2024

1ST ANNUAL

State of Industrial DevOps Report

The Cost of Downtime and How to Prevent It

COPIA

LETTER FROM OUR CEO & FOUNDER

Welcome to the 1st Annual State of Industrial DevOps Report

First: what is Industrial DevOps, and why should manufacturers care?

We launched this report with the hypothesis that long-standing practices in the manufacturing and distribution sectors are driving up costs, particularly those caused by preventable downtime. In the data from this survey, we see that the current approach to managing Operational Technology (OT) systems is no longer viable.

This is an inflection point for industry like that of mass production aging out in the face of lean production. Similar to Toyota's reimagining of operations, the entrance of Industrial DevOps is poised to deliver proven advantages.

Industrial DevOps provides a collaborative and governance-driven approach to managing cyber-physical systems. These practices address the ever-growing cybersecurity risk inherent as the boundaries between IT and OT continue to blur in our age of digital transformation and the amount of code on the plant floor continues to proliferate.

Here are a few key stats from the report:

- **50%** of downtime attributed to industrial code
- Cybersecurity breaches are the **#1** cause of unplanned downtime
- **$4.2M/hour** is the average cost of downtime as reported by the 200 executive respondents, 42% of which are C-Suite
- **10%** of respondents identified as first movers, with no challenges to adopting Industrial DevOps

The State of Industrial DevOps Report serves as a catalyst for transformation by providing the data and insights needed to make informed decisions that will propel manufacturing and distribution into a more competitive, secure, and dynamic future.

Sincerely,
Adam Gluck
CEO & Founder

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EXECUTIVE SUMMARY

PREVENTABLE DOWNTIME

Not all downtime is created equal. Operational Technology (OT) is modernizing and bringing with it methods that can reduce costly downtime. The numbers from this survey present a compelling argument for change vs. the risk of maintaining the status quo.

- **67%** say downtime costs **$1M / hour** or more
- **36%** say downtime cost is **great than $5M / hour**
- **50%** downtime attributed to **industrial code management**

CYBER-SECURE PRACTICES

Blurred lines between OT and IT continue to create more vulnerabilities. To modernize in a cyber-responsible way, leading organizations are adopting IT best practices like Industrial DevOps.

- **78%** say **ad hoc fixes** are commonplace
- **41%** OT decisions involve the Cybersecurity/Security stakeholders
- **47%** of unintended downtime is caused by a cybersecurity breach, **the #1 response**

COMPETITIVE ADVANTAGE

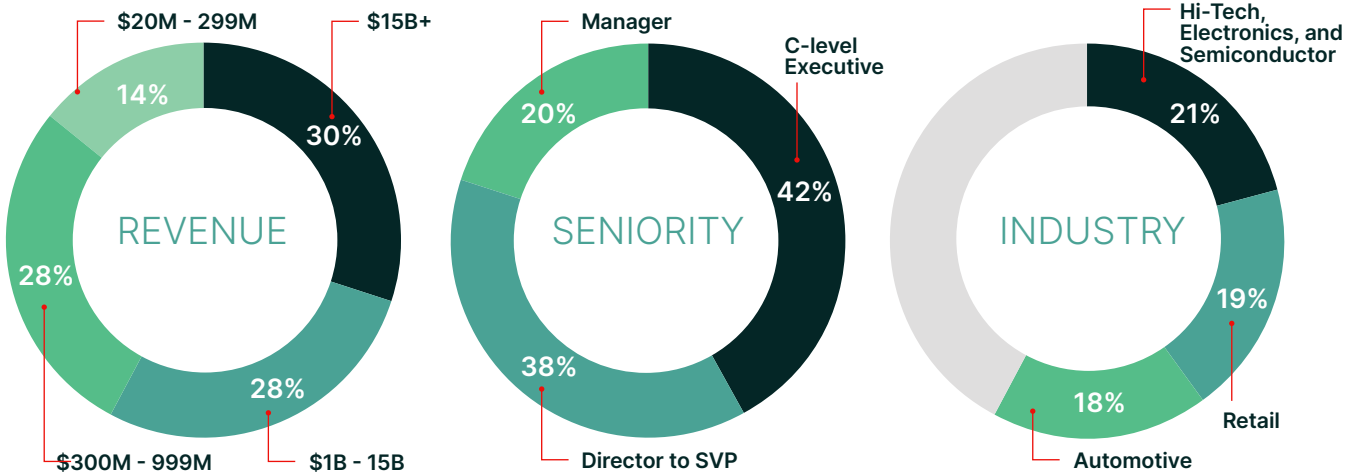
The overwhelming majority of respondents favor Industrial DevOps but are hampered by competing priorities and lack of interest from decision makers. The early adopters are moving, though, and establishing a coveted competitive edge.

- **97%** agree that their team would benefit from using **Industrial DevOps**
- **45 hours** spent **debugging code** on average
- **10%** say **no obstacles** to adopting a more DevOps-oriented approach to industrial automation

INTRODUCTION

This industry report from Copia Automation, in association with Sapio Research, is focused on the growth of DevOps principles and practices applied across the industrials, retail, and distribution organizations. We believe that these segments have reached an inflection point and launched this report to benchmark where organizations are today and to track change over time.

The data set used to build this report includes **200 executive respondents** with the titles of (or equivalent to) C-Suite, SVP, VP, Head of Department, Director, and Manager. **Forty-two percent** of respondents identified as C-Suite.



View all survey demographics

> Industrial DevOps is the application of Lean, Agile, and DevOps principles to the planning, development, manufacturing, deployment, and serviceability of significant cyber-physical systems.
>
> Suzette Johnson, Robin Yeman
> What is Industrial DevOps? - IT Revolution

01

The History, Context, and Definition of Industrial DevOps

Industrial DevOps is rapidly gaining traction across manufacturing and distribution operations. Tracing its roots from traditional DevOps, this specialized approach for complex industrial systems has captured the attention of the most innovative global companies.

This section will further define Industrial DevOps and examine its unique context in today's rapidly modernizing facilities.

HISTORY OF DEVOPS AND DAWN OF INDUSTRIAL DEVOPS

2008-2009
DevOps is born and gains traction through conferences, conversations, and thought leadership

2009
Allspaw and Hammond give their talk at Velocity and Patrick Debois launched the very first DevOpsDays Conference

2013
The State of DevOps Report is first published

2013
The Phoenix Project by Gene Kim, Kevin Behr, and George Spafford further builds the case for widespread DevOps adoption

2016
Gartner predicts mainstream adoption of DevOps

2017
Forrester calls this “the year of DevOps”

2020
Copia founded to bring DevOps practices to Industrials, establishing the first company dedicated to Industrial DevOps

2023
Industrial DevOps: Build Better Systems Faster by Dr. Suzette Johnson and Robin Yeman is published, providing a wealth of study around the practice and impact of Industrial DevOps

2024
The 1st Annual State of Industrial DevOps Report is released

2024
Frost & Sullivan name Industrial DevOps in Top 15 Growth Opportunities in Industrial Automation

WHAT IS INDUSTRIAL DEVOPS AND WHAT DOES IT MEAN FOR MANUFACTURING AND DISTRIBUTION?

