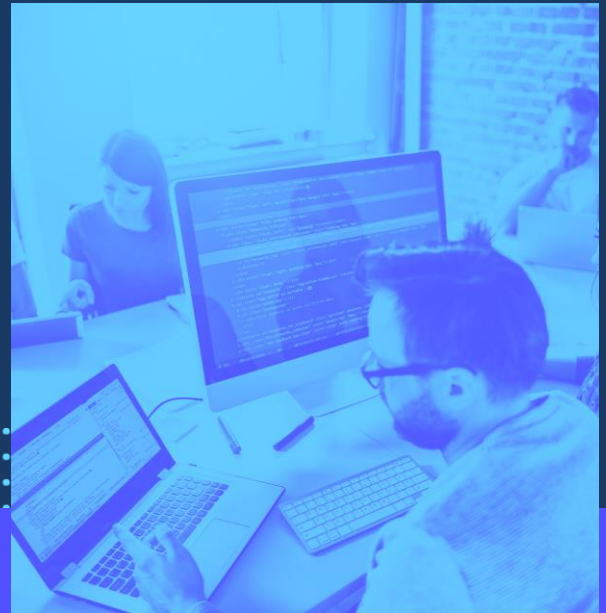




SPEED KILLS!

THE DEVOPS MAINFRAME
CONUNDRUM: APPLICATION DEV
SPEED VS. APPLICATION QUALITY

July 16, 2021 | Noon CDT





Legalese

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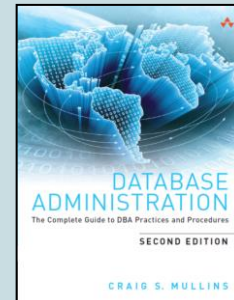
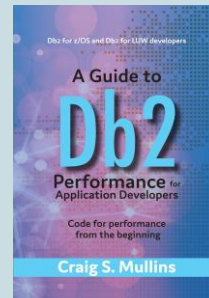
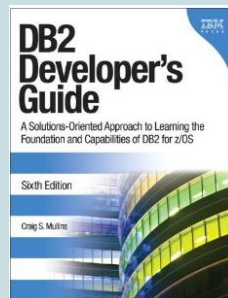
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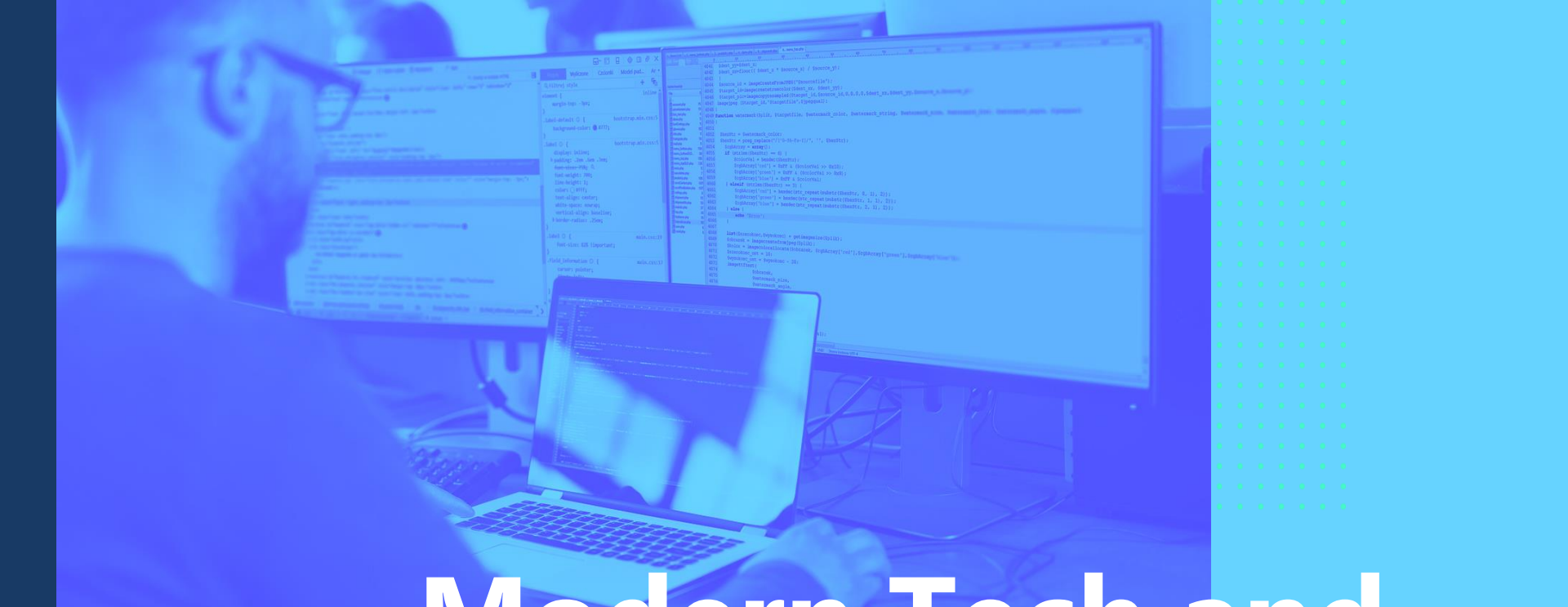
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Modern Tech and Business Trends

