VMware Cloud Foundation 9

Authentication & Authorization

Introduction & Best Practices

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These slides correspond to the
“Authentication and Authorization Best Practices in VCF 9”
video on the VCF YouTube Channel

https://www.youtube.com/@VMwareCloudFoundation

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Disclaimer

This document is intended to provide general guidance for organizations that are considering Broadcom solutions. The information contained in this document is for educational and informational purposes only.

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Organizations should engage appropriate legal, business, technical, and audit expertise within their specific organization for review of requirements and effectiveness of implementations.

Based on a

TRUE STORY

ZERO TRUST

Means **less trust**, not more trust.

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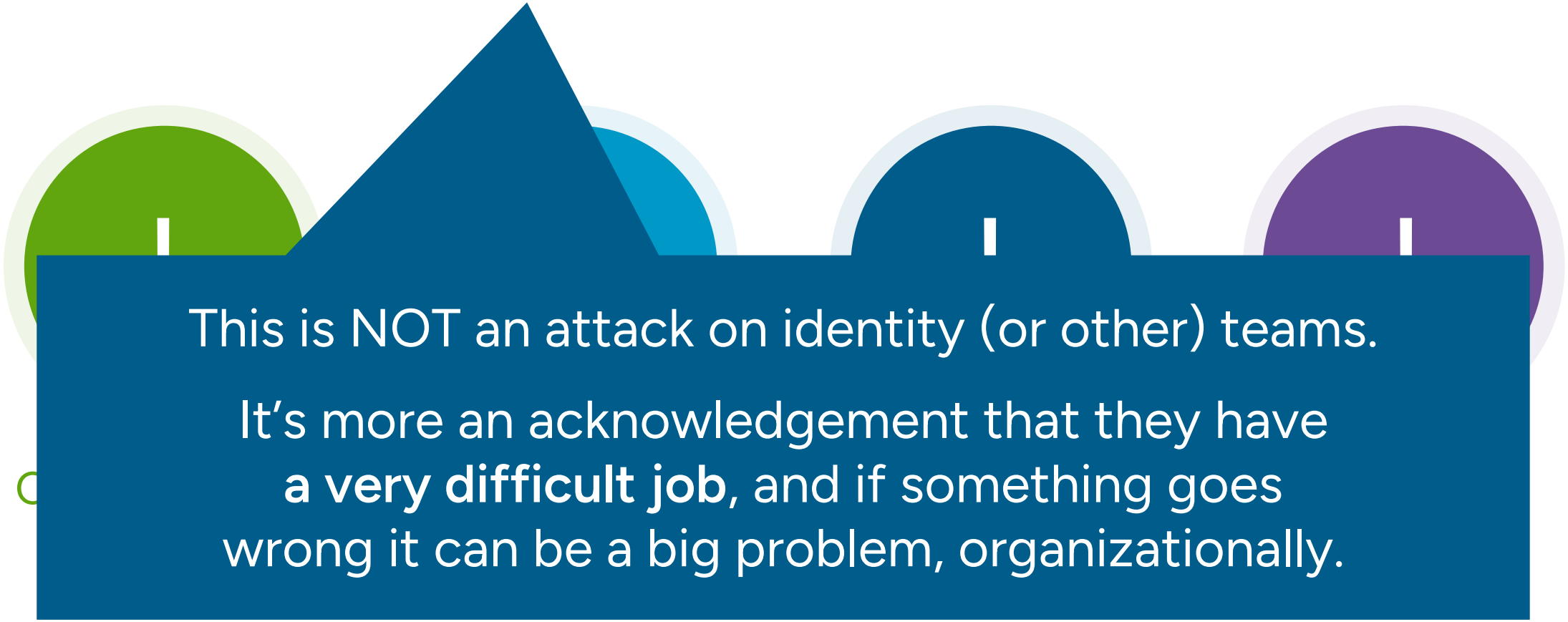
Things Your Identity Provider Can Do To You

Immense Amounts of Trust Placed in Identity Providers



Things Your Identity Provider Can Do To You

Immense Amounts of Trust Placed in Identity Providers

Change Group Membership

Reset User Passwords

Disable MFA and Other Controls

Cover Their Tracks

Identity Providers Have To Trust a Lot of Things, Too

Organizations are Complicated

Provisioning, Monitoring, EDR Systems

Other People They Didn't Choose

Human Resources

Help Desk & Support Staff

Underlying Infrastructure (What?! :)

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VCF Admins already have privileged access to **all organizational data**

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IdP admins are implicit admins **of everything** in the organization

(so are backup admins, among others)

Insider Threat Mitigation

A holistic insider threat mitigation program combines physical security, personnel awareness, and information-centric principles.