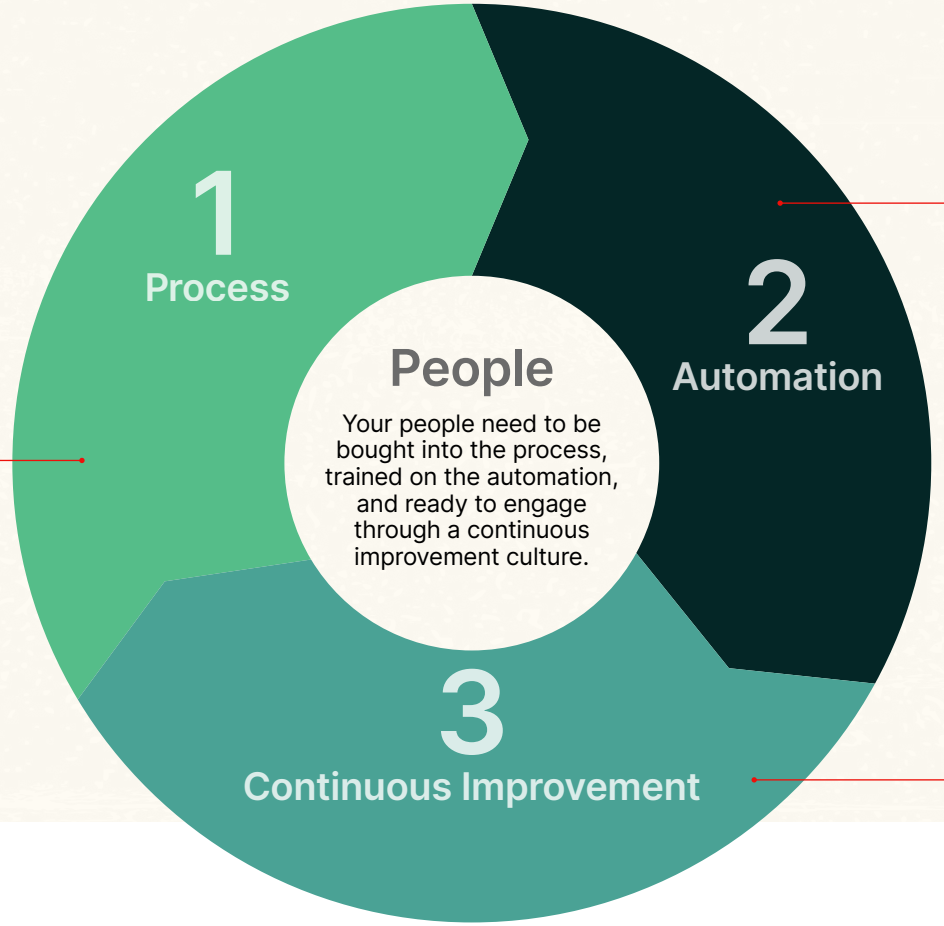
According to Dr. Suzette Johnson and Robin Yeman, from their seminal book on Industrial Devops, “speed, flexibility, and adaptability are an imperative across the value stream. When we couple the results of Agile and DevOps implementation in software development with Lean and Agile in manufacturing, we have the foundational success patterns for the development, manufacturing, and deployment of cyber-physical systems in the modern age. The benefits that have been obtained across industries can be transferred to the cyber-physical domain, and they had the potential to provide an even greater impact on the delivery of products. This can be achieved through the application of what we have defined as Industrial DevOps: a set of proven principles and success patterns for building better systems faster to achieve business outcomes.”

INDUSTRIAL DEVOPS ADAPTS SOFTWARE DEVELOPMENT PRINCIPLES

to the complex, integrated systems in manufacturing, distribution, and adjacent operations. The application of Industrial DevOps accelerates innovation by streamlining processes and enhancing collaboration between teams. By providing a framework and toolset for continuous improvement, Industrial DevOps leads to faster production cycles, higher quality products, and reduced operational costs. Most importantly, it can i**ncrease margins and create a competitive advantage** if properly leveraged.

> The industry is enthusiastically responding to the promise of Industrial DevOps, driven by the escalating complexity of industrial software and the scarcity of skilled labor. Companies actively seek solutions that offer version control, continuous integration and delivery, automated backups, and collaborative capabilities for automation code development and delivery.
>
> Sebastián Trolli, Research Manager, Head of Industrial Automation
> Frost & Sullivan

INDUSTRIAL DEVOPS PROCESS



The start and end of success in automation and what everything else is built upon.

Automate only where it makes sense. If a person can beat the automation, have a person do it.

Refine the approach through data analysis, trial and error, and willingness to adapt the process based on the outcomes.

WHERE INDUSTRIAL DEVOPS FITS INTO DIGITAL TRANSFORMATION INITIATIVES TODAY

TECHNOLOGY / AUTOMATION

IT / OT Convergence

SMART MANUFACTURING

CYBER (Software Examples)

- SCADA
- Enterprise Asset Management (EAM)
- Manufacturing Execution Systems (MES)
- Product Lifecycle Management (PLM)
- Supply Chain Management (SCM

PHYSICAL (Hardware Examples)

- PLCs (Programmable Logic Controllers)
- CNC (Computer Numerical Control) machines
- Intelligent Field Devices (IFDs)
- Cobots
- Network switches

OUTPUT: Data and industrial code

PROCESS / PLATFORM

Best Practice Convergence

INDUSTRIAL DEVOPS

Collaboration and Process Improvement:

- Version Control
- Monitoring and Logging
- Continuous Delivery
- Automated Testing
- Automated Backup

OT Security, Reliability, and Risk Mitigation:

- Cybersecurity (compliance, tracking, rigor)
- Secure Remote Access
- ML/AI model transparency
- Network Segmentation
- Intrusion Detection and Prevention

OUTPUT: End-to-end visibility and control of OT

PEOPLE / ACTION

Culture of Change for Continuous Improvement

CHANGE MANAGEMENT

Visibility, Governance, and Control

- Champion Change
- Communicate Often
- Train Continuously
- Celebrate Quick Wins
- Engage Stakeholders with Metrics & Evaluation

OUTPUT: Better data, processes, and control of operations

02

Downtime’s Impact on Cost: Overwhelming loss and erased margins

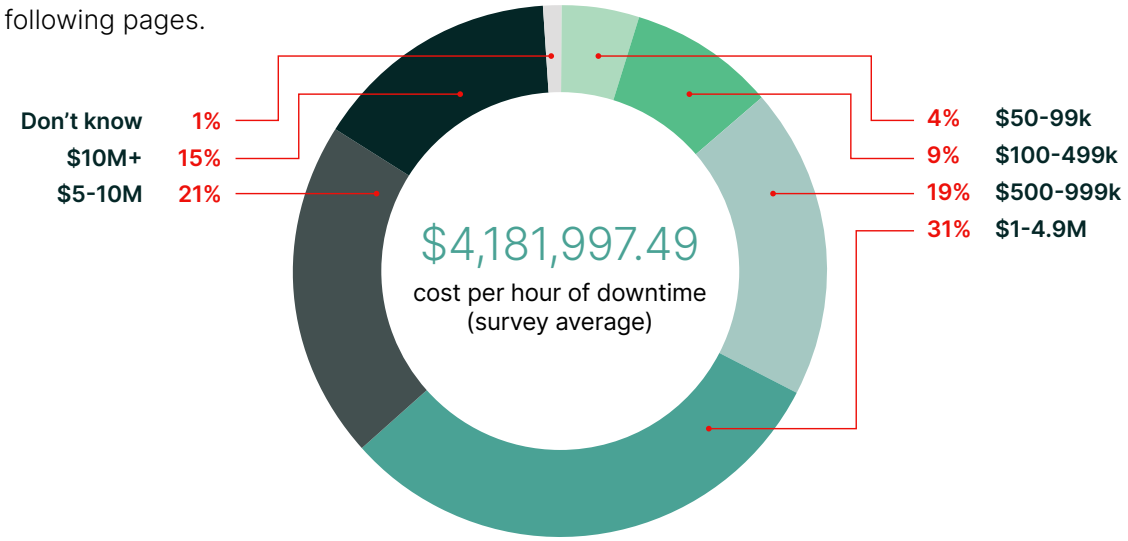
Downtime is not just costly; it’s a direct threat to profitability. Our survey reveals that the financial impact of downtime often surpasses expectations, with losses escalating as organizations grow larger.

This alarming trend, supported by external studies, underscores the critical need for proactive measures to minimize system disruptions and protect the bottom line.

THE COST OF DOWNTIME IS SOUL CRUSHING

NO MATTER HOW YOU CUT IT, THE COST OF DOWNTIME minimizes or eliminates altogether the margin between profitability and mediocrity, or even failure. Beyond the numerical impact, there is also the impact on morale in this age of skills gaps, workforce shortage, and rotating employees that stay for a day, a week, a month.

This survey found that respondents on average estimated the **cost of downtime at $4.2M/hour.** This is a higher cost than you might expect, which we will dig into deeper in the following pages.



Q. What do you estimate is the cost to your organization per hour of downtime? Select one. Base: 200

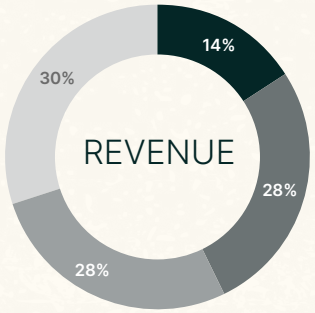
> Unplanned downtime is an expensive, uninvited guest. Just like compound interest, downtime amplifies the impact of each delay, resulting in severe and escalating consequences. This is particularly painful at scale, exacerbating a localized issue and making it a cascading expense across the organization.
>
> Jeff Winter, Sr. Director of Industry Strategy, Manufacturing
> Hitachi Solutions
> Contributing Analyst & Editor to this report

THE CASCADING IMPACT OF DOWNTIME

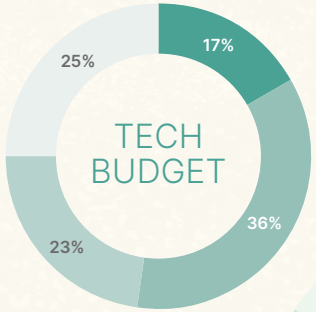
LOOKING ACROSS OUR DATA FROM THE 200 U.S.-BASED EXECUTIVE RESPONDENTS, we can infer that downtime is defined by the cascading impact across the organization.

