WHITE PAPER

DevOps

for CX-Driven Digital Transformation

CYARA

Customer Smiles. **Delivered at Scale.**

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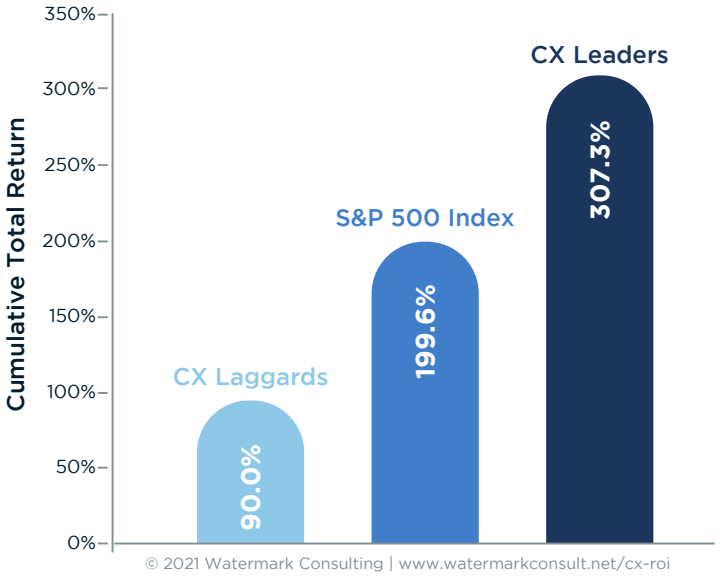
Executive Summary

Digital Transformation is Key to Flawless Customer Experience

Customer experience (CX) is one of today's leading differentiators, with many organizations seeking new ways to meet customer expectations for seamless interactions across all digital and voice channels. Digital transformation is the process by which businesses are redefining traditional operational models to deliver innovative products and services before digital-native or transformed competitors capture market share. Delivering quality CX has a positive impact on stock performance, as demonstrated by an extensive study conducted by Watermark Consulting.[1] Over a period of 13 years, customer experience leaders outperformed the S&P 500 Index by 108 points, whereas CX laggards posted a total return that was 110 points lower than the S&P 500 Index.

CUSTOMER EXPERIENCE LEADERS OUTPERFORM THE MARKET

13-Year Stock Performance of Customer Experience (CX) Leaders vs. Laggards (2007-2019)



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Companies With Great CX Are Rewarded

The quote that "every company is a software company," rings more true today than ever before. Digital transformation drives the need for the constant delivery of customer experience capabilities through software development.

In every industry, software development has become a strategic capability and data has become the new currency. For customer experience products and services, the imperative for quality is paramount. There are no second chances with customers who are empowered to amplify "CX fails" on social media and are willing to switch companies in a nanosecond. Customer experience must have flawless execution from day one.

DevOps is a Key Enabler for CX Success

To innovate quickly and assure quality, many enterprises have turned to DevOps. "DevOps for customer experience" expands on the DevOps software methodology and focuses on the unique aspects of customer experience software, enabling greater speed and quality.

DevOps for customer experience allows the delivery of software in which:

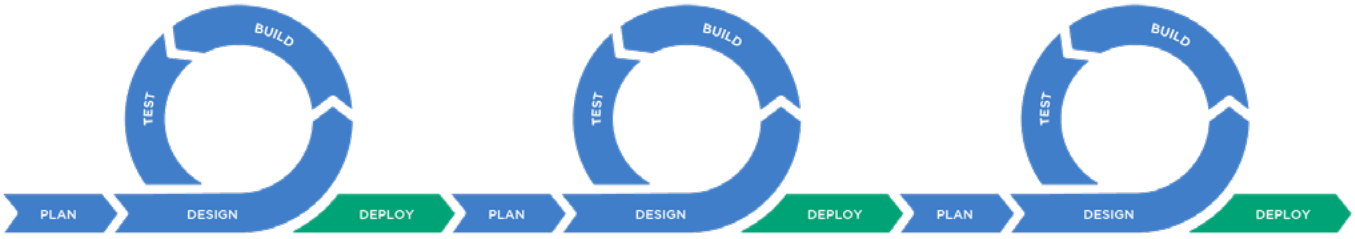
1. Quality is imperative for customer experience success
2. The customer's perspective is most important
3. A single customer journey spans multiple complex technologies
4. The DevOps solution set is different for customer experience

This guide defines DevOps for CX and explains why it is important to embrace these practices for successful digital transformations.

