Critical Capabilities for Enterprise Low-Code Application Platforms

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Initiatives: Software Engineering Strategies

Low-code application platforms (LCAPs) provide abstracted, guided development, automation and governance capabilities, enabling professional and citizen developers to rapidly develop digital solutions. Software engineering leaders should use this research to compare LCAPs.

This Critical Capabilities is related to other research:
Magic Quadrant for Enterprise Low-Code Application Platforms
View All Magic Quadrants and Critical Capabilities

Overview

Key Findings

- The adoption of LCAPs is accelerating across industries and geographies, as organizations demand new digital solutions in rapidly changing operational environments, where skilled developers are often in short supply.

- LCAP vendors are expanding their capabilities to support diverse developer personas, including business technologists, citizen developers, software engineers, business analysts and administrators.

- Integration, user experience design and workflow automation capabilities offered by LCAP vendors vary significantly in depth and breadth compared to specialist vendors in adjacent market areas. These areas include business process automation (BPA), multiexperience development platforms (MXDPs), citizen automation and development platforms (CADPs) and integration platform as a service (iPaaS).

Recommendations

When evaluating LCAP technologies, software engineering leaders should:
Strategic Planning Assumption
By 2025, 70% of new applications developed by enterprises will use low-code or no-code technologies (up from less than 25% in 2020).

What You Need to Know
Our team of analysts evaluated 12 LCAP vendor offerings based on eight capabilities that are critical to support evolving business needs. We rated these critical capabilities for each platform across three primary use cases:

1. Custom business applications: Build and maintain modern enterprise applications that require rich user experiences, complex integrations and robust monitoring, and handle large transaction volumes.

2. Business workflow automation: Automate workflows involving multiple application systems and human actors to accomplish business goals.

3. Collaborative app development: Enable different developer personas (professional and citizen developers) and fusion teams to collaboratively build applications.

We also identified eight critical capabilities that enterprise LCAPs need in order to support those use cases. Our team of analysts, all of whom field client inquiries and perform in-depth research on low-code technologies, rated each platform on these capabilities based on the vendor’s response to our evaluation questionnaire. During our assessment, we also included customer feedback on the vendors’ capabilities from our inquiries and the Gartner Peer Insights portal. The critical capabilities for LCAPs are:

- Assess vendors on their ability to support different developer personas by prioritizing LCAPs with governance, development productivity and platform ecosystem capabilities that align with the skills of users.
- Design clear requirements for LCAP usage by comparing your requirements to use cases presented here. Ensure vendors’ pricing and licensing models are suitable for the use cases, as these factors are as important as the technology fit to fulfill the long-term business vision.
- Use LCAPs for their intended purpose by complementing their capabilities with other purpose-built tools, such as iPaaS, BPA or MXDPs, particularly for use cases with sophisticated integration, workflow automation and user experience design requirements.
Software development life cycle (SDLC)

User experience design

Development productivity

Business logic and workflow

Integration and APIs

Platform ecosystem

Governance

Security and quality of service

Software engineering leaders should use this research to understand the key use cases and capabilities of enterprise LCAPs and to compare vendor offerings. They should evaluate each vendor based on the vendors’ capabilities to meet the tactical productivity and application development needs. They should also evaluate vendors’ product roadmaps and alignment with long-term business goals.
Analysis

Critical Capabilities Use-Case Graphics

Vendors' Product Scores for Custom Business Applications Use Case

Product or Service Scores for Custom Business Applications

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As of 12 August 2021

Source: Gartner (September 2021)
### Vendors' Product Scores for Business Workflow Automation Use Case

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As of 12 August 2021

Source: Gartner (September 2021)
Vendors’ Product Scores for Collaborative App Dev Use Case

Product or Service Scores for Collaborative App Dev

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As of 12 August 2021

Source: Gartner (September 2021)
Vendors

Appian

Appian’s LCAP is the Appian platform. Appian can be deployed either on-premises or in the cloud, and customers may use a mix of environments. For example, a customer may have a test environment in Appian Cloud while operating production in an on-premises Appian runtime.

Appian’s low-code environment provides process-driven automation and a user interface (UI) design experience for web, mobile and conversational applications. Appian’s heritage in the business process management (BPM) market lends to its strong capabilities in this area. The Appian Process Modeler is a business process and model notation (BPMN)-compliant visual designer that enables users to easily build out complex process flows. Appian’s Automation Planner provides the ability to discover new automation opportunities and manage the entire automation life cycle. It also enables users to build a prioritized backlog of automation opportunities, track ROI and drive collaboration between IT and business teams.