Infrastructure is different because infrastructure is **more important**

Authentication & Authorization Best Practices

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1. **Isolate from primary corporate/enterprise IdPs.**

Options for Isolating Authentication & Authorization

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Separate cloud IdP tenant?

Separate instance on-premises and clustered?

Separate on-premises instance per site?

Options for Isolating Authentication & Authorization

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Options for Isolating Authentication & Authorization

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This level of isolation only really useful if the rest of everything is independent, too.

?

Separate cloud IdP tenant?

Separate instance on-premises and clustered?

Separate on-premises instance per site?

Options for Isolating Authentication & Authorization

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This level of isolation only really useful if the rest of everything is independent, too.

May reach a point where even admins are going to start duplicating their passwords.

Remember: the password vault is an attackable trust relationship, too.

?

eparate on-emises instance per site?

“Reducing audit scope”

How Do You Reduce Trust?

Reduce Overall Trust, Not Require More

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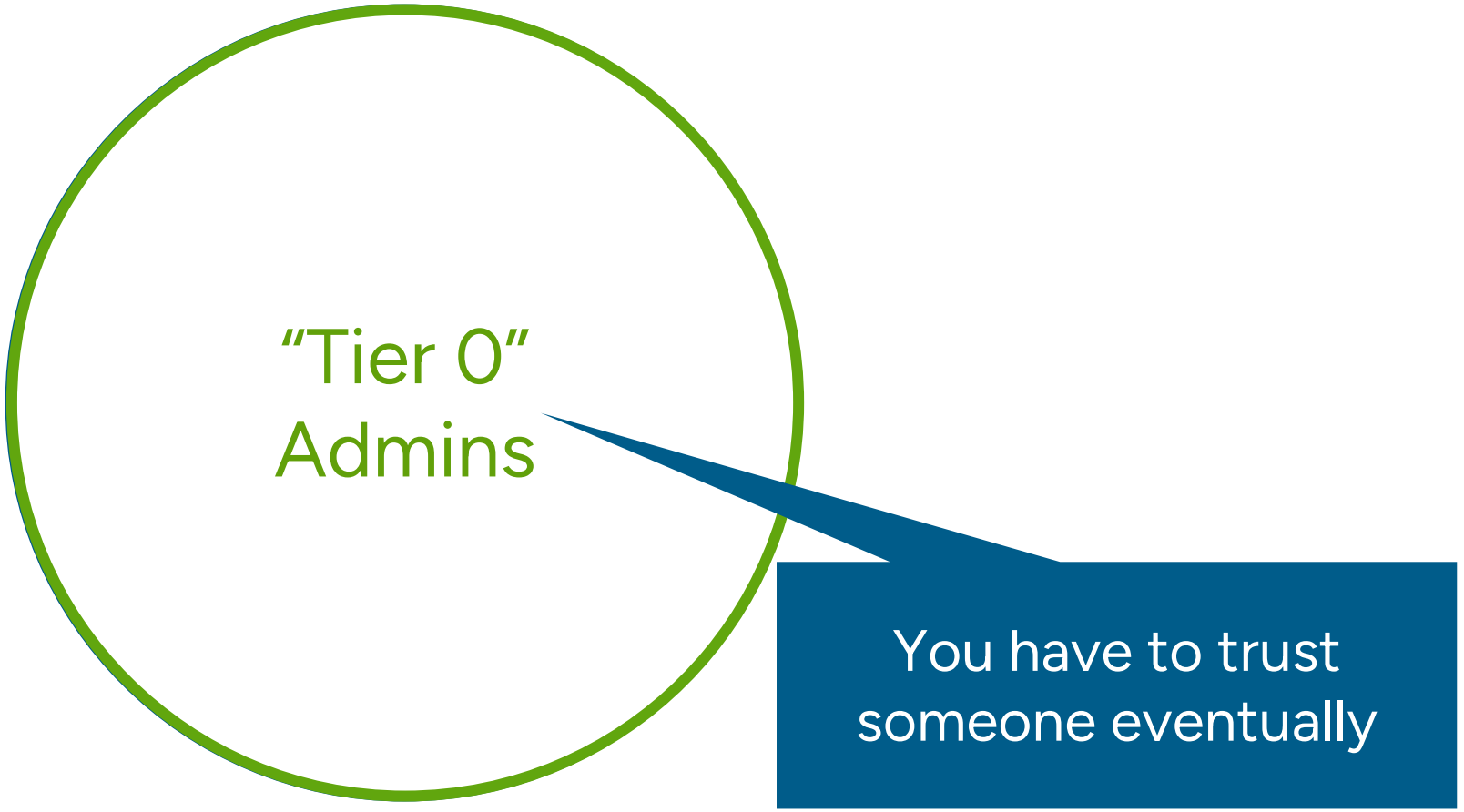