In these charts, the estimated cost rises across organization size, from $100M to $15B+ in revenue, from an OT tech budget of less than $1M to over $10M, and by number of PLCs from 100 to more than 5000, all showing a similar cost curve.

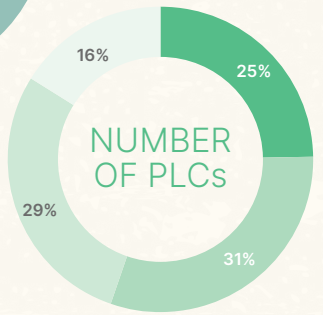
Cost of Downtime/Hour Across Revenue, Tech Budget, and Number of PLCs



14% Revenue Less than $300M / Downtime Cost **$1,724,710**
28% Revenue $300 - $999M / Downtime Cost **$2,818,278**
28% Revenue $1 - $15B / Downtime Cost **$4,283,518**
30% Revenue $15B+ / Downtime Cost **$6,626,627**



17% Budget Less than $1M / Downtime Cost **$1,468,059**
36% Budget $1.1 - $5M / Downtime Cost **$2,859,303**
23% Budget $5.1 - $10M / Downtime Cost **$4,802,111**
25% Budget $10M+ / Downtime Cost **$7,412,204**



25% PLCs 100 - 500 / Downtime Cost **$1,724,710**
30% PLCs 501 - 999 / Downtime Cost **$3,723,205**
29% PLCs 1000 - 5000 / Downtime Cost **$4,891,982**
16% PLCs 5001+ / Downtime Cost **$7,733,823**

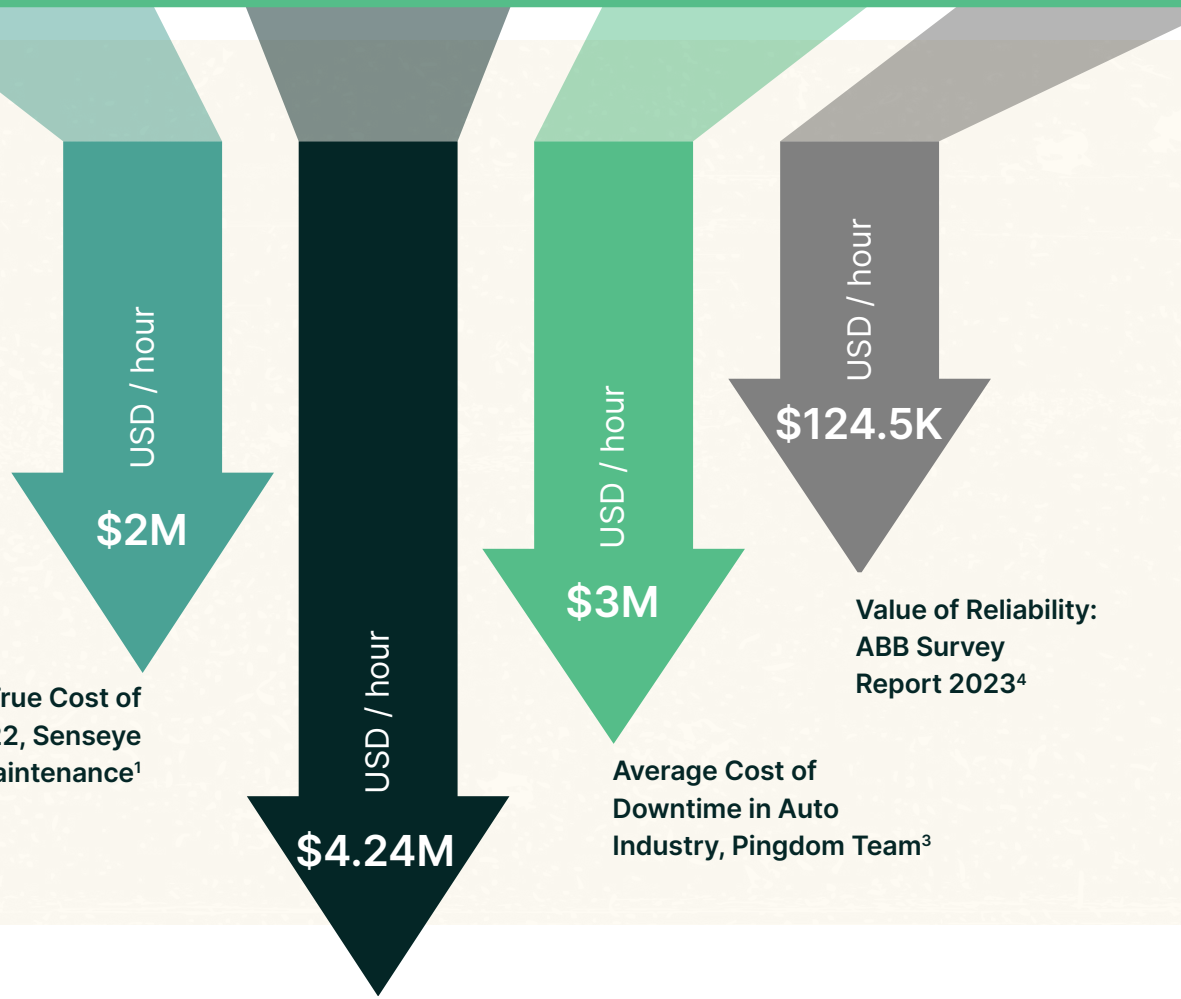
Q. What do you estimate is the cost to your organization per hour of downtime? Select one. Base: 200

DOWNTIME ACROSS THE UNIVERSE: SIZE MATTERS

DOWNTIME STATISTICS ARE HISTORICALLY DISPARATE.

The researchers for this report dug far and wide for data and came up with the displayed reports. While there are other estimates ($260k/hour from Aberdeen Research in 2016, and $540k/hour from Gartner quoted by many bloggers), the reports listed here are the most widely available that also include survey demographics.

Regardless of how your organization calculates downtime, it is costly and preventing it is a top priority for organizations everywhere.



The True Cost of Downtime 2022, Senseye Predictive Maintenance[1]

The 1st Annual State of Industrial DevOps Report[2]

Average Cost of Downtime in Auto Industry, Pingdom Team[3]

Value of Reliability: ABB Survey Report 2023[4]

1 Demographics: 56 interviews covering large industrial organizations
2 Demographics: 200 US respondents, 58% over $1B in revenue
3 Demographics: Automotive Industry
4 Demographics: 75% of respondents in $10M revenue or under organizations
Q. What do you estimate is the cost to your organization per hour of downtime? Select one. Base: 200

BIG NAMES IN DOWNTIME: THE CAUSES AND GLOBAL CONSEQUENCES

There have been many big names in downtime over the last few years. Toyota's reported outage from a system update in 2023 halted 14 plants for a full day, resulting in an estimated $356 million in lost revenue. Also in 2023, Clorox experienced a cyberattack that took six weeks for automation systems to recover with damage estimates in the hundreds of millions along with a loss of $3B to their market cap.

Downtime incidents occur across industries and for a wide range of reasons. The True Cost of Downtime Report highlighted that the top 500 global industrial companies alone are losing north of $1.5T annually due to downtime.

> It's easy for transformation programs to focus on the most advanced plants, and it makes sense to leverage what is easy for quick wins. However, Industrial Transformation programs must eventually address the bulk of the plants, which are often significantly less automated and often have disjointed IT and OT systems.
>
> Tom Comstock
> LNS Research Fellow Link to Research

03

Downtime’s Impact on Operations: Pressure at the Expense of Process

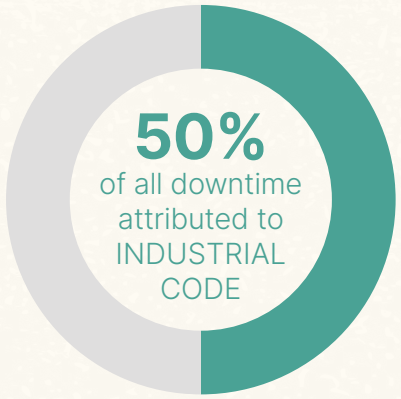
The crippling costs of downtime in manufacturing and distribution create immense pressure on organizations and specifically on those teams and individuals responding to a downtime incident.