Appian’s Interface Designer is a web-based IDE where multiple developer personas, such as professional developers, citizen developers and business analysts, can collaboratively build an application at the same time. Though applications developed in the Appian environment cannot be deployed independently to any other environment, it supports embedding the UI into any web or mobile application.

Appian plans to roll out its new microservices deployment architecture, where customers can build interfaces, rules and integrations and deploy them independently of the Appian platform in serverless architectures (such as Amazon Web Services [AWS] Lambda or Google AppEngine). Appian has created a portable container for its self-assembling interface layer (SAIL) architecture and business rule execution language. It can run locally on mobile devices to enhance the user experience with local processing of application logic.

Appian received its highest use case score for business workflow automation. It also received good scores for the custom business applications and collaborative app development use cases.

Creatio

Creatio’s LCAP is Studio Creatio. It is available as SaaS, and also supports both on-premises and private cloud deployments.
Creatio offers low-code, process-based application development for its CRM SaaS and other use cases. Studio Creatio has strong capabilities for automating business workflows, especially customer-facing workflows. It provides a web-based development environment for citizen developers and professional developers to collaboratively build process-centric applications. Professional developers can extend the data model, business logic and UI by using C# and JavaScript, either using the built-in IDE or with integrations with popular IDEs, such as VS Code or Webstorm. The platform uses the Apache Cordova framework to support the development of vendor-branded mobile applications with native features, such as offline mode, camera photo/video access and GPS access.

Studio Creatio provides role-based access controls to support granular management of object- or field-level user permissions. However, its data encryption and application security capabilities are limited to encryption of backups or encryption of data by cloud providers. It lacks support for advanced capabilities such as attribute-level encryption or support for customer-managed encryption keys. The platform provides detailed operational and usage data, but does not offer robust application, infrastructure or security monitoring. Application testing capabilities are limited to third-party test automation systems. Though applications developed in the Creatio environment cannot be deployed independently to any other environment, it supports embedding the UI into any web application using an iframe.

Creatio continues to enhance its platform extensibility by revising its UI using the popular Angular toolkit. It also plans to improve its application life cycle management and security capabilities by adding support for OpenID Connect (OIDC) and system for cross-domain identity management (SCIM), and enhancing its support for OAuth 2.0 flows. To enhance its process automation capabilities, Creatio plans to add a process design assistant to provide recommendations for best practices and popular use cases.

Creatio received its highest use case score for business workflow automation. It also received fair scores for the custom business applications and collaborative app development use cases.

**Kintone**

Kintone’s LCAP is the Kintone platform. It is available as a vendor-managed platform in the cloud, deployed to either Kintone’s cloud in Japan or AWS outside Japan.
Kintone is a no-code data application and workflow platform with communication capabilities. It primarily focuses on capabilities for business users and citizen developers. Its SDLC supports intuitive no-code development by providing capabilities such as turning existing applications on Kintone into templates, faster data import and providing recommendations and reminders to users for next actions. It has a robust platform ecosystem, which includes a vibrant developer community, 100+ prebuilt application templates offered by Kintone and a portal with plugins contributed to by more than 300 partners.

Kintone scored relatively low in terms of the security and QoS, UX design and governance critical capabilities. It does not offer automatic scaling or security checking, and it provides limited support for traffic encryption (TLS1.2 only and VPN optional), certifications (GDPR) and activity tracking. It lacks design compliance checks and native support for chatbot, voice, augmented and virtual reality experiences. Though applications developed in the Kintone environment cannot be deployed independently to any other environment, it supports embedding the UI into any web application using an iframe.

Kintone plans to continue investing in improving its app development experience for citizen developers. It also plans to enhance its developer ecosystem for professional developers by adding more APIs and native plug-ins and augment its governance capabilities to provide improved reporting dashboards and export options for application structures. In addition to these improvements, Kintone plans to continue enhancing its security features and marketplace in an effort to expand its developer ecosystem and geographic coverage.

Kintone received its highest use case score for custom business applications. It received poor scores for the business workflow automation and collaborative app development use cases.

**Mendix**

Mendix’s LCAP is the Mendix Platform. It is available as SaaS and supports public, private, hybrid or multicloud deployments. Mendix also supports deployment on both the SAP and Tencent clouds via partnerships.
Mendix provides application governance and purpose-built IDEs to support numerous developer personas, enabling fusion teams to collaboratively build applications. Mendix Assist provides contextual logic, configuration and performance-related suggestions to help developers as they build applications. Mendix has its own Atlas framework for UI design and offers out-of-the-box templates to support SAP Fiori’s design system. Mendix leverages its ReactNative client architecture to support the development, deployment and management of stand-alone, cross-platform native mobile applications. It also supports hybrid mobile applications using Apache Cordova wrappers. Applications developed on the Mendix platform can be deployed independently to other environments.