Separation of Duties

Authentication & Authorization Best Practices

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1. **Isolate from primary corporate/enterprise IdPs.**

Starting to be mandated in regulations, such as the UK Telecommunications Security Code of Practice (M10.30, M11.19, M11.20)

Also called for in third-party defensive guidance for IT infrastructure (Mandiant et al)

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Frankly, probably not worth it if you have an isolated IdP.

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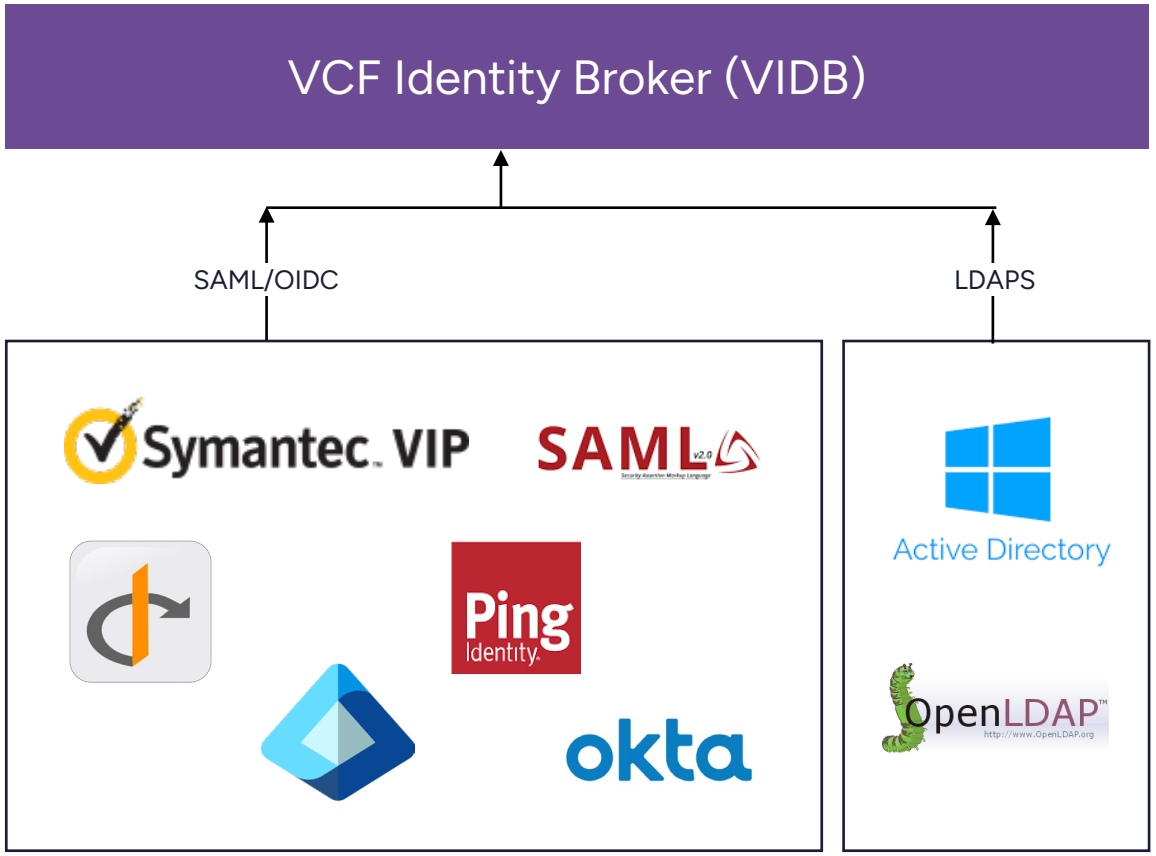
3. **Use the Identity Broker (VIDB) to introduce MFA.**

Modern Identity Broker Simplifies Configuration

Single Sign-On for VCF Administrator Access Across VCF



Embedded (in vCenter), standalone, and clustered appliance deployment models

Automatic configuration for vCenter, NSX, Operations, and Automation

One IdP configuration for VCF management components, but Automation has multitenancy

Supports any SAML, OIDC, and AD/LDAPS-based IdP

Do not put your infrastructure on the Internet.