This pressure often leads to hasty, temporary fixes that prioritize restoring operations over addressing root causes, which can lead to further issues down the line including more downtime and the creation of vulnerabilities that cyber attackers can exploit.

NOT ALL DOWNTIME IS CREATED EQUAL

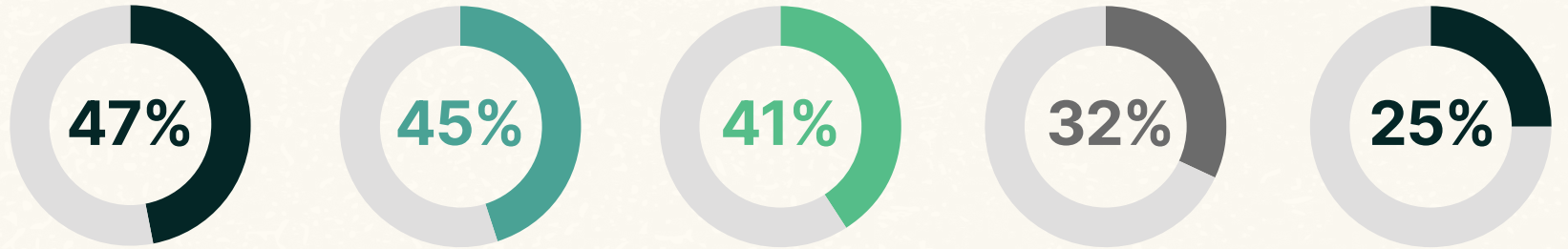
INDUSTRIAL CODE PLAYS AN OUTSIZED ROLE IN DOWNTIME EVENTS.

Below, respondents noted that half of all downtime is driven by industrial code and **41% of unplanned downtime** also points back to code challenges. What's also interesting to note is that Cybersecurity is the #1 cause of unplanned downtime, immediately followed by hardware malfunction, both of which could be aided by Industrial DevOps practices to secure, monitor, and track updates made to systems.



60%+ for organizations with 75 or more sites

Most Common Causes of UNPLANNED Downtime



Q. In the past year, what do you estimate is the percentage of your total downtime attributed to industrial code changes, confusion over code, lack of visibility into industrial code, and issues with PLC programming? Select one. Base: 200

Q. Looking at periods of unintended downtime in the last year, what were the most common causes? Select up to two. Base: 200

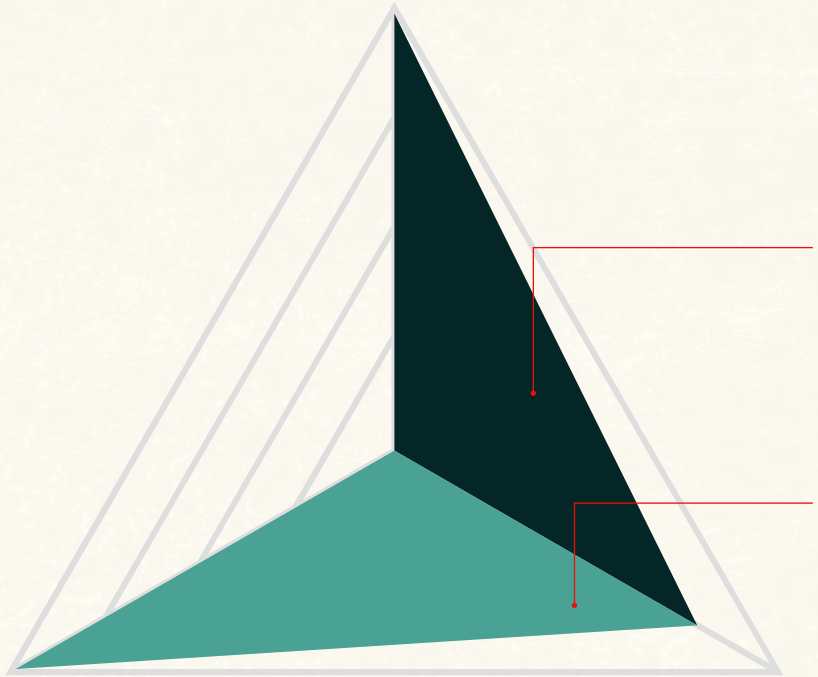
BROKEN PROCESSES CAUSE AND ESCALATE DOWNTIME

While 99% of respondents said they have a **code review process** in place, eight out of ten of those respondents spend **less than 4-hours/month reviewing code.**

Digging deeper into the data, we see that respondents spend an average of **10x** more time (45 hours/month) **debugging code** than reviewing it, which spikes as high as **20x** for retail/material handling (77 hours/month).

Number of hours spent on debugging code per month

Number of hours spent reviewing code per month



99%
Have a code review process

81%
Spend 4 hr or less a month reviewing code

Q. Does your organization have an industrial code/PLC programming review and approval process before integrating or deploying code? Select one. Base: 200
Q. On average, how much of your team's time is spent on industrial code/PLC programming code review and approval? Select one. Base: 200
Q. On average, how much time do you estimate that you and your team spend debugging code per month? Select one. Base: 200

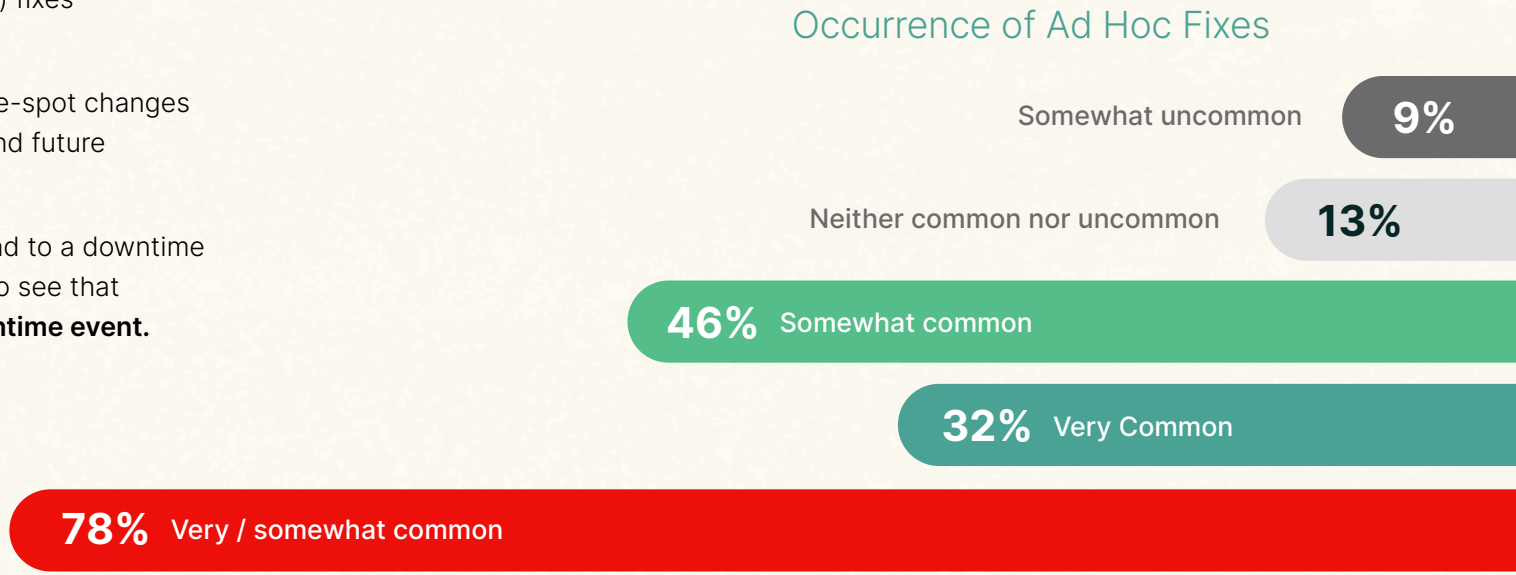
SO HOT RIGHT NOW: AD HOC FIXES

The high cost of downtime carries pressure to perform across all industries. In this survey, **78% of respondents** noted that Ad Hoc (also known as "hot") fixes are commonplace.