The recently introduced Mendix Workflow Builder enables users to build business process flows and long-running workflows. These business rules are defined using Microflow constructs, so customers will need third-party add-ons for declarative business rules and decision management. Likewise, Mendix leverages its partners’ solutions to support intelligent document processing. For platform administrators, Mendix does not automatically flag unused applications in an environment. Mendix supports OAuth, and security assertion markup language (SAML), and has recently introduced support for OpenID Connect (OIDC) as well.

Mendix is extending its data hub capabilities to add a Kafka-based broker. This feature will establish event-driven data sharing between Mendix apps and across enterprise landscapes. Mendix continues to invest in its AI-assisted development services and its marketplace. It also provides first-party support for deployments on the Tencent cloud in China.

Mendix received the highest score of all vendors in the collaborative app development use case. It also received an excellent score for the custom business applications use case and a good score for the business workflow automation use case.

Microsoft

Microsoft’s LCAP is Microsoft Power Apps, which includes entitlements for Power Automate and Dataverse. Together, these form part of the Power Platform. Its market differentiation is based on its complete Power Platform offering, with Power BI for business analytics and Power Virtual Agents for chatbots, which complements Power Apps with Microsoft Office 365, Dynamics 365 and Azure services. The platform is available as a cloud-only offering on Microsoft Azure.
Microsoft Power Apps provides various enterprise-grade security features, such as deep integration with Active Directory (AD), a wide range of data loss prevention (DLP) policies and data encryption. Being deployed on the Azure cloud, it also brings a wide range of security certifications, such as SOC1, SOC2, PCI DSS and FEDRAMP, to support government cloud deployments. The recently introduced Power FX provides an open-source and Excel-based formula language to enable development by citizen developers. Power Apps offers a drag-and-drop interface to build apps, and professional developers can extend these apps using .NET development for complex logic, data integration and custom UX controls. For concurrent app building, developers can leverage component-based development and build tools, such as Azure DevOps and GitHub.

Gartner sees Power Apps mainly being used for simple web and mobile app UI use cases for internal applications. While its built-in governance capabilities are improving, it does not yet provide granular control and visibility into all aspects of the platform. Microsoft has added task discovery capabilities with Process Advisor, but more complex logic and workflow use cases may require investments. Applications developed in the PowerApps platform cannot be deployed independently to any other environment.

Microsoft plans to add its OpenAI GPT-3, a natural language-based AI model, to Power Apps Studio to enable the automatic generation of Power Fx formulas based on natural language input. Microsoft continues to improve its application life cycle, quality and governance capabilities. These enhancements include the release of Power Apps Monitor and Test Studio, and improvements to its onboard solution system for application life cycle management (ALM), including data source environment variables that allow for one-click deployments. Microsoft also expanded its IT administrator controls to enable tenantwide governance, including deeper analytics and more granular control over DLP policies.

Microsoft received its highest use case score for collaborative app development. It also received good scores for the custom business applications and business workflow automation use cases.

**Newgen**

Newgen’s LCAP is part of its Low-Code Digital Transformation Platform that includes Intelligent Process Automation, OmniDocs Content Services, Enterprise Framework for Mobile Applications and OmniOMS, a customer communications platform. The platform is available as SaaS, a cloud-hosted managed service or a client-managed public or private cloud.
Newgen provides comprehensive process orchestration, decision modeling and case management capabilities to automate complex business processes. It provides process insights tools that analyze the cost and performance of processes against KPIs. The platform provides out-of-the-box connectors for popular enterprise applications and iPaaS solutions, such as MuleSoft and Zapier, through REST endpoints. It also enables users to create custom integrations by developing REST/SOAP APIs and messaging services, and it supports GUI-based integrations. Newgen's platform integrates with IDEs, such as Eclipse, to enable professional developers to customize applications using CSS, Java and JavaScript. The platform provides comprehensive data modeling and connects data between popular cloud and on-premises databases.

Newgen's platform has limited native CI/CD capabilities, but it supports integration with code repositories like Apache Subversion and Git, and also with Jira for agile project management. Autoscaling is primarily handled by the autoscaling policies of the cloud provider where the platform is hosted. The platform supports visual debugging and testing of process models, but not entire applications. Newgen's support for designing user journeys is basic, and it does not provide support for incorporating third-party design systems. Applications developed in the Newgen platform cannot be deployed independently to any other environment, such as PaaS or VM. It requires Newgen server components at the back end to run these applications independently.

Newgen plans to enhance its application development capability by creating a fully automated CI/CD pipeline, modernizing its UI for both developers and end-user applications, and adding prebuilt design components for progressive web applications. It also plans to add AI-based journey orchestration for next best action suggestions and enhance its document processing capabilities.

