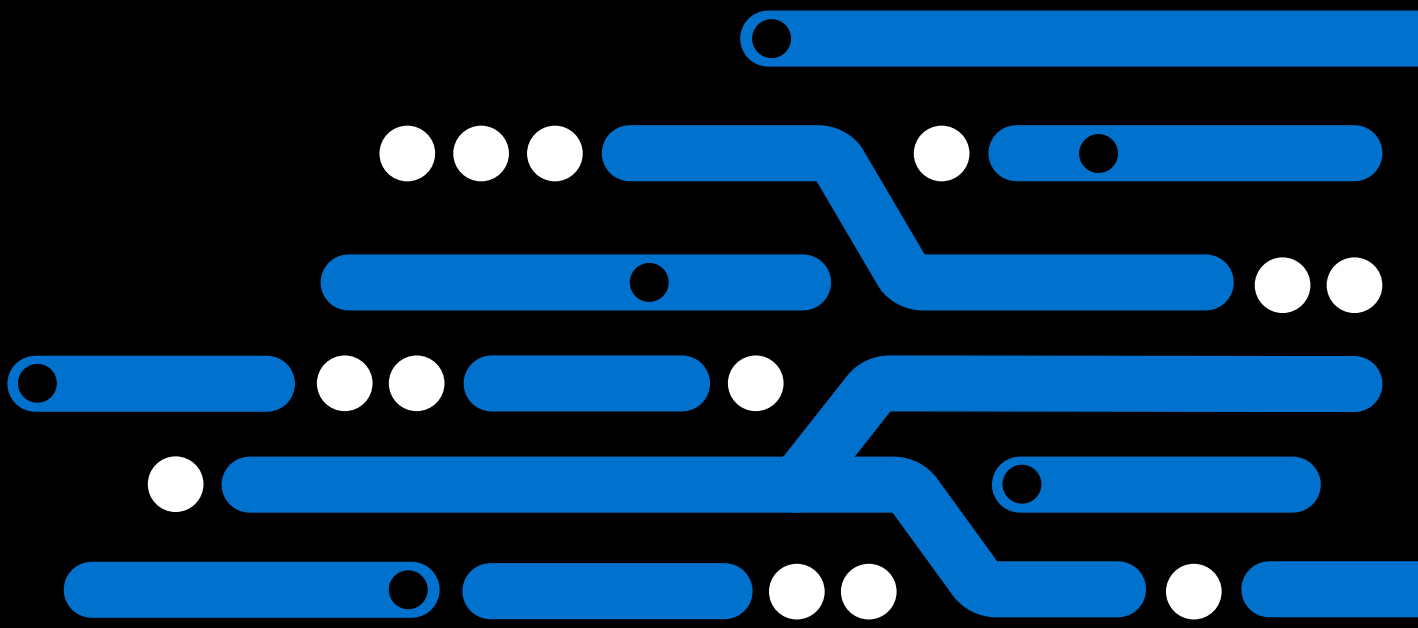
CAMUNDA

The Ultimate Guide to Building Your Hyperautomation Tech Stack



August 2022

camunda.com

Contents

The Road to Hyperautomation

Developers are under immense pressure to deliver innovative solutions while keeping technical debt to a minimum. Every new project requires you to translate business requirements into what's technically possible.

This position gives skilled developers an incredible opportunity. Being central to transformation initiatives exposes you to a range of business problems and the opportunity to discover new technologies that can accomplish lofty goals.

Digital transformation opens the door to working with a variety of cutting-edge solutions like microservices, AI, and IoT. As organizations establish automation Centers of Excellence (CoEs), they seek to understand and leverage the vast array of tools that will enable their success. As technology continues to evolve rapidly, staying ahead of the curve lets you weigh in on what's necessary to accomplish your goals.

Hyperautomation isn't all hype

The term *hyperautomation* can feel overloaded to experienced developers. The reality is that many process automation solutions tout the ability to automate end-to-end processes but do not deliver true transformation on their own.