Use the cloud services' local proxies instead.

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Should you put vCenter in/on the same network as ESX management?

Should you put VCF Operations in/on the same network as ESX management?

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7. **Reduce permissions for service accounts to the minimum needed.**

Know Exactly What Permissions Were Used

vSphere Privilege Recorder

Docs / VMware vSphere / vSphere Security

Using Privilege Recorder

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Updated on 06/08/2023

In vSphere, privileges are fine-grained access controls that can be grouped into roles and map them to users or g
you identify the minimum set of privileges required to run a vCenter Server workflow.

To run a specific set of operations, it is very difficult to determine the minimal set of privileges that are required b
not have one-one mapping with the specific workflow which usually consists of multiple calls to different APIs op
object. As a result, the user either has more access or too little access to the environment. With the aim to keep t
privilege recorder feature helps you identify the minimum set of privileges required to run a vCenter Server work
and query the privileges that were checked while performing an operation. Privilege recorder is implemented usi

Note:

This feature is available as an API, and it supports only workflows run by a script. There is no UI suppo

Querying the ListAPI allows you to retrieve lists of privilege checks along with the corresponding sessions, users,
operation IDs (opIDs). You can use the appropriate filters to obtain privileges for a particular workflow.

For example, assume that user A needs to create a VM. Creating a VM requires a certain set of privileges. User A
from the system administrator. The system administrator can enable the privilege recorder and execute the creat
privilege check is performed, the data for the privileges that were checked during the Create VM operation is sto
PrivilegeID, sessionID, OpID, and so on. In this example, this system admin will use the filters to get privileges for
system administrator can now create a role with minimum required privileges and assign it to the user.

Enable Privilege Recorder using the vSphere Client

You can enable privilege recorder by using vSphere Client or adding the configuration to vpxd.cfg. [Read more]

Parent topic: vSphere Permissions and User Management Tasks

Developer Center

Overview | API Explorer | Code Capture

```
curl -X POST 'https://vcenter-1.8.fcotr.org/api/vcenter/authorization/privilege-checks?action=list' -H 'vmware-api-session-id: <valid-vapi-ses
```

Response

```
VcenterAuthorizationPrivilegeChecksListResult {
  "items": (Array<VcenterAuthorizationPrivilegeChecksInfo>, required)
  [
    VcenterAuthorizationPrivilegeChecksInfo {
      "object": (Object, required)
        VapiStdDynamicID (domain-c8) {
          "id": (string, required) "domain-c8",
          "type": (string, required) "vim.ClusterComputeResource",
        }
      "principal": (Object)
        VcenterAuthorizationPrivilegeChecksPrincipal (administrator) {
          "domain": (string, required) "vsphere.local",
          "name": (string, required) "administrator",
        }
      "privilege": (string, required) "System.Read"
```

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vCenter will log the permission you are missing, so…

Create a role with no permissions, try the thing, then adjust the permissions. Repeat until done.

Remember that if it’s a backup system to try restores, too.

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8. **Enable IdP advanced features like conditional access, geographic location, phishing-resistant MFA (number matching), and device hygiene.**

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Initial breaches are often years earlier

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It also does not follow your defined authentication method policies for admins, allowing email and SMS.