Newgen received its highest use case score for business workflow automation. It also received a good score for the custom business applications use case and a fair score for the collaborative app development use case.

Oracle (APEX)

Oracle's LCAP is Application Express (APEX). APEX can be deployed wherever the Oracle database can be deployed — Oracle Cloud, AWS Relational Database Service for Oracle, private cloud or on-premises environments.
APEX provides a rapid application development environment that natively integrates with SQL and includes extensions to support all LCAP use cases. Through SQL, APEX users can access all the functionality of Oracle’s relational database management system (RDBMS), including its autonomous database features. Oracle provides a public GitHub repository for various starter apps and app components. It also provides extensive training materials in various languages and built-in functionality that enables users to build simple applications without recourse to SQL. Applications developed on APEX can be exported to other Oracle database instances. The UI developed on APEX can be embedded into other web portals using iframes. Oracle also provides additional services, such as integration and BPM, in its integration platform.

APEX users can develop PWAs using the underlying JET framework. However, it does not support stand-alone deployment to app stores, nor does it support offline or disconnected use. APEX does not yet provide complex process automation or case management capabilities, as it does not support native process or decision modeling, although it plans to develop these capabilities. Developers frequently use the procedural language for SQL (PL/SQL), JavaScript or Java-stored procedures for business logic.

Oracle plans to add mini-SaaS solutions based on APEX, including its survey/dynamic forms service and a discussion forum service. It also plans to release visual and graphical application logic editors and improve its existing CI/CD capabilities to identify and promote application changes from development to production.

Oracle received its highest use case score for collaborative app development. It also received a fair score for custom business applications, and a poor score for the business workflow automation use case. In all use cases, scores were in the lower range due to the focus on Oracle database customers in the past.

**OutSystems**

OutSystems’ LCAP is the OutSystems platform. The platform is available as SaaS, a cloud-hosted managed service or a client-managed public or private cloud.
OutSystems provides broad capabilities to accelerate application development across various stages of the SDLC. It has various web and desktop-based IDEs, AI-based smart development guidance and architecture discovery. OutSystems provides native CI/CD and application, infrastructure and security monitoring capabilities. For security, OutSystems provides design-time guidance to help developers protect against common vulnerabilities. It also offers advanced security options, such as an embedded security operations center and advanced mobile app shielding protections. Applications developed on the OutSystems platform can be deployed independently to other environments.

OutSystems has limited capabilities to support complex business processes, as it lacks support for standards such as BPMN 2.0, case management model and notation (CMMN) or decision model and notation (DMN). However, its workflow builder and expression-based DSL can enable nontechnical developers to design workflows. These features provide the guardrails required to automate the development of scalable workflows. Integrating the platform with a wider DevOps tool chain is complex and time-consuming.

OutSystems plans to add AI-powered automated unit testing, more granular monitoring, enhanced integration capabilities (to support frictionless data ingestion) and data cataloging capabilities. It also plans to replace Apache Cordova with a new modern mobile framework, which is currently used to support the development of native mobile applications.

OutSystems received the highest score of all vendors for the custom business application use case. It received good scores for the collaborative app development and business workflow automation use cases.

**Pega**

Pega’s LCAP is the Pega Infinity platform. Deployment options include Pega Cloud (on AWS), Cloud.Gov, Client Cloud Choice (AWS, Azure, GCS, Pivotal), hybrid cloud and on-premises.
Pega supports process-centric, low-code application development for multiple developer personas, including professional developers, citizen developers and fusion teams. Pega's no-code development environment provides end-to-end SDLC capabilities (including versioning, source control, automated testing, quality dashboards, visual debugging, guardrail compliance scoring and single-click deployment). Pega provides strong capabilities to automate complex business processes with sophisticated decision and state management requirements via the Pega Infinity platform. Rules-driven, straight-through processing and human-in-the-loop automations enable users to automate even highly adaptive processes. Pega's Cosmos Design has added the digital experience API (DX-API), which enables users to implement external design systems like Sketch, Material and Fluent while still using Pega's model-driven, low-code authoring capability. Applications developed on the Pega platform can be deployed independently to other environments.

Pega provides separate native web based IDEs to target professional and citizen developers, but neither provides a fat client IDE, nor do they support integration with popular IDEs, such as VS Code or IntelliJ. Pega has strong support for the use of AI for process and decision automation, but has limited capabilities to provide AI-assisted application development.

Pega released a new React-based version of its Cosmos Design System, enabling citizen developers to configure their UX in a more intuitive manner. Other new capabilities include Kubernetes as the default runtime platform and the introduction of multitenant storage and backing services (such as Kafka, Elastic Search, Cassandra, NoSQL, Mongo/Atlas). These scale up and scale down to help clients address even simple use cases cost-effectively.