DevOps Overview

Software development has evolved to meet modern-day needs. Early on, software development used the conventional "waterfall" method, which was a linear and sequential approach. The business side of a company would develop detailed requirements and "throw it over the wall" for IT to implement. Large, complex projects were often delivered in this "big bang" fashion. However, the development was too slow and customers' needs often changed before features could be released, rendering them obsolete upon delivery.

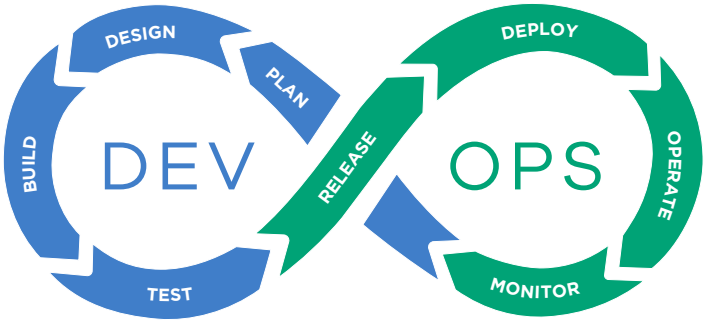
In the mid-1990s, companies started adopting Agile software development practices to better deliver on rapidly evolving customer needs. This approach focused on collaboration, self-organizing teams, and iterative development cycles. Agile methodology also helped to break down the walls between business and IT, resulting in more frequent feedback and continuous improvement.



"Companies pave the way for digital transformation by deploying processes, solutions, and organizational approaches that enable them to quickly deliver applications that codify high-quality CX."

Source: Adopt Agile and DevOps to Drive Digital Business Success. Forrester. 2021.

A decade later, as organizations looked to deliver software faster and more reliably, a new set of practices called DevOps started gaining momentum. The mindset focused on constant testing, continuous delivery, and streamlining the processes between design, build, test, and release phases in the software development lifecycle. At the core of the DevOps culture was an emphasis on collaboration between historically siloed teams; development (Dev) and IT operations (Ops). According to the 2021 Accelerate State of DevOps report by Google Cloud DevOps Research and Assessment (DORA), elite-performing DevOps teams deploy code 973 times more frequently than low performers, are 6,570 times faster at making changes and restoring service, and are three times less likely to have changes fail.[2]



Digital transformation requires a different model of software development. It emphasizes ongoing evolution, in which many IT groups release dozens of applications each year.[3] Agile and DevOps practices give companies the ability to create small experiments to learn which products and experiences customers will ultimately embrace. These practices give companies the ability to learn rapidly from shorter feedback cycles and iterate as fast as the market is moving. Survey numbers suggest that 81 percent of executives believe Agile and DevOps are key to successful digital transformation.[4]

While digital transformation requires speed, quality is an equally important goal. Agile and DevOps practices have the potential to enable customer experience innovation with increased speed and improved quality.

DEVOPS CONCEPTS

DevOps focuses on delivering software with speed and quality. DevOps concepts encourage communication among software developers and IT operations to improve the speed and quality of delivering software.

COLLABORATION

Collaboration is the cornerstone of DevOps where development teams and operations teams work together and share the responsibility to achieve speed and quality in releases. Software development requires constant and effective communication between teams. Collaboration can be achieved through DevOps by following common teambuilding tactics, such as:

- Goal definition with a common set of objectives
- A one-team approach to build trust
- Diversity sensitivity for teams from different regions and cultures
- A clear roadmap that defines the path to achieve objectives

AUTOMATION

One of the key objectives with DevOps is to streamline the development lifecycle by reducing manual workload and increasing automation. DevOps requires automated builds, automated functional and regression testing, automated feedback on code quality, and automated monitoring of the production system. Additionally, automation has broader applications in DevOps outside of routine processes. According to BMC,[5] automation helps teams to:

- Eliminate performance bottlenecks
- Minimize communication gaps between development, operations and QA teams
- Introduce mechanisms that facilitate agility through standardized processes

CONTINUOUS INTEGRATION

Continuous integration refers to the build stage of the software development process and the practice of integrating frequently. The goals of continuous integration are to improve developer productivity, find and address problems sooner, and deliver releases faster. Specific capabilities are required to perform continuous integration. Some of those requirements include:

- A single repository for source code
- Adopting the practice of automated builds
- Team access to current executable code, to ensure latest version is always run

CONTINUOUS DELIVERY

Continuous delivery is the ability to get software into production safely, quickly, and sustainably. The idea behind continuous delivery is to produce code that is always "ready to go into production." Research has found that the biggest contributor to continuous delivery is test automation. Other drivers of continuous delivery are to build quality in, work in small batches, and pursue continuous improvement. Businesses that adopt continuous delivery are more likely to have processes that are high quality, low risk and cost effective.

CONTINUOUS DEPLOYMENT

Continuously deploying software results in better throughput and more predictable releases. It requires automated testing to ensure that every change can be immediately tested and released without manual intervention. Recent research finds that elite performers have higher throughput and stability than other teams. According to the State of DevOps Report[2], elite performers have:

- 973 times more frequent code deployments
- 6,570 times faster lead time from commit to deploy

CONTINUOUS TESTING

Continuous testing is the practice of executing automated tests in order to assess if software is ready to proceed through the software lifecycle. Simply put, continuous testing practices are to test early, test faster, test often, and automate. The concept of "shifting left," moves the focus on quality earlier in the software lifecycle. Continuous testing is one of the key levers that enable tests to be run sooner in the software process and test cycles to be shorter.

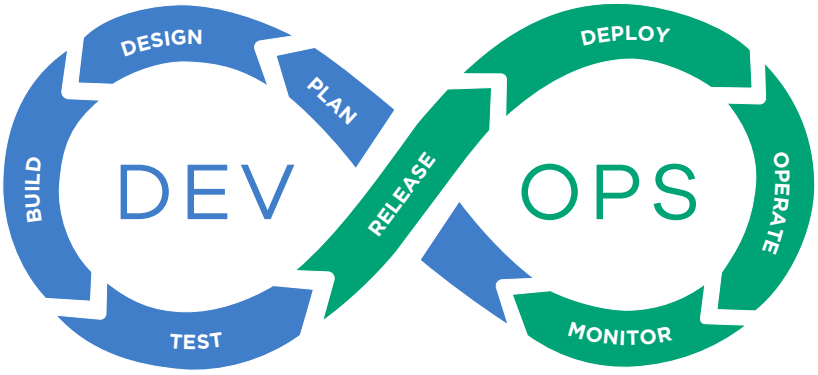
Test automation is required to drive continuous testing. It facilitates more frequent and accurate User Acceptance Testing (UAT), functional testing, regression testing, and load testing.

CONTINUOUS MONITORING

"Shifting left" focuses on quality earlier by testing sooner, shortening test cycles, and moving towards prevention of defects rather than just detection. There are many points of failure in sophisticated software. Proactive monitoring starts in the pre-production stage and is ongoing in the production stage. Monitoring continuously in production enables organizations to identify and fix issues before customers are affected.

DEVOPS ITERATIVE PROCESS

The DevOps iterative process is an infinite loop that applies as projects move from the Plan Stage through to the Monitor Stage and then back to Plan for software upgrades and refinements. The concept of "shifting left" starts test creation and execution earlier in the process.



Digital Transformation Challenges Facing DevOps Teams

Teams who are committed to following a DevOps methodology may still encounter a number of obstacles standing in the way of digital transformation and improved customer experience. In this section, we discuss the common challenges that DevOps teams face and the strategies to overcome them.