While this can serve the goal in the moment, these untracked, on-the-spot changes to industrial code can leave organizations susceptible to breaches and future downtime events when the fix runs out.

This is also a contributor to the extended time it takes to fully respond to a downtime event. With so much time spent reacting to code, it's not surprising to see that **respondents on average take 31 hours to fully recover from a downtime event.**

Average time spent completely resolving a downtime event

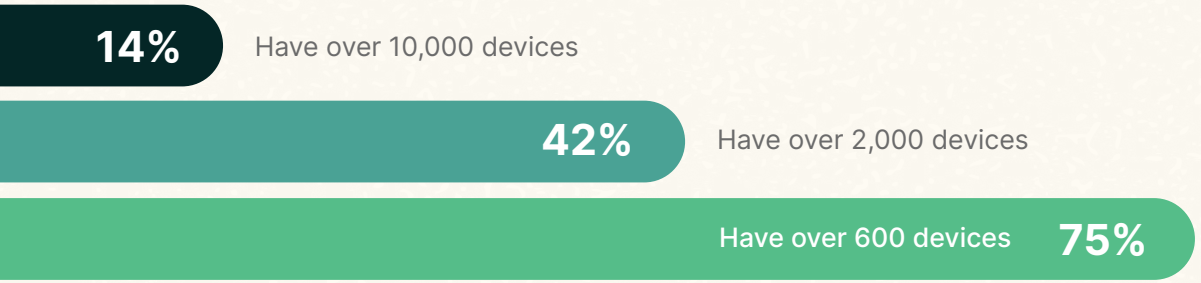


Q. In your estimation, how common are ad hoc fixes to industrial code on the factory floor that are aimed at minimizing downtime? Select one. Base: 200
Q. On average, how long does it typically take to resolve a downtime event attributed to industrial code changes, confusion over code, lack of visibility into industrial code, and issues with PLC programming? Select one. Base: 200

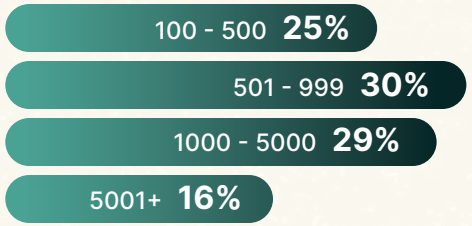
THE PROBLEM WITH AD HOC FIXES

AVOIDANCE OF DOWNTIME CREATES A PRESSURE COOKER EFFECT across the organization, pushing those on the operations floor to do what they have to in order to keep things moving.

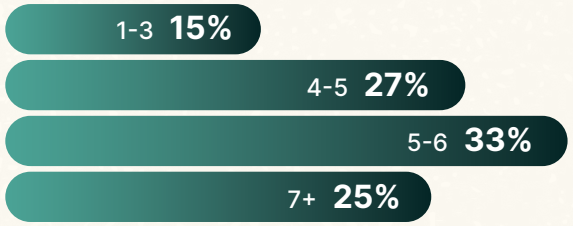
While one Ad Hoc fix might seem insignificant, the impact cascades as you think about the amount of devices that are impacted, especially considering those with hundreds, thousands, and even tens of thousands of devices to manage.



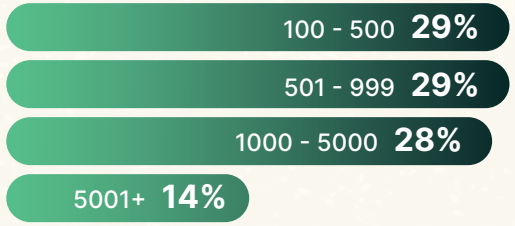
PLCs

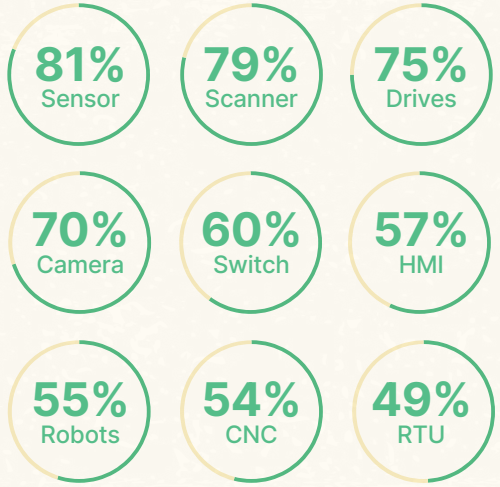


Different Brands of PLCs in Use



Associated Devices

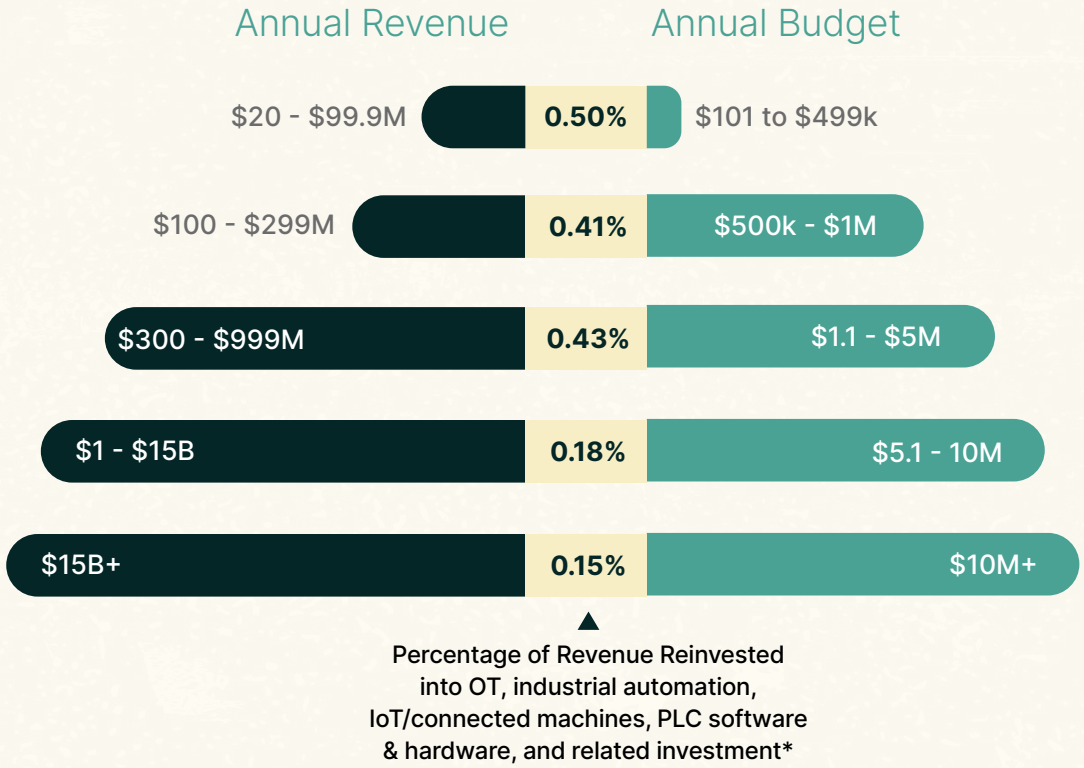




Q. In your best estimation, how many different brands of PLCs do you have in your organization? Select one. Base: 200
Q. In your best estimation, how many PLCs do you have? Select one. Base: 200
Q. How many associated devices do you have with those PLCs? Select one. Base: 200
Q. What types of devices do you have? Select all that apply. Base: 200

ARE ORGANIZATIONS SPENDING ENOUGH ON OPERATIONAL TECHNOLOGY (OT)?

When comparing annual revenue vs. the annual budget for operational technology (OT), there is a clear drop as revenues rise. Some of this can be attributed to economies of scale, but it is likely also driven by the tendency to get maximum use out of something that is not broken. Time will tell if these numbers equate to an efficient business plan or an underinvestment in critical assets.



*Calculated using the mean of the budget and revenue numbers across the different bands presented above.

