events can play in advancing the organization's business outcomes.

- Determine if IT workload can be reduced where resources can proceed to the next task once their scheduled or rule-based activities are completed. This eliminates the need for events to be queued or buffered, preventing consumers from putting back pressure on producers or blocking them.
- Modernize your analytics and business intelligence capabilities by employing three styles of event stream processing: continuous intelligence, on-demand intelligence based on historical data, and on-demand intelligence that uses both real-time and historical data (see "Three Ways to Derive Information From Event Streams").
- Use EDA judiciously. EDA is complex. Adopt it gradually. Help development teams determine when and where it is appropriate to use EDA by establishing governance and decision criteria (see "Applying Event-Driven Architecture to Modern Application Delivery Use Cases").
- Always combine EDA with other architectural paradigms, including service orientation, request/response APIs, and event streaming. Treat EDA interfaces and event payload formats with as much care as you treat request/response APIs (see "The Impact of Event-Driven IT on API Management").

Sample Vendors: Microsoft, Amazon Web Services (AWS), SAP, Oracle, Google, Solace

In-Memory-Computing-Based ERP

Definition: This is an ERP system where all data is loaded in the main memory. All the transactional processing, planning, reporting and analytics are performed against this dataset in real time. in-memory-computing (IMC) provides ERP systems with a hybrid transaction/analytical processing architecture where sophisticated analytics can be performed, in real time, directly on the ERP data.

Trend Analysis: The concept of running an entire ERP system in-memory is no longer new. A growing number of organizations are using or testing the business benefits of this technology. SAP has made IMC a cornerstone of its strategy and, with the release of S/4HANA, it is fully committed to IMC. Workday has implemented some large-scale global, IMC-supported HCM deployments and is increasing deployments of its IMC financial applications. Microsoft, Oracle and others are starting to use IMC capabilities inherent in the underlying databases in their applications. IMC has spread beyond ERP. For example, Anaplan and Board offer IMC for corporate performance management analytics. Kinaxis off IMC in the field of supply chain management. The real potential of in-memory-based ERP lies not in the acceleration of processes and analytics, but in the enablement of real-time business processes that result in innovative new ways to support the business. Gartner predicts that, by 2022, by effectively supporting data sharing across different workloads, IMC technologies will enable organizations to reduce data duplication by at least 35%.

Time to Next Market Phase: Two to five years

Business Impact: IMC is a key building block of the digital enterprise. In a highly transactional system, it is a common practice to create copies of master data to support different workloads (for example

transactional and analytics). This is a costly and error-prone approach that poses nontrivial challenges to data consistency and data governance. Using in-memory database management systems, (IMDBMSs), application leaders can reduce or eliminate this practice altogether. Different applications can use IMDBMS techniques to dynamically and efficiently request their own logical views of data from a single physical in-memory dataset. The elimination of disk latency, batch processing, and the onerous extraction and synchronization of analytics data is changing the capability of ERP systems. In-memory processing means that large amounts of data can be sifted, correlated and updated in seconds, with no real latency or historical reconciliation issues. Simplification of the ERP platform should also eliminate some of the need for expensive infrastructure investment for vendors and users alike.

User Advice:

- Acquire enough knowledge of IMC to help the business support digital initiatives, manage risk and make effective sourcing decisions. Customers may have to retire cube-based reporting tools or existing “data stores” used for online application processing (OLAP) to adopt hybrid transactional application processing (HTAP).
- Avoid a “run faster is better” approach, as just “running faster” may not provide real business benefits. Often, it is the fusion of real-time data, business process changes and people skills that drives business value.
- Analyze case studies and references aligned to your workloads to understand the performance and total cost of ownership (TCO) ROI from utilizing persistent memory.
- Ensure your application architects and developers are familiar with IMC techniques that allow dynamic transformation and sharing of information in a simplified, persistent-memory-enabled architectural scenario.
- Engage with data quality and governance teams to assess the degree to which these standards are changing in support of low-latency access to data.

Sample Vendors: Ramco Systems, SAP HANA, Workday, Oracle Exadata, IBM Netezza

PaaS-Based ERP

Definition: PaaS provides a platform for rapid development using a consistent set of web/cloud tools and methodologies. For many organizations, this will provide a quick way to develop customizations for cloud and on-premises applications. PaaS platforms are provided by ERP vendors such as Microsoft, Oracle-NetSuite, and SAP to support their ERP suites. Other ERP vendors use third-party PaaS to develop their applications. For example, FinancialForce uses the Salesforce PaaS.