The most common reasons for this are misalignment or misunderstanding of what's required to achieve this digital transformation goal. The complex nature of today's business processes can obscure the tools, people, and technologies that operate in the background.

The challenge with hyperautomation

Simply put, critical business processes are complex. Not only are they mission-critical, but they span a complex web of technology, systems – and most challenging – people.

The complexity creates a roadblock for many organizations because multiple departments and stakeholders are essential to the project's success. Uniting these different entities can be difficult and time-consuming to achieve if there is a lack of alignment around the importance of the transformation initiative.

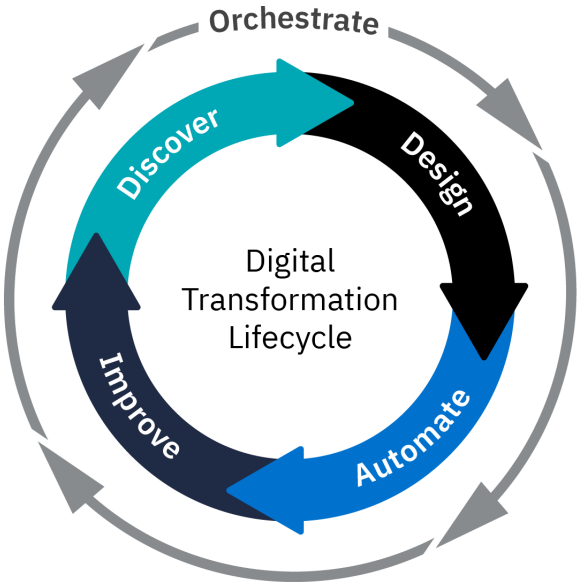
Additionally, resources are scarce for even the most technically mature companies. Talented developers with the expertise to engineer end-to-end digital processes at scale are in high demand. As a result, developers are constantly balancing the need to level up technology with the reality that change happens more slowly as an organization grows in size.

By 2025, cloud-native platforms will serve as the foundation for more than **95% of new digital initiatives** — up from less than 40% in 2021.

Source: Gartner®

After reading this guide, you'll understand:

- The challenges and opportunities hyperautomation gives developers
- Common automation technologies (and their strengths and weaknesses)
- Why successful transformation relies on orchestration



Developers are central to hyperautomation success

Where automation mainly focuses on cost reduction, hyperautomation aims to transform the business process completely. This requires developers to leverage the latest tools and technologies to accomplish the business's strategic goals.

Taking a digital-first approach brings developers into focus for nearly every initiative. They're often tasked with translating business goals into what is technically feasible. This can be a challenge with a project like replacing legacy or homegrown solutions, where the original implementation was intended to transform the business but failed. This is why having developers *and* business users collaborate early to identify the appropriate technologies to implement is so important. Without both parties working together, the project will suffer the same fate.

This challenge does come with a potential award. Transformation projects give developers more freedom to solve complex challenges creatively, grow their skillset, and continue working on more interesting projects.

The secret to successful transformation is orchestration

Digital transformation is, much like software development, cyclical. There are relative start and end times for a project, but the process is continuous. For developers, having tools to handle advanced workflow patterns that enable agile development with your current stack is essential.

The secret is using process orchestration software that can hook into any endpoint. Uniting disconnected technologies with a proper orchestration platform allows you to improve upon your existing processes while creating truly innovative solutions. Iterating continuously without upsetting in-flight workflows gives you the freedom to experiment and deliver better software faster.

That's why it is important to choose technology that solves problems today but has the flexibility to grow and scale with you as needs change. Otherwise, you run into the same limitations down the road you're trying to fix now through hyperautomation.

Real-world hyperautomation examples

End-to-end process automation and true digital transformation rely on a variety of endpoints and technology. Below you'll find a number of examples, but remember that nearly everything can be automated with the right set of tools.

Human workflows

Many tasks require human intervention, such as compliance checks or quality assurance. Automate notifications, recordings, assignments, and escalations while providing a flexible front-end to include human workflow activities and decisions.