Important Trends

Q. What are your organization's major investment areas for digital technology strategy in the coming 12 months? Please select up to three. And which of the following do you think will have the most transformational impact on your organization over the next 2-3 years? Please select up to three.



- Digital Transformation
- Mainframe Computing Will Continue to Thrive
- Improving the Customer Experience (CX)
- Shorter Development Cycles, Faster Innovation
- Reduced Costs and IT Headcount
- Automation is increasingly important



Digital Transformation

- **Digital Transformation** is the adoption of digital technology to transform services or businesses, through replacing non-digital or manual processes with digital processes or replacing older digital technology with newer digital technology.
 - Replacing old tech with new tech is also frequently referred to as **Modernization**.
- According to Gartner, 87% of senior business leaders cite digital transformation as a priority for their companies.
- According to 451 Research survey, data management and analytics will have the most transformational impact on organizations.



Mainframes Will Thrive

- More than half of mainframe users (54 percent) reported an increase in transaction volume and 47 percent reported an increase in data volumes.
- 59 percent of executives believe the mainframe will continue to grow and attract new workloads.

Source: BMC Mainframe Survey,

<https://www.enterprisesystemsmedia.com/post/2020-bmc-mainframe-survey-results>

- 47 percent of organizations say the mainframe is running more business-critical apps than ever before

Source: Vanson Bourne survey conducted on behalf of Compuware

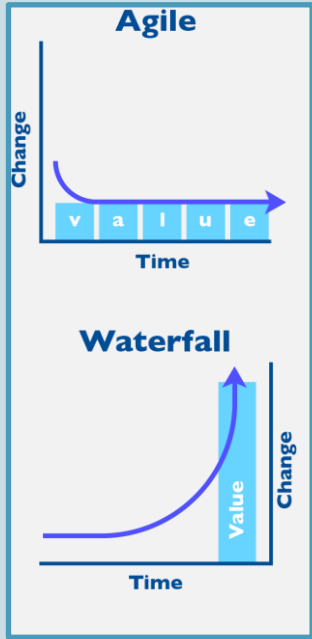
<https://digitalisationworld.com/news/58958/mainframe-innovation-on-the-rise>

Improving CX



- Frequently, the impetus for digital transformation projects is to improve Customer Experience or CX.
- **Customer experience** is the sum of all the interactions and responses that a customer has with a product (or brand) during all stages of the consumption process, including pre-purchase, consumption, and post-purchase.
 - A customer experience strategy aims to improve all aspects of the customer journey.
 - CX leadership means putting the customer at the center of everything the organization does.
 - Digital transformation (and modernization), in that they can improve technology and processes, can be vital parts of improving CX.

Shorter Dev Cycles and Faster Innovation



- Businesses are requiring fast innovation and faster time-to-market for software to support the faster speed of modern business.
- This has driving organizations to Continuous Integration (CI) and Continuous Delivery (CD) of software as part of an agile development methodology and the practice of DevOps
 - Just look at Db2 for z/OS, which has adopted a CD model as of Version 12
- Dev teams deliver improvements in smaller chunks more frequently, instead of waiting until the end of the project.



Reduced Cost & IT Headcount

- At the same time, cost and IT headcount reductions are a constant reality, especially in the mainframe world, even as mainframe usage grows.
- According to the BMC's annual mainframe survey (2020):
 - 90 percent of respondents see the mainframe as a platform for new growth and long-term applications.
 - Mainframe workers have less experience than ever; number with 20 or more years of experience has decreased significantly since 2019, as has the average worker age.
- According to QuinStreet Enterprise Research, while the world generates 50x more data, the IT staff managing it will grow only 1.5x.

Automation



- According to Gartner:
 - By 2024, organizations will lower operational costs by 30% by combining hyperautomation technologies with redesigned operational processes.
 - By 2024, endpoint analytics and automation will help digital workplace service staff shift 30% of time spent on endpoint support and repair to continuous engineering.