Q. Which of the following best describes the annual revenue of your organization? Select one. Base: 200

Q. What is your estimated annual budget for OT, industrial automation, IoT/connected machines, PLC software & hardware, and related investment? Select one. Base: 200

04

A Need for Industrial DevOps: How Industrial DevOps addresses modern concerns in essential ways

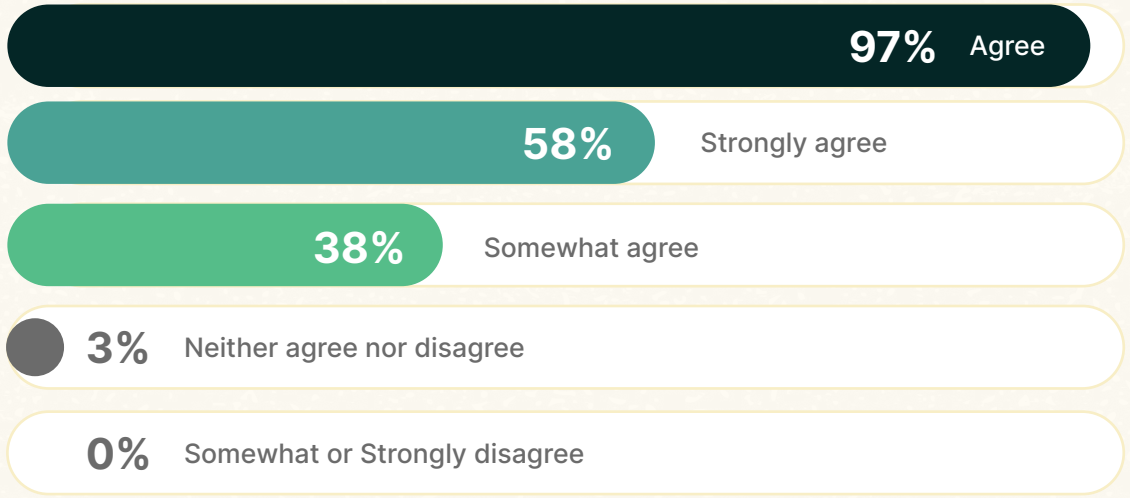
Embracing Industrial DevOps is rapidly becoming a strategic imperative for growth across the industrial landscape. This section dives into the current industry sentiment surrounding Industrial DevOps.

Additionally, we'll explore key Industrial DevOps practices that will empower your organization, and we'll look at what is preventing other organizations from making progress.

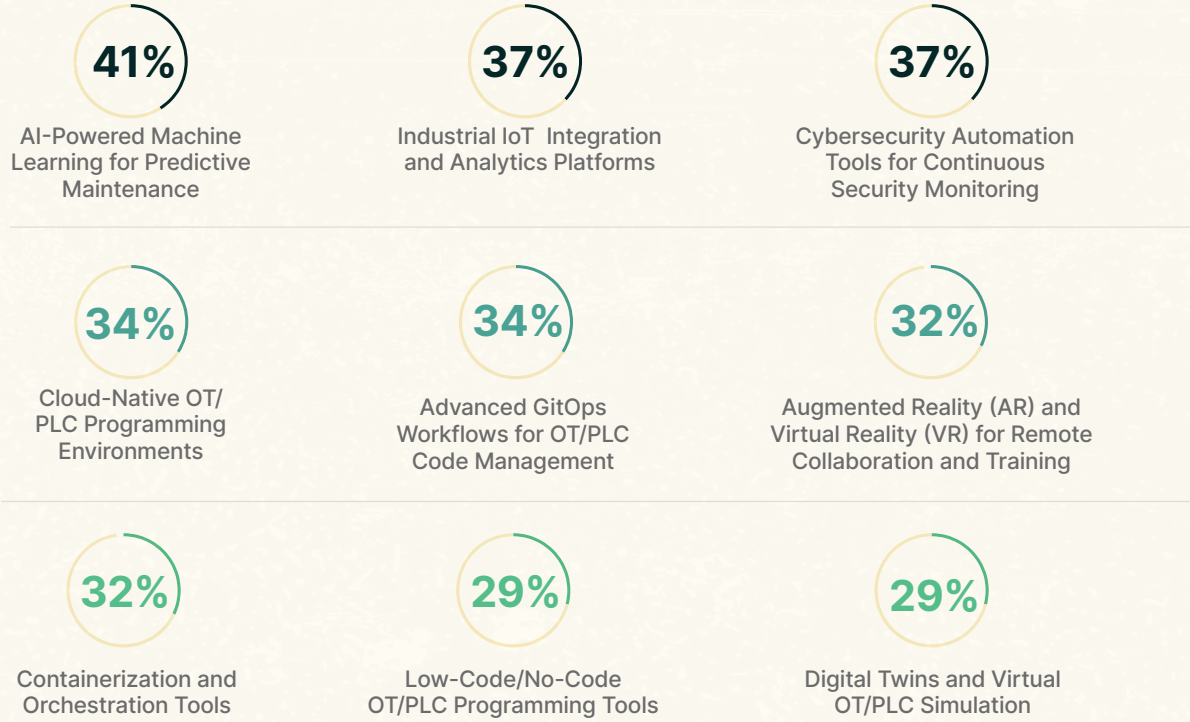
INDUSTRIAL DEVOPS SENTIMENT AND TOOLS

Almost all respondents (97%) agree that their team would benefit from using **Industrial DevOps** technology and practices for PLC coding and management.

My team would benefit from Industrial DevOps



Technologies / Tools to Advance Industrial DevOps practices

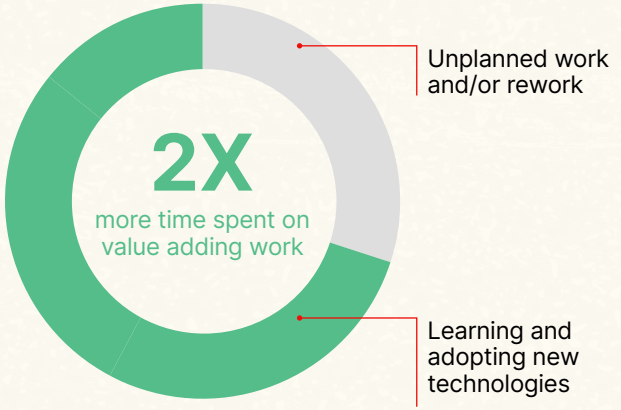


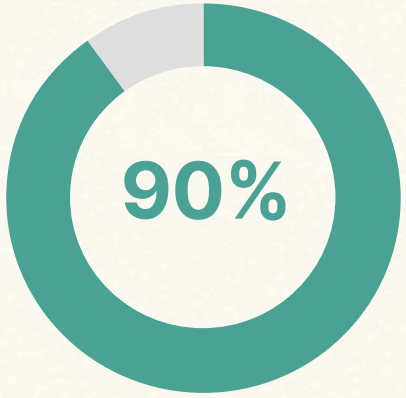
Q. Based on your experience, to what extent do you agree with the following statement: 'My team would benefit from using Industrial DevOps technology and practices for PLC coding and management'. Select one. Base: 200

Q. What specific technologies or tools do you believe hold the most potential for advancing Industrial DevOps practices? Select all that apply. Base: 200

INDUSTRIAL DEVOPS ADVANCES WORKFORCE

Decision makers think their teams spend most of their time “learning and adopting new technologies”. In contrast, “documentation and knowledge sharing” and “unplanned work” ranked last on the list of where **Industrial DevOps** teams spend their time.





Think that cloud-based technologies should be used in the OT space, providing flexibility and visibility to the workforce 24/7

Where Industrial DevOps Teams Focus Time

16% Learning and adopting new technologies	14% Security testing and compliance	13% Monitoring and troubleshooting applications
12% Version control and configuration management	12% Code review and approval	10% Remediating cybersecurity issues
9% Business value-adding work	7% Documentation and knowledge sharing	7% Unplanned work and/or rework

Q. Based on your knowledge and/or experience with Industrial DevOps practices, where do you think teams that leverage these principles spend the majority of their time? Select one. Base: 200

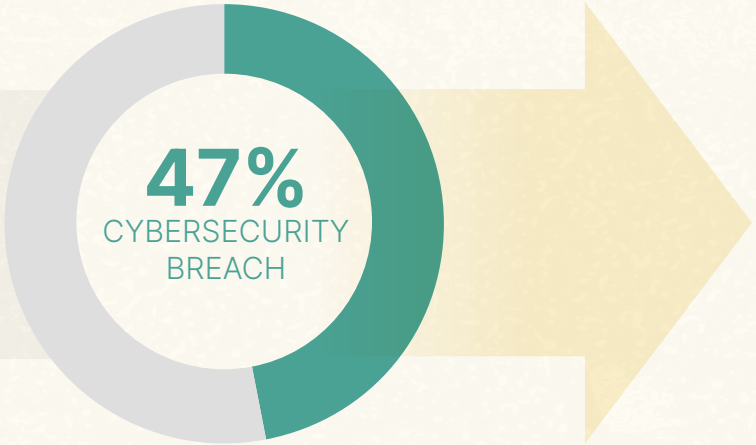
Q. Do you think that cloud-based technologies should be used in the OT space? Select one. Base: 200

INDUSTRIAL DEVOPS REDUCES CYBERSECURITY RISK

CYBERSECURITY BREACHES RANKED AS THE #1 CAUSE OF UNPLANNED DOWNTIME.