Loosely-coupled microservices

Microservices are an integral part of a full business process. Ensuring they are carefully monitored, managed, and analyzed is crucial for continued effectiveness.

Untangling RPA bots

Brittle RPA implementations can break and disrupt critical business processes. Orchestration gives you the ability to monitor, control, and analyze multiple RPA bots alongside other activities from end to end.

Modernizing legacy systems

Outdated technology often exists in a black box, limiting your ability to stay agile and adapt. Transforming these systems lets you move beyond technical boundaries by shedding restrictive, expensive, and outdated BPMS products.

Replacing homegrown solutions

Homegrown solutions are opaque and require historical knowledge to understand. Reinventing these expensive and inflexible in-house workflow solutions saves critical time and effort for your development team.

Delivering better customer experiences

Add workflow automation to your software products through a powerful engine that scales with your business and enables them to continue adapting and growing.

Centralizing your process automation platform

Creating a central, scalable process automation platform for your application delivery stack lets you continue to deliver better software in less time.

Upgrading legacy IT systems

Transforming these will increase your agility and overcome roadblocks to digital transformation by retiring homegrown software, breaking down monoliths, and reducing RPA bot overhead.

Discover

Before beginning the process analysis phase of a project, it's essential to set out key objectives and desired results. Having this alignment upfront ensures you choose the right technology.

While uncovering inefficiencies can feel like a tough first step, they often become obvious when taking an objective look at your processes. The initial signal may come from unhappy stakeholders like your users, customers, or even internally. You may be fortunate to have monitoring in place to see how your applications perform, but even that data doesn't pinpoint the problem or help you plot a path forward.

Process mining is a method for discovering, monitoring, and creating plans to improve real processes. The software captures information from the event logs of your enterprise system and provides precise, data-backed details about process performance.

However, because process mining doesn't apply to entirely new processes, you'll need to conduct interviews and workshops to align on what's required.

95% of respondents agree that for process automation to happen effectively, business and IT leaders need to be aligned and collaborating.

State Of Process Automation 2022

Things to consider with process mining tools

Strengths	Weaknesses
✔ Ingests large volume of data to uncover optimizations	X Relies on existing log data
✔ Leverages event logs	X Misses steps happening outside of the system

Process mining vendors

The discovery tool marketplace is quite mature, so there's no shortage of processing mining vendors to sift through. Ultimately, we'd recommend selecting one that isn't embedded in other applications in your stack. Agnostic vendors are more focused on articulating the bottlenecks versus suggesting a specific technology to solve the problem.

Apromore **Celonis** **Minit Process Mining**

Design

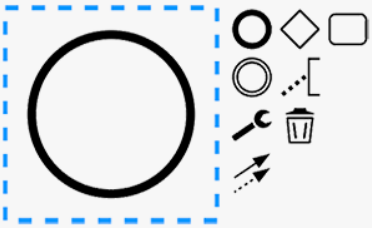
Research shows that 95% of professionals believe business and IT alignment is critical to an automation project's success. Successful digital transformation requires a way to expose logic hidden deep within processes in a way that everyone can understand.

Business Process Management and Notation (BPMN) is a standards-based approach to designing executable process models. Decision Model and Notation (DMN) Both languages are easy to learn and well documented by the non-profit institution OMG, which promotes these commonly used standards which reduce the potential for vendor lock-in.

The simplicity helps eliminate any miscommunication, yet is complex enough to articulate the most complicated business processes clearly from end to end. The long history of BPMN and DMN makes it the de facto choice for most organizations transforming complex business processes.

Having the ability to quickly translate decision requirements into executable decision tables further improves the developer experience. Keeping these standards closely connected reduces context switching, improves alignment, and speeds up iterative improvements even while in production.