Source: <https://www.advsyscon.com/blog/gartner-it-automation/>



MF Dev Under Pressure to Adapt

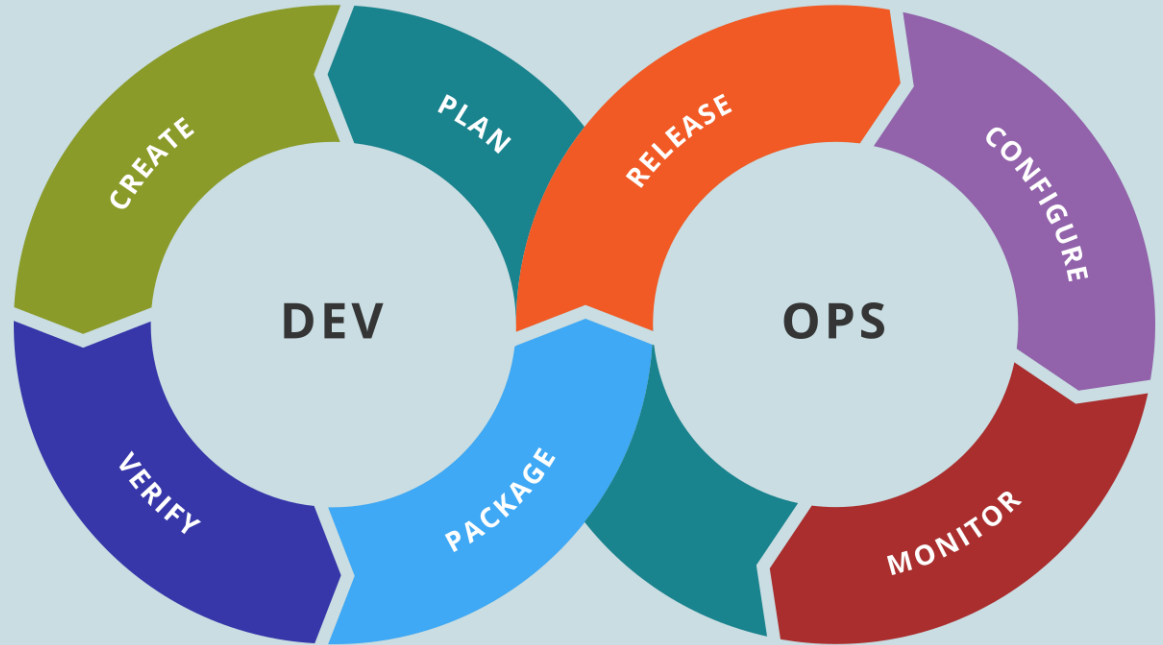
- 97 percent of app dev managers feel more pressure than ever to deliver software innovation faster.
- 95 percent said their IT teams are struggling to adopt modern development practices on the mainframe to accelerate delivery and innovation.
 - 52% of organizations have adopted DevOps on the mainframe
 - 42% have adopted Agile methodologies.

Source: <https://digitalisationworld.com/news/58958/mainframe-innovation-on-the-rise>



DevOps

DevOps is a culture, movement or practice that emphasizes the collaboration and communication of both software developers and other information-technology (IT) professionals while automating the process of software delivery and infrastructure changes.



DevOps is not a technology, it is a methodology

Mainframe Dev Speed Lags

- Modifying mainframe applications takes much longer than on other platforms
 - Months, not weeks or days
- Why?
 - Dependencies on manual processes
 - Legacy of “the way things are done”
 - Organizational inertia
- Bottom Line
 - Mainframe development can benefit significantly from a DevOps speed boost

How long does it take to update a Mainframe Application?



Source: How Best to Bring DevOps to the Mainframe,
https://devops.com/wp-content/uploads/2018/10/DOCA_DevOpsToMainframe_v11.pdf

The Mainframe and DevOps



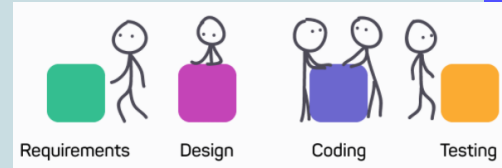
- Slower adoption of DevOps on mainframe, but it is picking up
 - Mainframe development and operational support teams are transitioning to DevOps, but it is a work in progress (50%)¹
 - Top mainframe DevOps initiatives include governance and process improvement (49%), automated **testing** (43%), security **testing** (38%), code quality (35%), and CI/CD automation (34%)²
- DevOps adoption does not have to be “all at once”
 - Many mainframe teams have begun their DevOps journeys by experimenting with, and sometimes deploying, enabling technologies³
- Automating pieces of the SDLC helps pave the way for more complete adoption of DevOps practices and procedures
 - For example, improving software testing