Poorly Defined Executive Sponsorship

For a CX-focused digital transformation initiative to succeed, it needs an empowered executive champion to drive cultural change and strategic investments. Customer experience spans multiple departments: operations, development, marketing, sales, and service to name a few. There are different approaches to the organizational structure. Some companies assign responsibility to an existing executive, for example the COO, CIO, or CMO. Others create a new role of Chief Customer Experience Officer. The executive assigned should have broad authority and budget over people and processes.

Competing and Misaligned Incentives

Adopting DevOps is a team effort, and aligning objectives and incentives is key to ensure that teams work in harmony. Each team should have objectives that align with their function, such as speed or a low defect rate on the development side, and high reliability on the operations side. The objectives should not be at odds with one another. The functional objectives should be complemented with business objectives around customer satisfaction.

Unclear Key Performance Indicators

Adopting DevOps means taking on a new, more collaborative mindset as an organization. It's important that KPIs are clear, widely acknowledged, and measurement and monitoring solutions are accessible across teams. It is also critical that KPIs are widely distributed, so that customer experience can be viewed at an operational level.

Dependence on Heroic Efforts

A project that requires late-night escalations and long employee hours to get over the finish line indicates problems in the process and organization. Ultimately, this situation is unsustainable and will result in the delivery of a poor customer experience. These issues stem from unplanned work, which frequently happens because of insufficient testing. Automating software testing makes it possible to test more frequently, accurately, and thoroughly, eliminating unplanned work and reducing or avoiding escalations altogether.

Different Configurations Across Customer Experience Delivery Environments

Moving between environments—from Development to QA to Staging to Production—is a big source of frustration, as the environments are often configured differently. Time is wasted fixing bugs introduced as code moves through the software lifecycle. Have a consistent approach to the solutions and environment. This is best achieved through deployment automation.

Errors Introduced by Manual or Outdated Processes

Manual processes can lead to human error and disrupt agility, causing delays and defects that result in unplanned work. Manual testing is a major source of project delays and quality issues. Automating the testing of customer experience systems results in higher quality and reliability, at faster speeds.

DevOps for Customer Experience

Digital transformation drives the need for the constant delivery of customer experience capabilities through software development. But customer experience products and services have the imperative for quality. DevOps for customer experience takes the DevOps software methodology and focuses on the unique aspects of CX software, enabling speed and quality.

Quality is Imperative for Customer Experience Success

Customers have higher expectations than ever before and are empowered to take action when their experiences don't measure up. Recent research from CCW confirms that roughly two-thirds of customers will consider switching companies after just one or two bad experiences.

The Customer's Perspective is Most Important

There are no second chances when it comes to a customer's interaction with a company. The customer's perspective is most important, so the software must be designed and tested from that perspective. Execution must be flawless. This reality puts demands on the solutions and processes specific to User Experience (UX) design, CX testing, and CX monitoring.

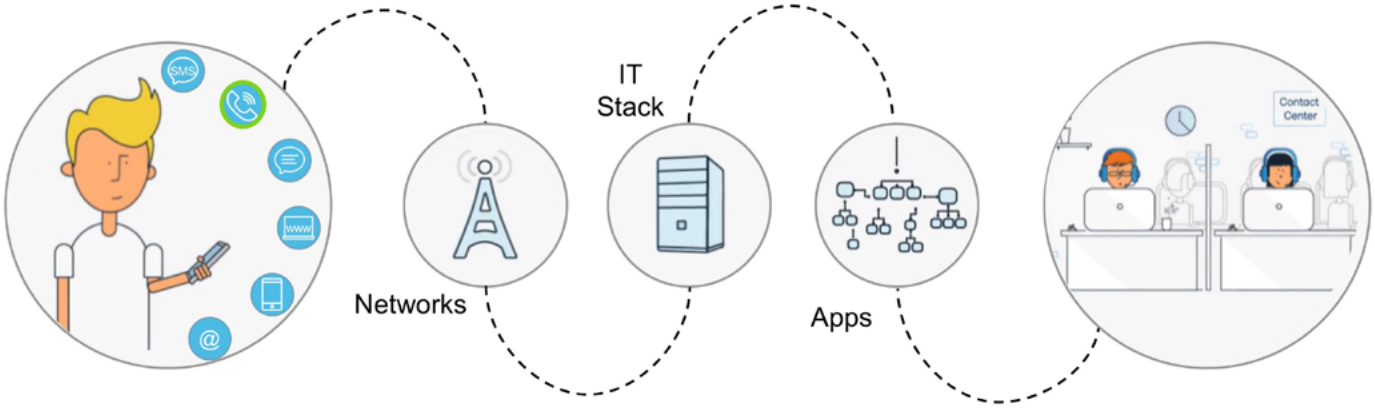
Software must be designed with the customer's goal in mind, rigorously tested based on the different channels and ways a customer might accomplish that goal, and constantly monitored to identify issues in the paths and channel transitions before a customer experiences them.