Pega received the highest score of all vendors for the business workflow automation use case. It received good scores for the custom business applications and collaborative app development use cases.

**Quickbase**

Quickbase's LCAP is the Quickbase platform. It can run as a cloud service on Quickbase's own data centers, and it is also available on AWS and Google Cloud Platform for some customers in the EMEA region.
Quickbase Pipelines technology supports direct integration with about 50 popular SaaS and enterprise applications, and its Gartner Peer Insights rating for integration has improved during the previous year. It can directly access data residing in a customer’s private cloud instance or on-premises systems via its new prebuilt on-premises agent (in limited release until September). Quickbase offers both RESTful and XML APIs that enable reading and writing both data and schema. The platform provides audit log capabilities that cover user activities, builder activities and data changes in the application. It also provides a full runtime audit log for Pipelines, providing users with visibility into how data is moving across the platform and enterprise systems. Quickbase extended this visibility into platform usage, including APIs, directly from its admin console. This approach enables customers to quantify and evaluate the value they are deriving from the platform.

Quickbase plans to extend its platform-only SDLC capabilities into supporting common SDLC tools. Its visual data flow and Pipelines business logic capabilities meet most customer needs, but it does not support more advanced capabilities like BPMN or process mining. Quickbase is planning to upgrade its UI architecture over the next year, which will improve its fairly basic UI design capabilities. Applications developed in the Quickbase environment cannot be deployed independently to any other environment.

Quickbase has improved its reporting and dashboarding capabilities with a series of new features, such as real-time table reports and more data aggregation features. This capability supports fusion team development by providing operational insights into data across systems and teams. Quickbase is also adding predictive and prescriptive analytics to its platform analytics capability.

Quickbase received its highest use case score for collaborative app development. It received fair scores for the business workflow automation and custom business applications use cases.

**Salesforce**

Salesforce’s LCAP is the Salesforce Platform. It runs on Salesforce data centers around the world as a multitenant cloud service. Salesforce also supports deployment on AWS in certain regions.
Salesforce's Lightning Design System provides a rich library of tools, documentation and components for collaboration among designers and developers. Salesforce extends its platform's capabilities through AppExchange, which offers thousands of prebuilt apps, components and flows that enable composability on the platform. The Salesforce Platform supports the SDLC across fusion teams with native low-code approaches, such as application testing, and with code-centric tools, such as a VS Code extension, unified command-line interface (CLI) and smooth integration with CI/CD pipelines.

Salesforce Flow is capable, but may not currently be suitable for more complex use cases. It plans to enhance Flow by adding capabilities to design decision models involving multiple people, as well as approvals, which are needed to automate complex processes. Salesforce provides Sandbox and Scratch orgs as temporary environments to support different users during independent and collaborative team development. These environments support modern application life cycle management (ALM) and governance, such as source-driven development, continuous integration and automated testing. Applications developed in the Salesforce environment cannot be deployed independently to any other environment, but developers can render Salesforce Lightning Web Components in remote web containers outside Salesforce servers.

Salesforce is increasing its investments in automation under the umbrella of Einstein Automate, which includes new prebuilt workflow options, an expanded array of testing tools and new capabilities for RPA delivered via AppExchange. It has launched MuleSoft Composer as a low-code integration tool that links the Salesforce Platform with MuleSoft. It also released Salesforce Data Pipelines, a low-code ETL solution for aggregating, transforming and writing data back to Salesforce objects. Data Pipelines includes more than 50 prebuilt data input connectors to sources like Snowflake, AWS S3 and Redshift. In the coming year, with its new Hyperforce multicloud substrate, Salesforce plans to support deployments across major public cloud infrastructure providers.

Salesforce received its highest use case score for custom business applications. It also received good scores for the collaborative app development and business workflow automation use cases.

**ServiceNow**

ServiceNow's LCAP is the ServiceNow Now Platform App Engine. The platform is primarily delivered as SaaS running on ServiceNow's enterprise cloud infrastructure, but it can also be deployed on-premises or in a Microsoft Azure environment (in some regions).
ServiceNow provides separate web-based IDEs to enable different developer personas to build applications. It supports integration with Visual Studio Code to extend applications or customize UIs. IntegrationHub provides 150 out-of-the-box connectors to popular SaaS applications. It also provides capabilities to develop custom integrations with applications and databases through APIs and events. The platform provides Workflow Builder, Flow Designer and Process Automation Designer to support natural-language-based approval management and collaborative process modeling. The ServiceNow Store is a rapidly growing ecosystem of applications, industry solutions, connectors and independent software vendors (ISVs) developed to assist in the rapid development of digital solutions.

