

# Consul Onboarding Program Closing Thoughts

December 2022



# Agenda



## Onboarding Program Recap

Look back at what we've accomplished the last 5 weeks



## Production Readiness

Consul Production Checkpoints



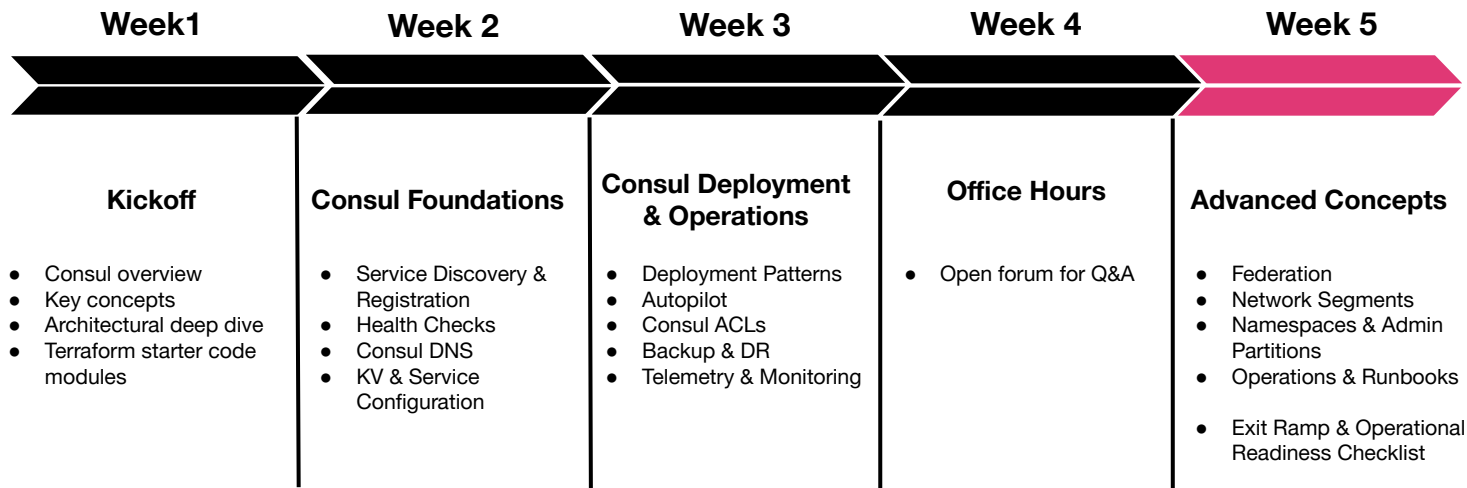
## Exit Program Resources

Resources to support your post-program journey



# Program Recap

# Consul Enterprise Path to Production





# Onboarding Goal

Our objective is to make you successful with our products and see value within 90 days



## Consul Installed

- Consul Enterprise installed in your environment
- Basic configuration completed
- Telemetry and monitoring in place
- Deployment and operational patterns established



## Consul Operational

- 3+ foundational use cases in place
  - Service Catalog
  - Service Health Checking
  - Service Discovery
  - Consul DNS
  - Consul Key Value store
- A roadmap created for onboarding additional use cases (Service Mesh track or NIA track).



## Completed within 90 days



# Production Readiness



# Consul Production Readiness



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	lu...@hashicorp.com	[ANN] Nomad 1.2.4, 1.1.10, and 1.0.16 Released — Nomad 1.2.4, 1.1.10, a...	Jan 19	☆
	jba...@hashicorp.com	Terraform CLI v1.1.3 Released — Today we release Terraform CLI v1.1.3. T...	Jan 6	☆
	meg...@hashicorp...	Vault 1.9.2 released! — Hi folks, The Vault team is announcing the release ...	12/21/21	☆
	meg...@hashicorp...	Vault 1.8.7 released! — Hi folks, The Vault team is announcing the release ...	12/21/21	☆
	meg...@hashicorp...	Vault 1.7.8 released! — Hi folks, The Vault team is announcing the release ...	12/21/21	☆
	Krista LaFentes	Terraform CLI v1.1.1 released — Hello everyone! Today we released Terraf...	12/15/21	☆
	tgr...@hashicorp.com	Nomad 1.2.3 released — Nomad 1.2.3 Security Release Nomad 1.2.3 has b...	12/13/21	☆



# Consul Production Readiness



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Security ▾ Security-Vault ▾ | Latest Top