A Single Customer Journey Spans Multiple, Complex, Technologies

Customers demand omnichannel journeys where they can interact with a company's website, chatbot, live chat, IVR, live voice agent, email, SMS and other channels. Customers expect seamless journeys where each channel knows their context and history without having to repeat their information and issue.

The technology infrastructure required to connect siloed channels and pass customer data between channels is extremely complex. For example, the IVR channel requires not just an IVR voice portal, but also VoiceXML applications, speech recognition, text-to-speech, and IP telephony. Connecting an IVR to another channel often requires the connection to a CRM system, CTI (screen pop to a live agent), e-commerce application, and others, all in the cloud. IVRs in particular, tend to be supported by legacy technologies that are fragile and brittle. Connecting legacy technologies to other channels is a challenge in and of itself.

DELIVERING GREAT CUSTOMER EXPERIENCE IS COMPLEX



The DevOps Solution Set Is Different for Customer Experience

DevOps for customer experience has unique needs, and there are purpose-built solutions that enable DevOps for customer experience systems. Generally speaking, the solutions increase automation and facilitate an Agile approach to CX design and management. Customer experience applications have some unique needs. Many customer experience applications involve voice interfaces, and you'll need specialized testing and monitoring to support that. And, for complex contact center software, you may need purpose-built technology to help with things such as configuration management.

VALUE STREAM AND SAMPLE CUSTOMER EXPERIENCE SOLUTION SET

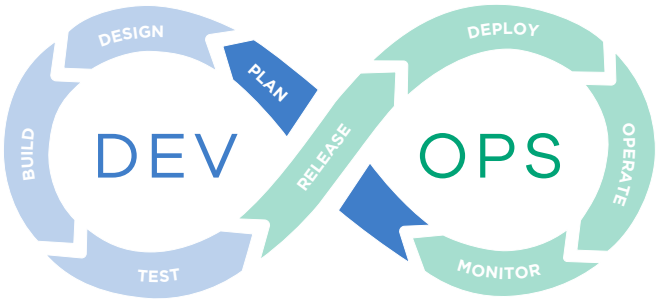
Pull feature off backlog	Document CX & create acceptance tests	Develop	Build & unit test	Deploy to pre-prod & test	Deploy to production, validate & UAT	Monitor
JIRA RALLY	**CYARA**	ECLIPSE GITHUB	BAMBOO	**CYARA** BLACKCHAIR CHEF INPROD PUPPET	**CYARA** XEXBIALABS	**CYARA** ELASTICSEARCH NAGIOS SPLUNK

PRACTICES TO ASSURE QUALITY THROUGH THE DEVELOPMENT LIFECYCLE

DevOps enables customer experience innovation quality at speed. Never before has it been so important for software to have flawless execution out of the gate. To achieve quality at speed, focus on the Plan, Design, Test, Release, and Monitor stages.

PLAN

The Plan stage is where all parts of the project are scheduled and resourced. In order to achieve speed and quality in CX software development, include the following practices:



Incorporate "Shifting Left" into the Plan
Schedule testing and monitoring to be done early in the project.