¹ Source: How Best to Bring DevOps to the Mainframe, https://devops.com/wp-content/uploads/2018/10/DOCA_DevOpsToMainframe_v11.pdf

² Source: State of Mainframe DevOps, IDC report, June 2020

³ Source: Navigating a Mainframe DevOps Journey, Modern Mainframe, December 2020

Software Testing Statistics



- Of the four components of the SDLC – Requirements, Design, Coding, and Testing -- only design takes more time than testing in the SDLC
 - Source: Capers Jones, Programming Productivity, ISBN 0-07-032811-0, page 137
- The more bugs you find, the longer testing will take
 - Average feature test that passes w/o failure: 2 minutes
 - Average feature test that fails: 10 minutes
 - Source: Su Win Phyu, Why does software testing take so long?
<https://medium.com/@suwinphyu/why-is-testing-taking-so-long-1b6eabac39c2>



How Much of the SDLC is Testing?

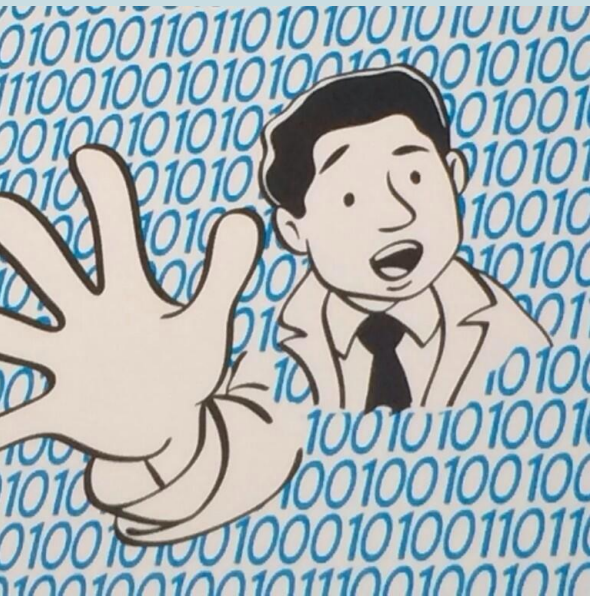
- According to a software design expert, testing occupies **20 to 50 percent of the overall development effort**:
 - 20 percent of the overall development time for a single-component application
 - 20 to 30 percent for a two-component application
 - 30 to 35 percent for an application with GUI
 - For a distributed application with GUI the number can be as high as 35 to 50 percent.

Note: these numbers are broad generalizations; in practice, each project and each agile development model has its own unique set of risks and challenges that need to be accounted for.

Source: Dennis Turpitka, jaxenter, Aug 2, 2016

<https://jaxenter.com/time-estimation-for-software-testing-128078.html>

Data: a Significant Test Challenge



- Over the past 3 years:
 - 75% of organizations have experienced an increase in demand for data
 - 70% of organizations indicate that the amount of data they generate has increased
 - 60% of organizations say the amount of data they collect has increased
 - Even with MORE data, many of those same organizations are not seeing increases in innovation or quality improvements
- 66% of organizations say they constantly need more access to data than current capabilities can provide
 - But 71% say they are gathering data faster than they can actually analyze and use it



Data/Database & Testing

- Over 81% say their organizations manage different versions of the same databases (source: 2021 study by SingleStore)
 - If every tester accesses the same database/tables, test cases will be hard to manage, including these issues:
 - Data isolation
 - One program changes the data that another relies on
 - Hard to manage data test beds
 - Can require long outages where programmers are waiting on data refreshes
 - What data is to be used?
 - Generated data
 - Subset of production data
 - Authority and security issues
 - Can developers run database utilities like unload, load, check, statistics collection, etc.
 - Data masking
 - User and query conflicts
 - Backup and Recovery?

Test Automation Adoption is Slow

- The adoption rate for automated testing is slow but strides are being made
 - 14% highly automated
 - 58% somewhat automated
- Adoption of DevOps will help bolster the rate of automated testing adoption

How automated is your application testing?