Build your first model:



Try Camunda Modeler

Things to consider with process modeling tools

Strengths	Weaknesses
✔ Collaborative	X Simple to get started, but there is a learning curve
✔ Visual	
✔ Standards-based	
✔ Simplistic but powerful	
✔ Executable	

Process modeling vendors

The key things to look for here are collaboration and ease of implementation. Even the most gorgeous UI doesn't matter if you can't collaborate, share, and ultimately execute your process and decision models.

ADONIS **Camunda Modeler** **Signavio Modeler**

Automate

Automation has historically focused on repetitive, often siloed tasks that could be easily replaced with often-siloed technology. As companies continue digitizing core processes and replacing old solutions, the ability to handle advanced workflows across multiple endpoints becomes essential for success.

The key is understanding the end goal, learning the reasons why a certain technology is used now, and determining if that's still the best choice. Because the industry changes so fast, there are often newer and better ways to handle the same problem.

This is especially true with replacing legacy or homegrown solutions that serve as the foundation for mission-critical processes. Having a solution to orchestrate a diverse set of automation technology gives you the freedom to solve the problem cohesively without being boxed into any specific tools or vendors.

For developers, selecting the right technology leads to:

- Working in their preferred languages and environments
- Faster sprints with quicker delivery
- Utilizing next-generation technologies
- Solving more interesting and complex problems

All of these benefits give developers a chance to be the expert in their organization at translating business needs into technical realities. They're better able to shape their career focus by having experience with such a diverse set of technologies.

In the following sections, we'll discuss the various technologies that could exist in a mature hyperautomation stack.

APIs and event streams

APIs and event streams help you get the data you need in the right system. They can interact with a workflow engine to kick off processes or integrate data from other systems.

Strengths	Weaknesses
✔ Gives you more flexibility	X Requires additional coding
✔ Opens new services to be called in	X Updates can cause breakage

API and event stream providers

There are open source event streams and APIs that you can leverage for your next project. Alternatively, specific software vendors typically have a well-maintained API that you can use. Below are just two examples for reference.

Apache Kafka

Open source distributed event streaming platform used by thousands of companies for high-performance data pipelines, streaming analytics, and mission-critical applications.

REST API

Application programming interface that allows for interaction with RESTful web services.

Robotic Process Automation

Robotic Process Automation (RPA) platforms automate work by simulating user interactions with software, or by using an API.

The technology was a quick win for many early automation projects by reducing or eliminating manual tasks. The simple tool gives you the ability to automate legacy or traditionally production-heavy processes that normally require scripting.

Strengths	Weaknesses
✔ GUI-based rapid prototyping	X Not for complex tasks
✔ Less-technical users can automate processes without modifying underlying components	X Fragile automations can break easily and require high costs to maintain
	X GUIs aren't versions which can obscure screen elements
	X Licensing can quickly become cost-prohibitive with more users

RPA vendors

This class of solutions has gained momentum over the years but is brittle in nature for true digital transformation. Its continued relevance will depend on orchestrating its use alongside other automation technologies.

Automation Anywhere **Blue Prism** **UIPath**

Integration Platform-as-a-Service

Integration Platform-as-a-Service (iPaaS) providers connect various systems through libraries of pre-packaged APIs to simplify integration efforts. These platforms are most effective when handling a series of data interactions by systems where human involvement isn't needed.

Strengths	Weaknesses
✔ Wide range of pre-built integrations	X Limited abilities; can't persist state for long-running tasks
✔ Accessible for most organizations	X For simple application integration flows
	X Not for end-to-end process orchestration

iPaaS vendors

This category offers a variety of predefined integrations for a variety of systems. Each has a number of these pre-built with new integrations being added frequently.

MuleSoft **Workato** **Zapier**

Low-code tools

Low-code platforms emerged to reduce the time and skills needed to develop new mobile and web applications. Many of these vendors have extended their platforms to enable workflow-driven applications and process automation but have limitations.

Strengths	Weaknesses
✔ Rich features to quickly build modern UIs	X Not for complex tasks
✔ Optimized for citizen developers	X Limited set of protocols to integrate existing applications
	X Proprietary languages cause vendor lock-in

Low-code vendors

This class of solutions has gained momentum over the years as developer roles have changed and internal software creation becomes more democratized.