Through App Engine Studio and Mobile Studio, ServiceNow supports the development of mobile apps. The distribution of those files is currently carried out through private channels (corporate intranet, mobile device management and Apple Business Manager). However, the company plans to add support for developers to distribute custom mobile apps through their own private app store accounts in an upcoming release. Though the platform provides native infrastructure monitoring capabilities, it does not provide detailed application or behavior monitoring capabilities, nor does it support integration with specialist monitoring vendors. Applications developed in the ServiceNow environment cannot be deployed independently to any other environment.

ServiceNow plans to enhance its decision management by simplifying user experience. It also plans to add screen flows to App Engine, along with native RPA capabilities to integrate task management into end-to-end workflows. It plans to add optical character recognition (OCR), image classification and object identification capabilities. It also plans to augment its capabilities for citizen development by adding a center of excellence (CoE) and a starter kit for citizen developers.

ServiceNow received its highest use case score for collaborative app development. It also received good scores for the business workflow automation and custom business applications use cases. ServiceNow's consistent performance across use cases aligns with its similarly consistent technical scoring across all capabilities.

Context
This research evaluates and compares LCAP product capabilities to determine how well a vendor's product solves specific use cases. This Critical Capabilities concentrates on LCAP product capabilities, whereas the Magic Quadrant for LCAP evaluates vendors based on a broader set of strategic qualities such as corporate viability, vision, marketing and geographic focus.
The LCAP market is extremely diverse, with many vendors from different backgrounds offering a range of low-code capabilities for application development and composition. Given the diversity of LCAP solutions, software engineering leaders should map these product capabilities to popular use cases to ensure that they select an LCAP solution that meets the needs of the application creators and their end users. In conjunction with the above vendor analysis, software engineering leaders must note that:

- They may need to use multiple platforms for different developer personas and use cases. Many enterprise organizations leverage several LCAP offerings to address specific requirements as part of a multi-SaaS vendor strategy.

- Many LCAP vendors have expanded their products to provide capabilities similar to Gartner's application composition technology framework (see Innovation Insight for Application Composition Technology). When selecting vendors to deliver technology to enable application composition, software engineering leaders should select vendors that have strong AI, process automation, application governance, data integration and management capabilities.

- Many vendors are shifting to a cloud-first strategy to support hybrid cloud and multicloud deployments of their platforms and the applications built using them. Software engineering leaders should assess the sensitivity of data that is likely to be stored and processed using the LCAP, and evaluate the granularity and completeness of the controls provided by vendors to manage and secure the application data.

**Product/Service Class Definition**

A low-code application platform (LCAP) is used to rapidly develop and deploy custom applications by abstracting and minimizing hand coding. At a minimum, an LCAP must include low-code capabilities (such as model-driven and graphical programming model with scripting) to develop a complete application consisting of user interfaces, business logic, workflow and data services.

Enterprise LCAPs can be used to create enterprise-class applications that require:

- High performance
- High availability and scalability
- Disaster recovery
- Enterprise security
API access to and from enterprise and third-party cloud services
Application usage monitoring
Service-level agreements (SLAs)
Technical support and training from the vendor

Enterprise LCAPs should provide one-step application deployment, execution and management using declarative, high-level programming abstractions, such as model-driven and graphical approaches.

Advanced capabilities offered by some enterprise LCAPs include:

- Front-end user experiences beyond web user interface (UI)
- Complex business process automation and management
- Event-driven architecture
- AI augmented development techniques
- Application composition

**Critical Capabilities Definition**

**SDLC**

How does the platform support professional developers in building applications faster?

Vendors were asked:

- What software development environments do they provide?
- What programming languages and native frameworks do they support?
- What application testing and monitoring capabilities do they provide?
- What DevOps capabilities do they support?

**User Experience Design**

How does the platform support the design, development and testing of user journeys, rich mobile and web interfaces, continuous user experience and other user interfaces?
Vendors were asked:

- What support do they provide to design user journeys and user personas?
- What support do they provide for the design of PWAs, responsive applications and mobile applications?
- What UX design standards and systems do they support?
- What capabilities do they provide to develop chatbots, voice-enabled applications, AR/VR and wearable applications?

**Development Productivity**
How does the platform enable professional developers, citizen developers, business technologists or fusion teams to collaboratively develop applications?

Vendors were asked:

- What capabilities do they provide to nontechnical developers during the software development life cycle?
- What capabilities do they provide to support visual modeling of data and business logic?
- What AI capabilities are provided to assist during development, testing and application monitoring?