When looking at the benefits of industrial code/PLC programming software, the data shows an opportunity to mitigate Cybersecurity risk. Additionally, the governance, visibility, and control provided by a centralized solution can help track and automate error prone tasks, which would further reduce exposure to coding/software issues and human error.

The #1 cause of UNPLANNED Downtime



How industrial code/PLC programming software helps mitigate cybersecurity risks

- **42%** Compliance with cybersecurity standards
- **41%** Data integrity features
- **39%** Secure coding guidelines and vulnerability scanning
- **37%** Security training and support programs
- **36%** Secure communication protocols
- **34%** Password management
- **33%** User authentication and access control
- **32%** Network segmentation and firewall integration
- **31%** Secure remote access features
- **26%** Code signing and version control

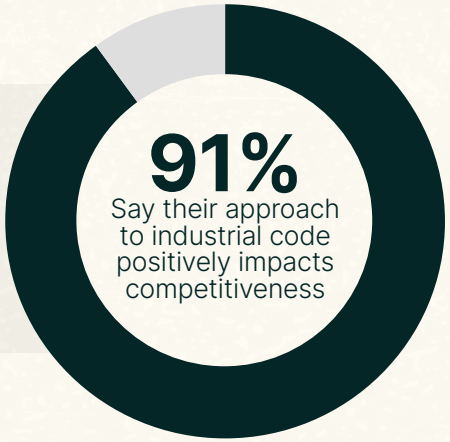
Q. Looking at periods of unintended downtime in the last year, what were the most common causes? Select up to two. Base: 200
Q. How can industrial code/PLC programming software help mitigate cybersecurity risks? Select all that apply. Base: 200

COMPETING PRIORITIES MINIMIZE THE EFFECTIVENESS OF TEAMS

While respondents overwhelmingly support the idea of Industrial DevOps (97%), blockers exist to progress in the form of competing priorities (44%) and lack of interest from decision makers (39%).

Only 10% noted that they have no challenges to moving forward with an Industrial DevOps approach in their organizations.

No need for urgency



Challenges to DevOps-oriented approach in Industrial Automation

- **44%** Competing priorities
- **39%** Lack of interest from management/decision makers
- **31%** Lack of budget to fund an initiative
- **30%** Lack of need to manage code more effectively
- **29%** Lack of skills
- **24%** Haven't found a technology that can take a DevOps-oriented approach
- **10%** We have no challenges

Q. In your estimation, how difficult is it to manage version control and configuration management for your industrial code/PLC programs with multiple vendor products? Select one. Base: 200
Q. How does your approach to industrial code/ PLC programming impact your competitiveness? Select one. Base: 200
Q. What are the main challenges your organization faces in adopting a more DevOps-oriented approach to industrial automation? Select all that apply. Base: 200

05

Actionable Insights: How to leverage the data from this Report to Competitively Differentiate your Business

Empowering governance, collaboration, and visibility is key to maximizing the value of Industrial DevOps.

This section translates our benchmark survey findings into actionable insights, providing a roadmap for users of industrial automation to bridge the gap between current practices and future success.

7 STEPS TO DRIVE SUCCESSFUL INDUSTRIAL DEVOPS ADOPTION

1. **Understand What's Next: Early Adopters will lead to Fast Followers**
   Early adopters are moving forward with Industrial DevOps practices to gain a competitive advantage.
2. **Assemble Decision Makers: Diverse teams wield the power of change**
   Include detractors and individual contributors because these are the people that will use and endorse the technology.
3. **Apply the Theory of Constraints as you build your business case**
   Identify bottlenecks with stakeholders. Breakdown contributing processes. Agree on how to maximize the constraint.
4. **Make the Business Case for Investment**
   Leverage Step 3 and calculate potential reduced downtime, increased efficiency, and optimized resource allocation.
5. **Research and Select Your Solution(s)**
   Evaluate available platforms and tools for compatibility, support, industry fit, security, and scalability.
6. **Design and Deploy the Solution(s)**
   Test functionality, identify issues, and refine approach using POC and/or Pilot, then scale across production to realize benefits.
7. **Champion Change and Drive Adoption**
   Drive cultural change with data, support, and training. Appoint champions. Celebrate successes. Empower teams to deliver continuous improvement.

Further Learning: 7 Steps to Drive Successful Industrial DevOps Adoption (Webinar)

STEP 1

UNDERSTAND WHAT'S NEXT: EARLY ADOPTERS WILL LEAD TO FAST FOLLOWERS

The 10% that have no challenges to moving forward with an **Industrial DevOps approach** in their organizations are the early adopters, and they are moving quickly to gain a competitive advantage.

Challenges to DevOps-oriented approach in Industrial Automation

44% Competing priorities

39% Lack of interest from management/decision makers

31% Lack of budget to fund an initiative

30% Lack of need to manage code more effectively

29% Lack of skills

24% Haven't found a technology that can take a DevOps-oriented approach

10% We have no challenges — **Early Adopters are on the move!**

Q. What are the main challenges your organization faces in adopting a more DevOps-oriented approach to industrial automation? Select all that apply. Base: 200

STEP 2

ASSEMBLE DECISION MAKERS: DIVERSE TEAMS WIELD THE POWER OF CHANGE

The power of change remains rooted in IT with influence from the C-Suite and other departments. What's interesting to note is that individual contributors — those most likely to use and ideally benefit from the investment — are infrequently involved in decision making, which may cause issues when it comes to adoption success.

Involve a diverse team and include detractors — these are the people who often become champions once they see the benefits of what you are doing.

Decision Makers for OT and related investment

73% Information Technology (IT)
50% C-Suite
41% Cybersecurity/Security Office
38% Operational Technology (OT)
35% Engineering
32% Head of Department
32% Director
29% Facilities/Maintenance
27% Continuous improvement
27% SVP or VP
5% Individual Contributor

Missed opportunity to increase chances of success!

Q. Who is involved in the decision making process for investment in OT, industrial automation, IoT/connected machines, PLC software & hardware, and related technologies within your organization? Select all that apply. Base: 200

STEP 3 APPLY THE THEORY OF CONSTRAINTS AS YOU BUILD YOUR BUSINESS CASE

The Theory of Constraints (TOC) is a management philosophy developed by Eliyahu M. Goldratt that views any manageable system as being limited in achieving more of its goals by a very small number of constraints.

In the context of manufacturing, TOC focuses on identifying and managing these constraints, or bottlenecks, to optimize production and improve overall performance.

Steps to Follow:

- Identify the Constraint
- Exploit the Constraint
- Subordinate Everything Else to the Constraint
- Elevate the Constraint
- Repeat the Process

STEP 4 MAKE THE BUSINESS CASE FOR INVESTMENT

To secure the necessary investment for an **Industrial DevOps project**, a robust business case is essential. This involves quantifying the financial impact of adopting these practices.

Calculate the potential return on investment (ROI) by identifying areas where cost savings can be achieved, such as reduced downtime, increased efficiency, and optimized resource allocation.

Additionally, factor in the potential for increased revenue through faster time-to-market, improved quality, and enhanced customer satisfaction. By presenting concrete data and illustrating the tangible benefits, you can create a compelling narrative that justifies the investment in Industrial DevOps.

Further Reading: The Goal: A Process of Ongoing Improvement eBook : Goldratt, Eliyahu M., Jeff Cox: Amazon.ca: Kindle Store

STEP 5 RESEARCH AND SELECT YOUR SOLUTION(S)

Thorough research is crucial when choosing the right **Industrial DevOps solution** for your organization. Evaluate available platforms and tools, considering factors such as compatibility with existing systems, support for relevant industry standards, security, and scalability.

Engage in demos to assess functionality and user-friendliness. Seek expert advice from consultants or industry peers to gain valuable insights where appropriate.

Ultimately, select the solution(s) that best aligns with your specific requirements, budget, and long-term goals. Remember, **the right technology partner** can be a game-changer in your Industrial DevOps journey.