Appian **Mendix** **Pegasystems**

Artificial intelligence and machine learning

The biggest challenge with any artificial intelligence (AI) initiative is data quantity and quality. machine learning (ML) can help to automate process execution through well-defined statements but lacks the intelligence of an AI model. AutoML platforms and home-built AI models can help inform processes, make decisions, and more.

Strengths	Weaknesses
✔ Making decisions based on historical data	X Quality models use a lot of data X Bias needs to be monitored

AI and ML vendors

There are a few vendors that have AI and ML solutions for process execution. We see this category growing as better data and models are created for public use. Other technologies that can be involved include Computer Vision, Natural Language Processing, and Optical Character Recognition.

DataRobot **H2O.ai**

Front-end technology

Even the most advanced automation can benefit (or even require) human interaction. Front-end tools help alert users in the automation loop about tasks, deadlines, and status.

Strengths	Weaknesses
✔ Enable human task automation ✔ Provide visibility into human workflows	X Little control over third-party tool updates X Custom UIs require front-end development

Front-end solutions

Many organizations will build out a custom front-end for their applications depending on the purpose and end user. Since there are so many options to choose from, we're listing out groups of solutions that can support this work depending on the desired goal.

Project management

A good project management tool like Asana, Airtable, and Monday.com makes it easy to monitor and take action on projects with multiple stakeholders.

Human task orchestration

Camunda Tasklist is an out-of-the-box app that gives developers the ability to assign and orchestrate tasks that require human interaction like compliance checks or quality assurance.

Communication

Microsoft Teams and Slack can be used in a business process to send notifications, alerts, and even full communication streams to teams.

Continuous Integration / Continuous Delivery

Continuous integration and continuous delivery (CI/CD) tools help teams streamline the development, deployment, and testing of critical deployments. Each tool has its own focus area like integration, testing, or other functions.

CI/CD vendors

Automating tests depend on the framework that suits your application. There are lots of options for each language so you might have to do some research to uncover which framework is best for your team.

Instead of listing all the vendors, we'll highlight some key tests to run before your software hits production.

End-to-end testing

End-to-end tests replicate user behavior in a complete application environment. It verifies that various user flows work as designed, but can be expensive to perform and hard to maintain if not automated.

Performance testing

Performance tests help measure the reliability, speed, scalability, and responsiveness of your application. The tests determine if you're meeting performance requirements, help locate bottlenecks, and calculate stability under peak load.

UI or GUI testing

Testing the aspects of any software that a user will come into contact with ensures usability. The tests focus on verifying the functionality and performance of visual elements against requirements.

Unit testing

These tests are very close to the source of the application and often run locally on the developer's machine. They test individual functions of the classes, components, or modules used by your software. Unit tests are generally affordable to automate and run quickly using a continuous integration server.

Orchestrate

The key to successful digital transformation is process orchestration. Because business processes are remarkably complex, they require an automation fabric to effectively stitch together a wide variety of endpoints and technologies.

To accomplish this, you need to be able to accurately express everything happening in your business process from end to end. This requires workflow patterns that go beyond basic control flow patterns (like sequence or condition). Without an orchestration tool to show advanced workflow patterns, you'll need to implement time-consuming workarounds, and you will end up with hard-to-read models that make it difficult to align stakeholders and inform developers what needs to happen.

Universal process orchestration solutions enable developers to rapidly connect a complex web of business processes that span people, systems, and devices based on collaboratively defined process models. The frameworks focus on orchestrating service calls and place less emphasis on providing tools to build interfaces.

Instead of handling a discrete portion of a process (like ordering or fulfillment), you can instead automate the entire process from end to end. Orchestration allows you to create a process that handles ordering, fulfillment, payment processing, and even returns.