**Business Logic and Workflow**
How does the platform support the design, development and testing or simulation of stateful and stateless business processes; the choreography of human workflows, services, documents and user experiences; and the business logic for controlling processes and making business decisions?

Vendors were asked:

- What capabilities do they provide to model processes and business rules?
- What capabilities do they provide to support case management?
- What capabilities do they provide to support document processing?
Integration and APIs
How does the platform support back-end integration with local and cloud services, service repositories and databases? How does it provide and manage application APIs for the external consumption of the data and business logic in applications built with the platform?

Vendors were asked:

- What integration protocols and capabilities do they provide?
- What support do they provide for complex event processing and event-driven integrations?
- Do they support applying fine-grained controls over APIs?
- What connectors do they provide and what iPaaS vendors do they integrate with?

Platform Ecosystem
How does the platform support developer ecosystems, including app stores, domain-specific data models and processes, UX component and back-end service sharing, access to third-party assistance and training services?

Vendors were asked:

- How broad and deep is their app or component store (in terms of volume and accessibility)?
- How broad and deep are their training and certification capabilities?
- What are the management and governance mechanisms of their marketplace?

Governance
How does the platform support the governance of application development and deployment (including development metrics and KPIs) and meet deployed application SLAs for distributed professional developers, citizen developers and fusion teams?

Vendors were asked:
What capabilities do they provide to govern application development by fusion teams?

What application logging and monitoring capabilities do they provide?

What developer guardrails and alerts can be applied?

What administrative and operation capabilities do they provide?

**Security and QoS**

How does the platform secure applications and data? How does the platform support service quality concepts such as scalability, low-latency practices and DR, including global coverage of data centers?

Vendors were asked:

- What deployment, HA, scalability and DR capabilities do they provide?
- What capabilities do they provide to secure the platform and the applications developed on the platform?
- What security certifications and standards do they comply with?

**Use Cases**

**Custom Business Applications**

Build and maintain modern enterprise applications that require rich user experiences, complex integrations, robust monitoring and handle large transaction volumes.

Examples include custom core business applications, applications to modernize legacy applications or user experience, and composable applications built with SaaS, marketplaces, existing data sources, event channels, cloud services and custom local services.

**Business Workflow Automation**

Automate workflows involving multiple application systems and human actors to accomplish business goals.

This includes complex processes, simple workflows, document-oriented processes, human task management and case management that require process modeling, orchestration, integration and decision modeling capabilities.
Collaborative App Dev

Enable different developer personas (professional and citizen developers) as well as fusion teams to collaboratively build applications.

This requires capabilities such as drag-and-drop development, proactive developer aids and guidance, simplified integration and robust application development governance.

Vendors Added and Dropped

Dropped

We have updated our business and go-to-market inclusion criteria for 2021, because clients are demanding greater long-term stability from their enterprise LCAP investments. Additionally, there are even more LCAP vendors that have grown to meet the business inclusion criteria from 2020, leading us to raise the bar for inclusion to ensure a reasonable number of vendors to evaluate.

Based on the changes, we have dropped the following vendors from this year’s evaluation, because they did not meet one or more of the updated minimum requirements. These, along with other LCAP vendors, should be part of a broader evaluation list for organizations, because they often provide compelling value and some offer differentiating product capabilities.

- AgilePoint
- AuraQuantic
- Betty Blocks
- Oracle (Visual Builder)
- ProntoForms
- TrackVia
- Zoho

Inclusion Criteria

To qualify for inclusion, vendors must:
Demonstrate a go-to-market strategy with specific pricing for their low-code application platform (LCAP) for cross-industry or general-purpose application development.

The LCAP must not be used only or mainly for building specific industry applications, and it must not only be a product bundled within some other solution or platform.

The LCAP must support development and deployment of applications by professional developers in both central IT and lines of business, rather than being just for citizen developers.

Provide an LCAP offering with both no-code and low-code capabilities to:

- Develop, version, test, deploy, execute, administer, monitor and manage applications and their relevant artifacts.
- Embed data storage features without relying on additional procured services (i.e., include a database).
- Support the design of data schema and application logic.
- Create rich application UIs (i.e., not just include a form-builder or build an administration UI).
- Enable the invocation of external third-party services via APIs or event topics.
- Support some automation of platform patching and versioning.
- Provide single-step deployment across environments (development, test, staging, production).
- Access a platform repository or marketplace for sharing components, modules, connectors and templates.

Offer an enterprise-grade LCAP solution aimed at enterprise-class projects and providing:

- High availability and DR
- Secure access to applications
In addition to the above market and technical criteria, each vendor must meet the following business criteria:

- **Revenue**: The vendor must have revenue of at least $50 million for LCAP licenses and subscriptions in the year ending 31 March 2021.