Trend Analysis: Organizations have realized that the desire to innovate and add differentiation to their ERP suite brings with it a need to customize. Although configurations have increased in capability, particularly for SaaS, there is still a need to build extra functionality. This is in addition to having the right tools to provide integration, particularly between on-premises and cloud environments. Because

much of the focus is now on cloud-based applications, PaaS platforms are being built as cloud services. Application vendors continue to announce new PaaS platforms, suites and components as they move to support the growing needs of ERP for integration and extensibility.

Time to Next Market Phase: Two to five years

Business Impact: Organizations are beginning to more clearly understand the role of ERP in supporting innovative and differentiating processes to provide more than a system of record. Businesses no longer want to wait for a vendor upgrade or undertake a major customization. Instead, they are seeking flexibility through rapid delivery of functionality, which increasingly includes cloud-based options.

User Advice:

- ERP requires platform capabilities beyond those required by smaller-footprint applications such as cloud-based travel and expense, which are relatively self-contained and usually need only lightweight, point-to-point integrations.
- Create an individual development plan for your ERP support team to acquire the skills and knowledge of the selected PaaS. This will help to maximize its functional and technical capabilities.
- Adopt bimodal development, particularly for rapid concept testing and integration between cloud and on-premises environments.

Sample Vendors: Google Cloud Platform, Microsoft Azure, Oracle-NetSuite, Oracle Enterprise Resource Planning (ERP) Cloud, SAP Cloud Platform, Infor CloudSuite, Salesforce Customer 360 Platform (formerly Force.com), IBM Cloud (formerly Bluemix)

Multitenant and Single-Tenant SaaS-Based ERP (combining two asset classes)

Definition: These are systems operated by a software vendor, where multiple customers either share the use of a single instance of the application or have a dedicated instance of their own. Customers do not own software licenses; they pay a monthly fee related to the number of users and the size of the application footprint being utilized. Solutions that exist in this space include Workday, Salesforce, Oracle ERP Cloud, SAP S/4HANA Cloud, Infor CloudSuite, and Oracle-NetSuite.

Trend Analysis: SaaS-based applications continue to be adopted at the expense of traditional on-premises applications. Examples include talent management and procurement — for some parts of the supply chain and for some midsize to large administrative ERP needs. SAP's S/4HANA Cloud MTE and STE announcements mean that more complex ERP functionality are being made available as cloud services. With vendors such as Oracle ERP Cloud, SAP S/4HANA, Infor CloudSuite, Ramco Systems and Workday all growing their cloud ERP businesses, adoption of cloud ERP remains a major trend. Issues such as estimating the TCO, addressing new integration and development challenges, and losing control of the application have not impacted this growth.

The use of PaaS technologies is easing both integration and development of extensions through low-code-to-no-code tasks and is now a core part of the ERP environment. Multitenant offerings dominate, but other configurations such as multitenant infrastructure with single-tenant applications — alongside isolated-tenant services — are available for users wanting higher degrees of security, albeit at a cost.

Adoption of cloud ERP has been faster in the service-centric sector, but remains at a standstill within the product-centric sector (that is, the manufacturing sector). Therefore, Gartner must revise our estimated time to the next market phase from zero to two years in 2018, to two to five years in 2020.

Time to Next Market Phase: Two to five years

Business Impact: These asset classes will impact two types of organization:

1. Those wanting to add capabilities to their suites, perhaps to support a specific business location.

2. Those seeking a total solution that is outsourced, in this case to a cloud provider.

Companies that adopt SaaS-based ERP will see a major shift in application responsibility, with business managers being responsible for key processes, and IT being responsible for integration. Integration will be an issue for those adopting the hybrid-reality model. Cloud solutions have, as yet, no compelling advantage where considerable customizations are needed — for example, when interfacing with operational plant equipment such as an automotive assembly line.

User Advice: SaaS is a delivery model, not a magic remedy. Organizations need to build their ERP strategy with an understanding that there will likely be a need to source and integrate cloud solutions — and, for some, a need to outsource their ERP depending on the business need. Application leaders responsible for postmodern ERP should not assume that they own or can control the business application sourcing of their organizations. They should use Gartner's pace-layered methodology to engage with the business and see where the demand or opportunities for SaaS exist.

Sample Vendors: Oracle-NetSuite, Oracle, Epicor, Plex, QAD Adaptive ERP, Ramco Systems, SAP (S/4HANA and Business ByDesign), Workday, Epicor, Infor CloudSuite, Microsoft Dynamics 365, Sage, IFS

Cost

None assessed for this IT Market Clock.