Benefits of Automated Testing Solutions



- Saves time
- Saves money
- Avoids human error
- Schedule tests at appropriate times
- Launch remote tests
- Better utilization of personnel
- Improved quality
- Optimized test coverage
- Team satisfaction
- Happy software users

Guidance



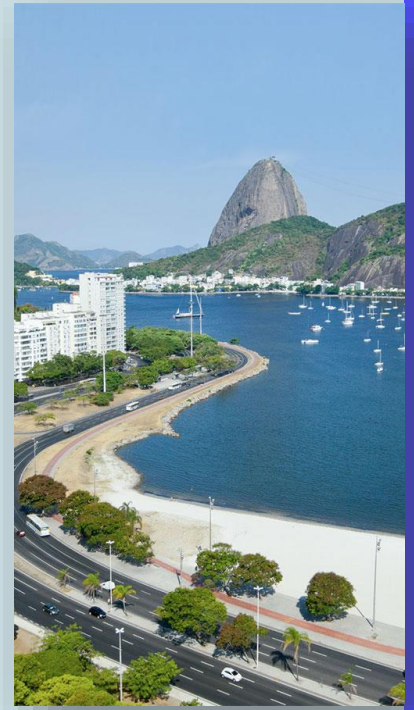
- Improve mainframe agility
- Adopt automated testing to meet demands of modern IT
 - Use automated testing as an entry to adopting DevOps
 - Automation is changing quality assurance testing, and QA professionals must adapt or lose relevance – Deborah Lewis *



Eccox Application Parallel Testing (APT) USE CASE LARGE BANK Tony Perri

Use Case: Large S. American Bank

- IT environment, human resources
 - IT department: ~10,000
 - Mainframers: ~4,000
- IT assets on z/OS
 - ~1,000,000 MIPs total capacity
 - ~500,000 MIPs allocated to applications
 - ~20,000 MIPs allocated to testing
- 8 LPARs dedicated to application testing
 - 1 LPAR general dev
 - 2 LPARs integration
 - 4 LPARs user acceptance
 - 1 LPAR unit testing





Use Case: Large S. American Bank

- Began “re-engineering project” for all core mainframe banking applications in 2006
- Running 3 concurrent systems at all times
 - Legacy
 - In development
 - Production
- Using containers for application development but very manual, time-consuming process

Use Case: Large S. American Bank

- They had 1 analyst dedicated to building test containers.
 - He had to have a lot of configuration knowledge plus have an audit of past configurations to create containers
- Their quest: Automate this manual process
 - Overlapping coding in same modules was causing ABENDs
 - Manual process to discover the root cause





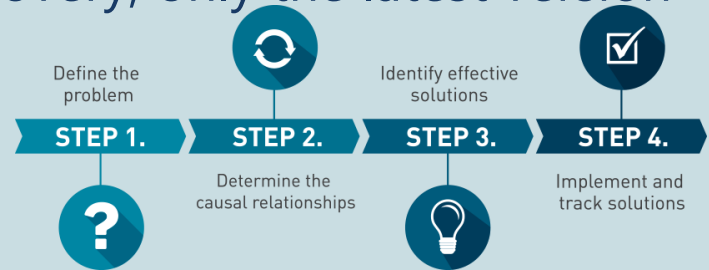
Use Case: Large S. American Bank

- To find root cause, Eccox implemented discovery to isolate components
 - Automated discovery created containers in isolation to ensure no overlapping code to same module
 - Discovery tool automatically determined components needed for container
 - Could run impact analysis allowing programmer to understand issues before production testing
 - Previously, THIS WAS A MANUAL PROCESS!

Discovery

Use Case: Large S. American Bank

- APT discovers then isolates only things that are changing.
 - Discovery scans and finds all components that are being called and this is what is put into the container.
- Because you don't have to clone everything it simplifies the link with the application to the components needed.
- Automation of discovery replicates the production environment.
- APT runs without affecting any other databases the app is connected to.
- Because of the efficiency of discovery, only the latest version of code is tested





Use Case: Large S. American Bank

Results:

1. Automation to discovery to create test containers with all the correct components
2. Time to discovery prior to automation was 4 weeks
 1. After deploying Eccox APT, TTD was 1 hour
3. Automation of discovery consolidated 3 human resources into 1 for creating test containers
4. Removed anxiety for accuracy of creating test environments that matched production
5. "Skills Gap" reduced through software with discovery automation



Use Case: Large S. American Bank

Other considerations:

1. With permissions and authorizations this building containers is still time consuming process
2. First container took 30-40 hours of raw time.
3. Fully compatible with RACF, ACF2, TSS so you can manage authorizations as per the norm
4. Helps you move away from waterfall method into a practical application of DevOps on mainframe
5. IDEAL for modernization initiatives because of all the changes
 1. Audit and add only the things that are changing. Don't replicate everything.
6. Easy to install. This was a 1-phase deployment that took 30 days
7. Consumes minimal CPU, less than 1% overhead



THANK YOU!

QUESTION & ANSWER SESSION

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