STEP 6 DESIGN AND DEPLOY THE SOLUTION(S)

Effective design and deployment are pivotal for the success of your **Industrial DevOps initiative**. Start with a Proof of Concept (POC) to validate the chosen solution(s) in a controlled environment. This allows you to test functionality, identify potential issues, and refine your approach.

Once the POC proves successful, move on to a Pilot implementation, applying the solution to a limited scope within your production environment. This phased approach helps to mitigate risks and gather real-world feedback.

Upon successful Pilot testing, gradually scale the implementation across your entire production environment, ensuring a smooth transition and minimizing disruptions. Continuous monitoring and optimization are key to maximizing the benefits of your Industrial DevOps transformation.

Further Reading: Industrial Automation Software Management on AWS—Best Practices for Operational Excellence | AWS for Industries (amazon.com)

STEP 7

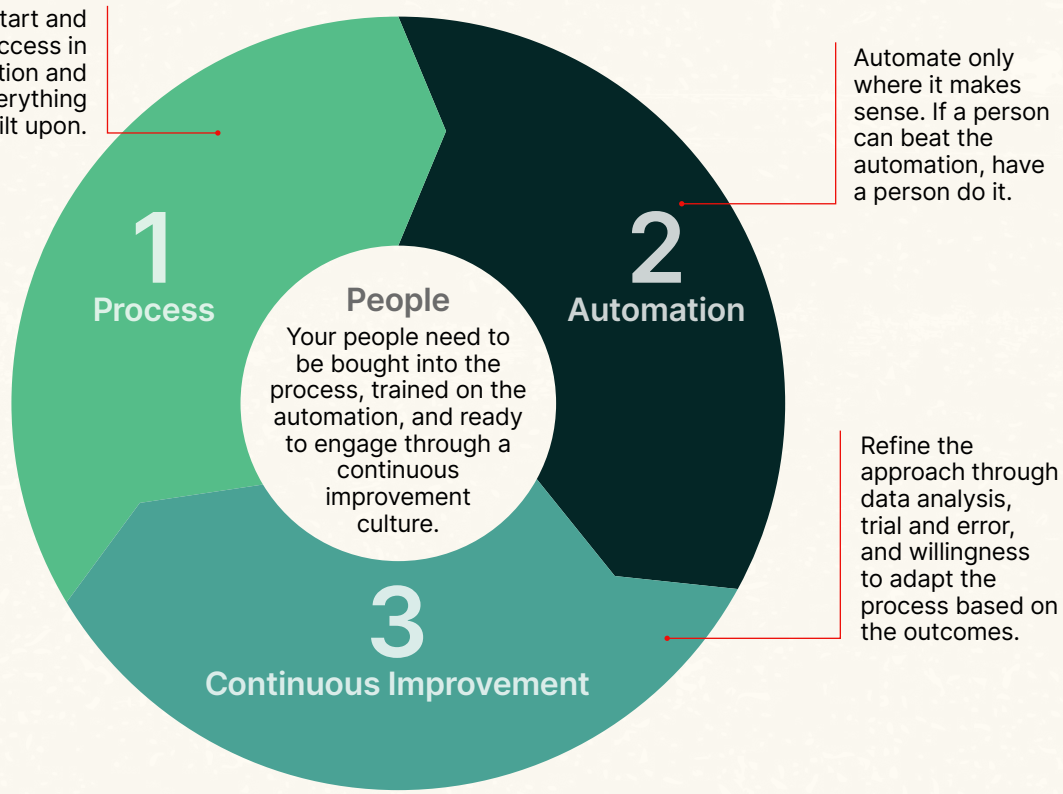
CHAMPION CHANGE AND DRIVE ADOPTION

Successful Industrial DevOps implementation necessitates a cultural shift and a data-driven approach. Appoint champions who advocate for the new processes and tools, fostering understanding and buy-in.

Provide comprehensive training and support, empowering teams to embrace the change. Regularly review agreed-upon goals and ROI metrics to assess progress and identify areas for improvement. This aligns your approach to desired outcomes, maximizing technology adoption and usage by addressing any roadblocks and adapting strategies as needed.

Celebrate successes and showcase the positive impact of Industrial DevOps to reinforce its value and drive continued adoption throughout the organization.

“Continuous improvement benefits from an experimental approach. Teams should establish a hypothesis, run experiments, and validate the results. Successes and failures are expected and real value comes from the lessons learned and commitment to continuing the practice.” - Nathen Harvey, DORA Lead and Developer Advocate at Google Cloud



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REPORT TEAM:

Copia Automation Team

These reports take a village

Friends of Copia:

- Jeff Winter (Contributing Analyst & Editor)
- Dr. Suzette Johnson (Contributor)
- Robin Yeman (Contributor)
- Nathen Harvey (Contributor)
- Industry Analysts that shared time and feedback

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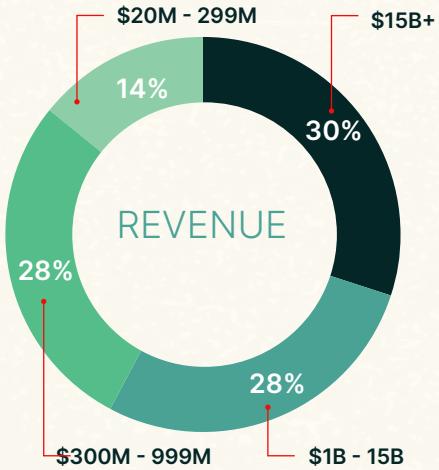
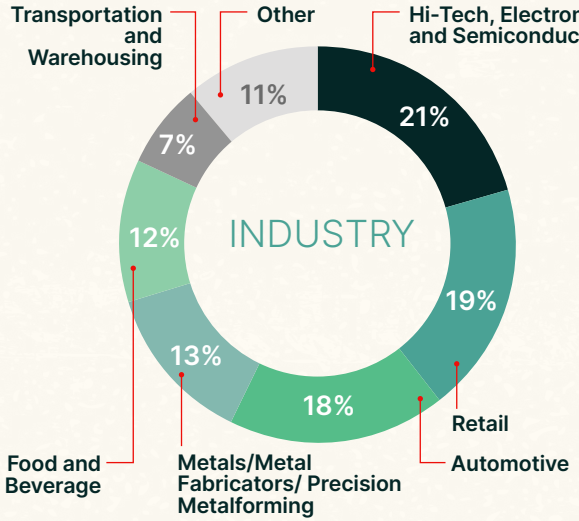
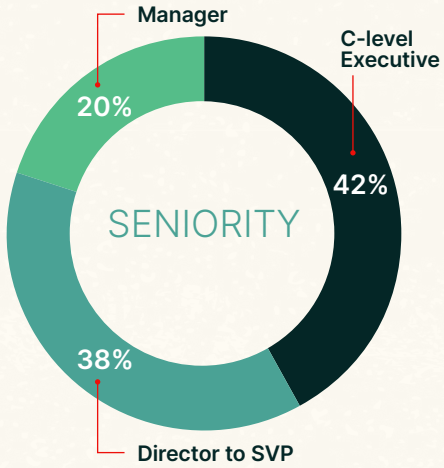
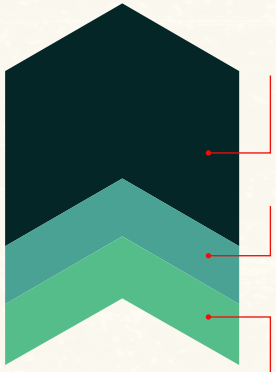






BUSINESS TYPE

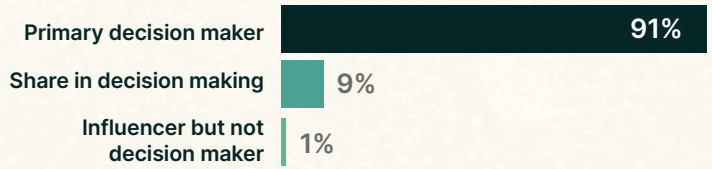


60%
End User / Consumer of automation

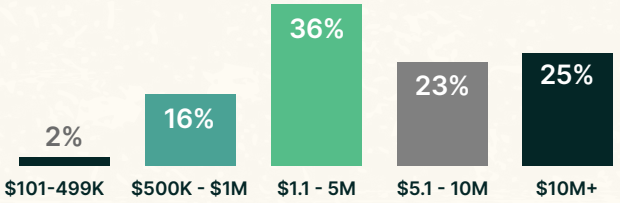
20%
System Integrator (SI)

20%
Original Equipment Manufacturer (OEM) / Machine Builder

DECISION MAKING ROLE



ANNUAL BUDGET FOR OT



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