Replacement

N-Tier Client/Server-Based ERP

Definition: This is a style of application architecture where the presentation, application logic and data are logically separated into different tiers of computing. The separation of tiers enables developers to

change applications quickly, since they can adapt or enhance one layer without having to rewrite the entire application.

Trend Analysis: N-tier architectures were developed to respond to an organization's need for more-distributed applications. It relied on low-cost hardware and the power of the internet as a platform for application delivery. The move from two-tier to n-tier/three-tier architecture was driven by scalability requirements. The applications needed to support higher transaction volumes, and the increasing use of web/internet technology made the browser the primary interface for application presentation.

Time to Next Market Phase: Two to five years

Business Impact: The delivery of n-tier applications offered a more flexible and distributed platform architecture to separate processing needs and draw on network-based resources. Today's environments offer more sophisticated ways of delivering a federated and scalable ERP architecture. N-tier client/server-based ERP systems are aging fast as adoption of newer platforms — including cloud delivery platforms — accelerates.

User Advice:

- Evaluate whether your application architecture is keeping pace with the increasing demands of stakeholders.
- Use a pace-layered application strategy to help you decide when to upgrade to new platforms, as business needs demand.
- Assess whether the cost of maintaining your n-tier client/server-based ERP and the cybersecurity risk it creates outweigh the value of maintaining the ERP.

Sample Vendors: Epicor, Microsoft (Dynamics AX/NAV), Oracle (E-Business Suite 11.x and later, JD Edwards EnterpriseOne, PeopleSoft 8.x and later), SAP (SAP R/3)

Two-Tier Client/Server-Based ERP

Definition: In this application architecture, ERP applications are split into two logical parts. The first is the client (which holds the presentation and some application logic) and the second is the server (which holds application logic and data).

Trend Analysis: Two-tier client/server ERP evolved as a result of the increased use of PCs as end-user productivity tools, and the implementation of LAN infrastructure to connect those PCs. These applications took advantage of the rich UI capabilities of Microsoft Windows to provide more functionality to users.

Time to Next Market Phase: Zero to two years to reach end of life

Business Impact: Client/server computing helped transform how employees used technology. The rich UIs and the ability to multitask put more information at the fingertips of employees than ever before. On the negative side, the distributed nature of client/server applications spawned a "viral" proliferation of applications. This architecture increased IT costs and made it more difficult for companies to manage their key business systems from a central location.

User Advice: The architecture of these applications inhibits the ability to make the most of their ERP investments in today's multienterprise, collaborative cloud environment. Some of these applications have a niche role and are still supported by the vendors. ERP managers should investigate vendor roadmaps and compare available functionality with the needs of the business. Two-tier architectures are in the Replacement phase, driven partly by new business needs and partly by ERP vendors pushing newer offerings.

Sample Vendors: Avalon Software Services, Infor (host-based Baan), Oracle Applications (early 10.x products), Oracle-PeopleSoft (before version 8.0)

4GL-Based ERP

Definition: Fourth-generation language (4GL) tools emerged in the 1980s. They promised to radically improve software development time and make it easier for system integrators and end users to modify and extend their applications. In many cases, these products had proprietary file management or database management systems.

Trend Analysis: The 4GL phenomenon was short-lived, and most of the toolsets have disappeared. Progress (OpenEdge) was the most successful of these products and is one of the few still actively used. Most of the organizations that use ERP systems developed on 4GLs have employed a system integrator to rewrite the code using modern procedural languages such as C, C++ and Java.

Time to Next Market Phase: Zero to two years

Business Impact: 4GL tools shortened development times and forced vendors to adopt a more standardized and structured coding approach. These ERP systems have tended to be tightly integrated, easy to use, and inexpensive to deploy and manage. They also tend to be somewhat dated in functionality and user interaction design.

User Advice: These systems are nearing their end of life. Upgrade to new (non-4GL) versions or migrate to more modern applications. One area to be particularly cautious about is the low and dwindling availability of technical resources familiar with proprietary 4GLs.

Sample Vendors: FUJITSU (GLOVIA), Infor (Growthpower, SYMIX), CDC Software (Ross Systems)

Host-Based UNIX ERP

Definition: Host-based UNIX ERP systems are designed to run on the UNIX OS. They are typically portable across a variety of hardware products and databases.

Trend Analysis: In the early 1980s, ERP vendors responded to the growing interest in open systems by developing applications that ran on UNIX. In some cases they were new systems written in C but many were ported from earlier versions that had been written for proprietary software. UNIX-based ERP systems tended to have better scalability than earlier minicomputers, and it was possible to run them on more powerful servers.