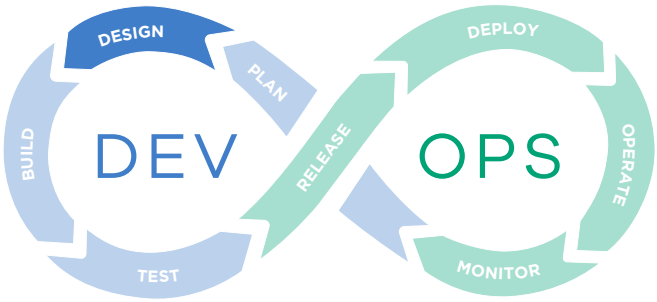
Create Early Design Prototypes to Visualize CX Features
Visualize customer experience features to clearly articulate requirements and decrease the chance of rework after code is written.

Plan for Small Experiments
One of the distinctive aspects of DevOps is the ability to test and learn. Launching small experiments in short feedback cycles enables the team to learn from the market.

DESIGN

Design from the Customer's Perspective

The most important stage of the development process is Design because what happens here impacts everything else. It is critical to design software from the customer's perspective. One approach is to design software based on common customer issues and identify the customer journeys to resolve the customer issue.

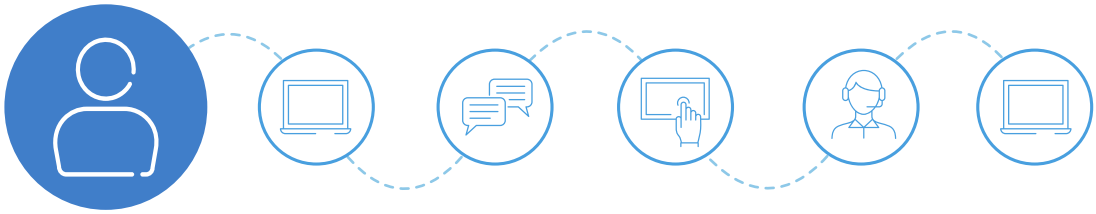


Precision and clarity in design is critical as well. By ensuring that you are clear and precise in the design and requirements, you can assure that all stakeholders are aligned, and that the development team has the details they need to design what the business wants.

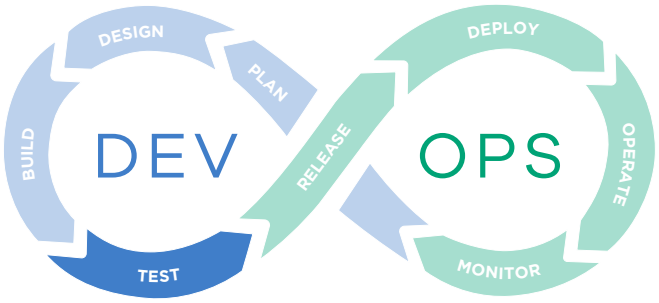
Designing a Customer Journey: Bill Inquiry

A typical customer journey is a bill inquiry, where a customer wants to know why his mobile phone bill is so high. The customer starts on the web and traverses through different channels until he gets the answer. Then he goes back to the web to pay the bill.

For this omnichannel journey, the customer interface for each channel must be designed. Additionally, the agent interface must be designed to ensure that the agent has access to needed applications and data.



TEST



Design and Test for Multiple Journeys for Each Customer Issue

Customer experience software is unique in that there are many paths that a customer can take to resolve specific issues. Journey design and testing should accommodate the most common customer journeys. One frequent variation is the use of self-service and assisted service. Customers often start in self-service (web, chatbot, IVR) and move to assisted service (web chat, voice call, email, SMS), if they cannot get resolution in self-service. Good journey design should take both into account.

Establish Continuous Testing

Continuous testing should be done throughout the development lifecycle. The only way to achieve this is with automation. Test scripts should be created starting in the design stage so that test suites are ready to be run in the Test stage. By following a design-driven testing approach, designs and test scripts are closely linked, assuring that what you designed reflects what is built.

The following types of testing should be done with tests that focus on the customer perspective:

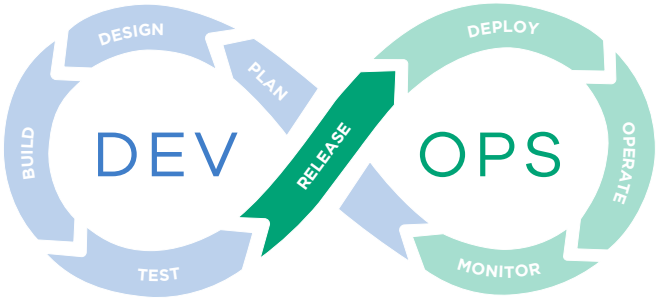
Functional Testing

Functional testing for customer experience software development ensures that the software developed conforms with all the CX requirements.