While some process orchestrators embed their workflow engine, others are designed for scalability and resilience. The next generation of tools decouples the workflow and decision engine from the database providing high-throughput performance under peak loads.

This innovation potential is exactly why universal process orchestration platforms offer so much value. The openness reduces friction points as you're able to plug into existing software using languages you're already familiar with instead of being limited by a vendor's capabilities.

Things to consider with universal process orchestration

Strengths	Weaknesses
✔ Core toolset is accessible to application developers ✔ Governance and orchestration of complex, long-running, end-to-end business processes ✔ Collaborative process definition and design	X Complex scenarios may require skilled technical developers

Process orchestration vendors

This category is growing in recognition as more organizations realize they're missing a crucial piece of the hyperautomation equation. The key things to look for are collaborative design, flexibility for developers, and performance.

Camunda

Camunda is the first solution specifically designed to solve the challenges of orchestrating complex, mission-critical business processes. The platform empowers organizations to collaboratively build high-performance workflows that can enable true digital transformation.

Improve

Hyperautomation is a continuum just like the software development lifecycle. Even after you've designed, orchestrated, and automated a business process from end to end, there will always be the need for improvement.

Shifting market dynamics or customer expectations can disrupt the most elegant and thoughtful processes. It's vital to have an analytics solution that provides data-backed insights into your process performance. Showing execution data in the BPMN model makes it much easier for process owners to identify impactful changes.

Clean analytic dashboards that don't require a lot of clean-up to be actionable will improve adoption and reduce any support required from developers.

Process intelligence vendors

There are a number of ways that you can get detailed analytics on your running processes. Leveraging a tool that pairs BPMN diagrams with real-time analytics provides actionable context instead of a data dump.

Camunda Optimize
OpenText Process Intelligence
TIBCO Spotfire

****Note about business intelligence tools:**

You can use an existing BI tool like Tableau to show process performance, but you'd be missing important contextual data from the process model itself which helps make your analytics more actionable.

Conclusion

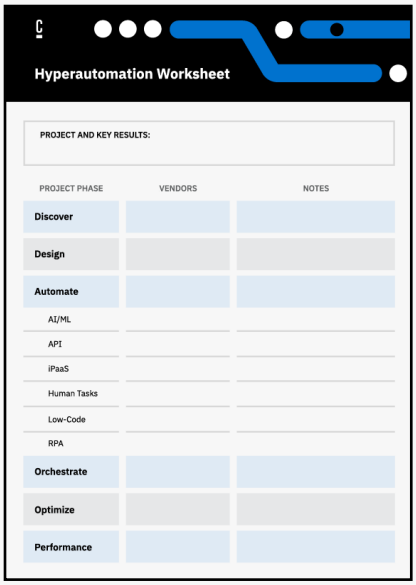
Developers are in greater demand due to an ever-growing business need to continue digitizing processes to stay competitive.

The focus on next-generation platforms gives developer communities a chance to stay on the leading edge of this work. Without your expertise and close collaboration with business stakeholders, there's a strong chance that your transformation project will fall flat.

By understanding how orchestration leads to successful automation, you have a chance to become indispensable in supporting the organization's biggest and most creative goals. With proper orchestration, developers can build a hyperautomation technology stack that weaves together any number of endpoints to completely transform an organization.

Source:
Gartner, "Top Strategic Technology Trends for 2022", David Groombridge, Frances Karamouzis, et al., October 18, 2021

Ready to chart your path forward?



Download Worksheet

Use this hyperautomation worksheet to map out the technology you'll need to orchestrate any process, anywhere. See an example.

About Camunda

Camunda enables organizations to orchestrate processes across people, systems, and devices to continuously overcome complexity and increase efficiency. With Camunda, business users and developers collaborate using BPMN to model end-to-end processes and run sophisticated automation with the speed, scale, and resilience required to stay competitive. Hundreds of enterprises such as Atlassian, ING, and Vodafone design, orchestrate, and improve business-critical processes with Camunda to accelerate digital transformation. To learn more visit **camunda.com**.