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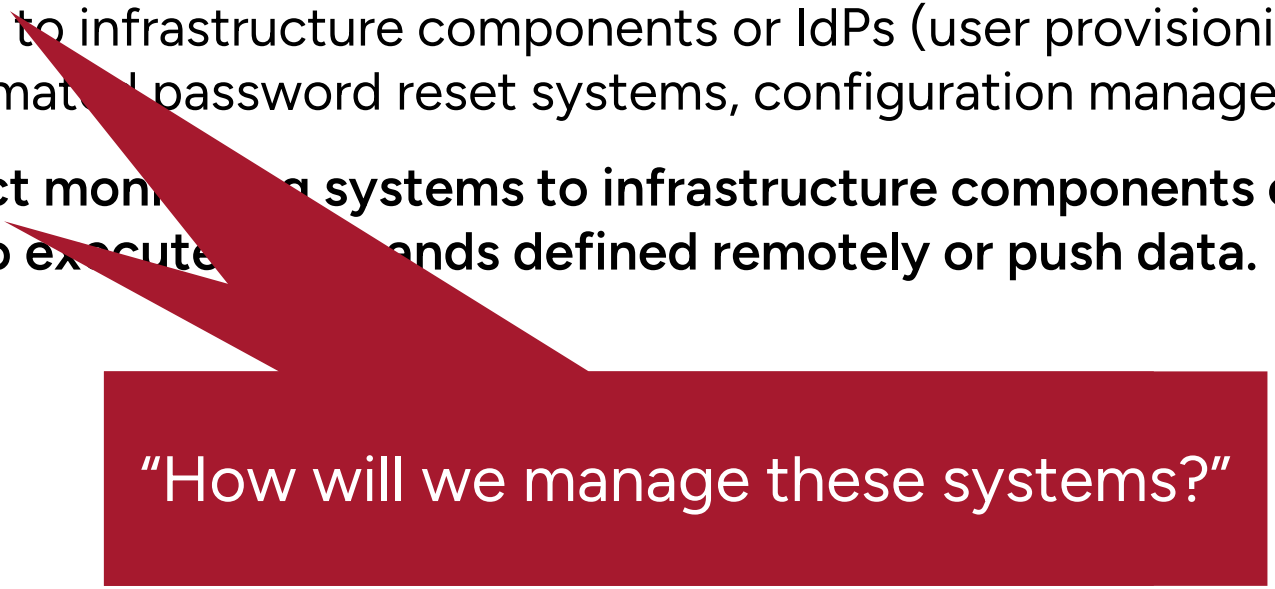

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Attackers are also impersonating Help Desk staff. How would one of your users know it's the real Help Desk?

How does your answer change if you consider the attacker might have the same information your users do?

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16. **Consider carefully where you store “break glass” authentication information.**

Non-Technical Topics

When Implementing Change

Organizational Resistance

"Not how we do things around here."

"We've always done it this way."

"If it ain't broke don't fix it."

"We don't have staff or time for this."

"Why do you think you're special?"

Ownership

"Who maintains the infrastructure IdP?"

"Who is funding this?"

Exceptions

“What about app admins that need access?”

“Infosec will need admin rights.”

Just in case...

But I need the console...

What if...?

Someone will need to say no.

Just for now...

Have boot media...

“I don’t want to have to wake you up...”

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Remember That They're Trying to Solve Problems, Too

"For security and compliance reasons we only grant access in limited cases."

Pre-Existing Written Policy

High-Level Risk Acceptance

VCF Automation

Remember That They're Trying to Solve Problems, Too

"For security and compliance reasons we only grant access in limited cases."

Pre-Existing Written Policy

Include access control as well as application standards to help avoid the need for this type of access.

Include a design review so technological solutions can be found.

Acceptance

Automation

Rememb roblems, Too

"For security in limited cases."

"Okay, fine, you can have access, but only if your VP accepts the risk, in writing, every X days."

1 Pre-Existing Written Policy

2 High-Level Risk Acceptance

3 VCF Automation

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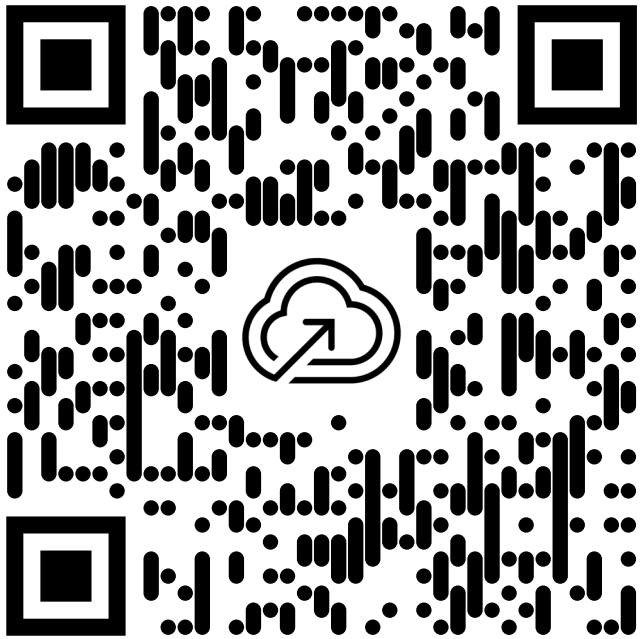
Security Hardening & Compliance Resources

https://brcm.tech/vcf-security

https://github.com/vmware/vcf-security-and-compliance-guidelines/



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Thank You