Regression Testing

This type of testing is part of functional testing and ensures that new code doesn't break code that was previously developed and tested. Regression testing should run continuously through the development lifecycle.

RELEASE



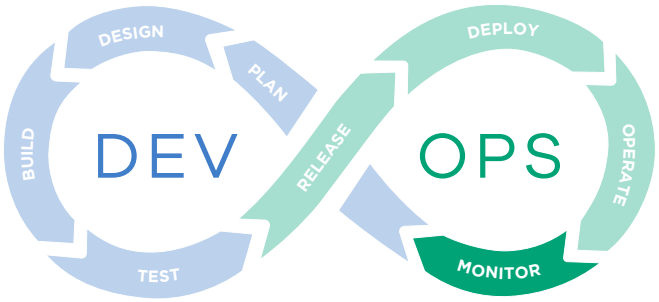
Ensure the Software is Ready for Hand-Off

The hand-off from the Test to Release stages is a critical step. Testing needs to ensure that the customer experience software performs as expected and at scale. The functional and regression testing should identify any issues. Monitoring tests should be started in the Test stage to help identify any CX issues before moving to production.

Load Testing

The only way to ensure that the customer experience software is prepared for high volume and sustained traffic is to perform load testing. Simulated real-world interaction volume is required to perform this type of testing across all channels in the customer journeys.

MONITOR



Continuously Monitor Software and Potential Points of Failure

Can a customer reliably connect and complete interactions on the web, on the IVR, or with a live agent? Will your organization know about an issue before the customer does? The only way to know if the customer interactions are flawless is to run monitoring tests continuously in the production environment.

Key Takeaways

Software is strategic to drive digital transformation, and DevOps for customer experience gives a path to success. Never before has it been so important for software to have flawless execution from day one. DevOps for customer experience takes the DevOps software methodology and focuses on the unique aspects of CX software, enabling speed and quality.

DevOps for customer experience focuses on aligning organizational processes and teams to deliver on these core objectives:

1. Successful customer experience relies on quality and effective delivery of brand promises.
2. Consider customer experience from the customer's perspective, and optimize every stage of the customer journey with flawless CX in mind.
3. Assure that the multiple, complex technologies involved in achieving each customer journey are connected and supported.
4. Customer experience requires a different DevOps solution set that emphasizes automation and specialized testing, as well as purpose-built technology.

DevOps for CX enables enterprises to innovate their customer experience rapidly, while delivering high-quality interactions. As CX leaders innovate new products and services through software, they must follow the latest best practices, use software designed for customer experience, and be laser-focused on a flawless execution. Digital transformation is within reach.

How Cyara Helps

Cyara empowers companies to accelerate their digital transformation, improve customer experience, increase quality across all digital and voice channels, and assure customer journeys end-to-end, at scale.

With Cyara, you can test complex technologies from the customer's perspective and quickly identify issues that can impact CX.

Deliver Better CX with Less Effort, Cost, Time and Risk.

Cyara supports the entire CX software development lifecycle, from design to functional and regression testing, load testing, and production monitoring, ensuring enterprises can build flawless customer journeys across voice and digital channels.

To learn more about how Cyara can help you adopt DevOps for your customer experience, visit **www.cyara.com**

VELOCITY
Functional & Regression Testing

CRUNCHER
Performance Testing

PULSE
Customer Experience Monitoring

LIVEVQ
Voice Quality Assurance

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Customer Smiles. **Delivered at Scale.**

As the world's leading Automated CX Assurance platform provider, Cyara helps you deliver better CX with less effort, cost, and risk. Cyara supports the entire CX software development lifecycle, ensuring enterprises can build flawless customer journeys across digital and voice channels while reducing the risk of customer-facing defects. Every day, the most recognizable brands trust Cyara to help them build better customer experiences faster.

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