Time to Next Market Phase: End of life

Business Impact: Application leaders once viewed host-based UNIX ERPs as combining the best capabilities of mainframe systems with the best of minicomputer systems. They had the ease of use and cost profile of minicomputers, with the power and scale of mainframe applications. They were often used in situations where user counts or transaction volumes were very high, or where a company had a centralized approach to ERP.

User Advice: These are now very dated platforms and applications. The longer organizations maintain these systems, the higher the risk will be of exposing a cybersecurity vulnerability that can cripple the operation. The host-based architecture is truly outdated now. Reset the organization's ERP strategy and engage with the business to remap business needs. Your organization may have specialist applications that can be left alone — where doing so will not derail the ERP strategy. However, these will be very rare and are probably operating on borrowed time.

Sample Vendors: Infor (Baan UNIX), Oracle (E-Business Suite 11i), QAD (MFG/PRO)

Acronym Key and Glossary Terms

MASA	mesh app and service architecture
MES	manufacturing execution systems
RPG	report program generator

Evidence

[1] The 2019 Gartner CEO and Senior Business Executive Survey was conducted from September through December 2018, in order to examine CEO and senior business executive views on current business issues, as well as some areas of technology agenda impact.

[2] The 2018 Gartner MESA Survey survey of 92 MES practitioners was conducted online from 11 October 2018 through 11 January 2019.

[3] The 2019 Gartner CIO Survey was conducted online from 17 April through 22 June 2018 among Gartner Executive Programs members and other CIOs.

Document Revision History

IT Market Clock for Technology Supporting Postmodern ERP, 2018 - 31 August 2018

Recommended by the Authors

ERP Primer for 2020

2019 Strategic Roadmap for Postmodern ERP

ERP's Emerging Fourth Era — Moving Beyond Postmodern ERP

Hype Cycle for Postmodern ERP, 2019

Magic Quadrant for Cloud ERP for Product-Centric Midsize Enterprises

Critical Capabilities for Cloud ERP for Product-Centric Midsize Enterprises

3 Steps to Designing a Future-Proof Business Application Integration Strategy

Magic Quadrant for Intelligent Business Process Management Suites

Magic Quadrant for Robotic Process Automation Software

Cool Vendors for Conversational Platforms

Magic Quadrant for Enterprise Low-Code Application Platforms

2019 CEO Survey: CEOs Are Divided on the Impact of Digital Giants — Now Is the Time for CIOs to Act

Gartner

Table 1: Summary Measures of Standardization

Score ↓	Categorization ↓	Definition ↓
10	Highly standardized	There is little variation across industries, because the asset class can accommodate most industry needs. Processes, functions and technologies do not differentiate competitively.
8	Mostly standardized	Some variations are likely. Little competitive differentiation is possible.
6	Core standardization	Standardized in core areas, but variations are still likely. Standard practices are emerging, but significant variations are likely based on functional areas. Some competitive differentiation may be possible in the way functionality outside the core processes is deployed, but it is likely to be short term.
4	Increasing standardization	There is some standardization. Core processes, functions and technologies are standardizing, but competitive differentiation can be delivered in the way the asset class is deployed.
2	Low standardization	An asset class with leading-edge or innovative practices is identified. Processes, functions and technologies are highly competitive and differentiating, and can be sustained in the long term.

Source: Gartner (February 2020)

Table 2: Scores for the Number of Available Vendors

Score ↓	Categorization ↓	Definition ↓
5	General availability	It is easy to find vendors in all geographies and market segments.
4	Readily available	There are several mature vendors, with good geographic and market segment spread.
3	Uneven availability	There are several mature vendors, but they are unevenly spread in market segments or geographies.
2	Increasing availability	There are increasing numbers of vendors of varying sizes.
1	Limited availability	There is a limited number of vendors.

Source: Gartner (February 2020)

Table 3: Evaluating Access to Appropriate Skills

Score ↓	Categorization ↓	Definition ↓
5	General availability	Skill levels are reduced and becoming part of a general skill set.
4	Readily available	Skills are readily available and costs are falling.
3	Uneven availability	Supply and demand for skills are balanced, and costs are stable.
2	Increasing availability	Skills are in short supply, but the situation is improving (demand is falling and/or supply is increasing).
1	Limited availability	Skills are in short supply, and the shortage is set to stay the same or worsen.

Source: Gartner (February 2020)