- **Growth**: The vendor must have at least 20% year-on-year growth in revenue for LCAP licenses and subscriptions, excluding professional services or other related product offerings, in the year ending 31 March 2021.

- **Customer base**: The vendor must have at least 100 paying enterprise customer organizations (those with at least 1,000 employees) for its LCAP offering, excluding other related product offerings, as of 31 March 2021.

- **International presence**: The vendor must have direct customers (i.e., not through resellers) in three of the following geographies:
  - North America
  - South America
  - Europe
  - Middle East and Africa
  - China
  - Asia/Pacific.

We have excluded vendors that meet any of the following criteria:

- Require a specific, licensed, third-party component or product that is not already included in their platform — that is, branded, sold and supported directly by the vendor.

- Only sell their platform with, and for the use of, their professional services and consultants.
- Require the purchase and/or installation of other unrelated products or platforms offered by the same vendor (such as a CRM application or content management system).

- Did not market a GA product prior to 2020 that was described as a distinct LCAP offering (e.g., a SaaS vendor that provided a low-code tool only as part of its SaaS license, and separated it out in 2020).

- Do not offer a commercially supported enterprise offering — that is, only offer the platform as open-source software.

### Table 1: Weighting for Critical Capabilities in Use Cases
(Enlarged table in Appendix)

<table>
<thead>
<tr>
<th>Critical Capabilities</th>
<th>Custom Business Applications</th>
<th>Business Workflow Automation</th>
<th>Collaborative App Dev</th>
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Source: Gartner (September 2021)

### Critical Capabilities Rating

Each of the products/services that meet our inclusion criteria has been evaluated on the critical capabilities on a scale from 1.0 to 5.0.
Table 2: Product/Service Rating on Critical Capabilities
(Enlarged table in Appendix)

<table>
<thead>
<tr>
<th>Critical Capabilities</th>
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<th>Kintone</th>
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As of 12 August 2021

Source: Gartner (September 2021)
Table 3: Product Score in Use Cases
(Enlarged table in Appendix)

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<th>Use Cases</th>
<th>Appian</th>
<th>Creatio</th>
<th>Kintone</th>
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As of 12 August 2021

Source: Gartner (September 2021)

Critical Capabilities Methodology

This methodology requires analysts to identify the critical capabilities for a class of products or services. Each capability is then weighted in terms of its relative importance for specific product or service use cases. Next, products/services are rated in terms of how well they achieve each of the critical capabilities. A score that summarizes how well they meet the critical capabilities for each use case is then calculated for each product/service.

"Critical capabilities" are attributes that differentiate products/services in a class in terms of their quality and performance. Gartner recommends that users consider the set of critical capabilities as some of the most important criteria for acquisition decisions.

In defining the product/service category for evaluation, the analyst first identifies the leading uses for the products/services in this market. What needs are end-users looking to fulfill, when considering products/services in this market? Use cases should match common client deployment scenarios. These distinct client scenarios define the Use Cases.
The analyst then identifies the critical capabilities. These capabilities are generalized groups of features commonly required by this class of products/services. Each capability is assigned a level of importance in fulfilling that particular need; some sets of features are more important than others, depending on the use case being evaluated.

Each vendor’s product or service is evaluated in terms of how well it delivers each capability, on a five-point scale. These ratings are displayed side-by-side for all vendors, allowing easy comparisons between the different sets of features.

Ratings and summary scores range from 1.0 to 5.0:

1 = Poor or Absent: most or all defined requirements for a capability are not achieved

2 = Fair: some requirements are not achieved

3 = Good: meets requirements

4 = Excellent: meets or exceeds some requirements

5 = Outstanding: significantly exceeds requirements

To determine an overall score for each product in the use cases, the product ratings are multiplied by the weightings to come up with the product score in use cases.

The critical capabilities Gartner has selected do not represent all capabilities for any product; therefore, may not represent those most important for a specific use situation or business objective. Clients should use a critical capabilities analysis as one of several sources of input about a product before making a product/service decision.

**Document Revision History**

Critical Capabilities for Enterprise Low-Code Application Platforms - 30 September 2020

Critical Capabilities for Enterprise Low-Code Application Platforms - 17 October 2019

**Recommended by the Authors**

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

Magic Quadrant for Enterprise Low-Code Application Platforms
How Markets and Vendors Are Evaluated in Gartner Magic Quadrants

Emerging Technologies: High-Velocity Demands Accelerate Low-Code Application Platforms

Forecast Analysis: Low-Code Development Technologies

Gartner Peer Insights ‘Lessons Learned’: Implementing Enterprise Low-Code Application Platforms

Identify and Evaluate Your Next Low-Code Development Technologies

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