Topic		Replies	Views	Activity
<b>HCSEC-2021-34 - Vault, Consul, Boundary, and Waypoint Affected By Denial of Service in Golang's net/http (CVE-2021-44716)</b>		0	487	Dec '21
Security security-vault, security-consul, security-waypoint, security-boundary				
<b>HCSEC-2021-33 - Vault's KV Secrets Engine With Integrated Storage Exposed to Authenticated Denial of Service</b>		0	487	Dec '21
Security security-vault				
<b>HCSEC-2021-30 - Vault's Templated ACL Policies Matched First-Created Alias Per Entity and Auth Backend</b>		1	983	19d
Security security-vault				





# Consul Production Readiness

- Architecture
- Performance
- Security
- Operations & Business Continuity



# Consul Production Readiness



## ● Architecture

- Are all Consul clusters aligned with the reference architecture?
  - [Consul Reference Architecture](#)
  - [Consul and Kubernetes Reference Architecture](#)
  - Is autopilot configured and are redundancy zones enabled?
  - Are server sizes appropriate to current and near-term future workloads?
- Are all Consul data centers aligned with best practices?
  - Have network segments been implemented to optimize LAN Gossip?
  - Is LAN gossip in all data centers within the 8ms latency budget for all nodes and clients?



# Consul Production Readiness



## ● Performance

- [Consul Server Performance Guide](#)
- **Read Heavy Clusters** - service heavy DNS usage and/or high volume of RPC calls
- For DNS heavy workloads, the [allow\\_stale](#) configuration will allow reads to scale across all Consul servers
- Read replica servers (don't participate in raft quorum) can help distribute the load on read-heavy clusters



# Consul Production Readiness



## ● Performance - Write & Read Heavy Clusters

- **Write Heavy Clusters** - have high K/V usage and/or a high rate of agent joins/leaves
- The file system should have adequate provisioned IOPS
- [Operating system ulimit](#) should be increased from the defaults
- Systems with heavy K/V write loads need additional RAM as Consul is an in-memory database
- $\text{Overhead RAM} = \text{number\_of\_keys} * 512\text{KB} * 2 \text{ or } 3$
- The normal maximum recommended number of Consul client agents in a single data center is 5,000, this might need to be reduced for read or write heavy clusters



# Consul Production Readiness



## ● Performance Considerations

- RPC requests from Consul clients can be [rate limited](#) to protect the Consul servers
- Gossip churn (how fast Consul nodes are joining, leaving, or failing) can have significant impacts on cluster performance
- Certificate signing for Connect / Service Mesh can spike cluster node CPUs
  - Setting `csr_max_per_second` and `csr_max_concurrent` values will reduce the potential for this issue to occur
  - By default, `csr_max_per_second` is set to 50/second, which may limit performance and needs tuned to suit your environment



# Consul Production Readiness



## ● Security

- Consul is **not secure-by-default**, Consul's security model is only applicable if **all parts** of the system are running with **a secure configuration**
- Tools to mitigate security threats
  - Encryption - configure mTLS for gossip traffic
  - ACLs - configure a default deny policy
  - Sentinel for K/Vs
  - Network Infrastructure Automation
  - Segmentation via Namespaces & Admin Partitions



# Consul Production Readiness



## ● Security

- Secure the Consul UI using TLS, HTTP write restrictions, and ACLs
- Rotate encryption keys regularly using the [Consul keyring](#)
- Rotate ACL tokens and X.509 Certificates regularly
- Do not run Consul as root (on servers or clients)
- Restrict access to the Consul data\_dir



# Consul Production Readiness



## ● Operations & Business Continuity

- Enable [telemetry and monitoring](#) for every Consul datacenter
  - Consul [key metrics](#) list
  - Envoy [metrics](#)
- Enable [audit logging](#) on all servers and agents
- Ensure NTP synchronization is configured across clusters and data centers
- Configure snapshot agent for each datacenter and ensure they are stored in accessible and secured locations





# Consul Production Readiness



## ● Operations & Business Continuity

- Create a Disaster Recovery (DR) Plan for Consul with clearly defined RPO and RTO
- Test DR operations on a consistent and scheduled basis
- Create and Document Standard Operating Procedures for Consul
  - Upgrade process including testing prior to production upgrade
  - Key rotation
  - Restoration process
- User and Operator onboarding and offboarding procedures established



# Content & Resources

# COBRA HashiCorp Consul Onboarding Journey



- [HashiCorp Customer Success](#) - password: c7d2gZjq39
- [HashiCorp Support Overview](#) - password: Welcome!
- [Kickoff - Consul Overview & Architecture](#) - password: Ezsy2Sp0t
- [Consul Foundations](#) - password: coq10!
- [Consul Deployment & Operations](#) - password: c7d2gZjq39
- [Advanced Concepts](#) - password:

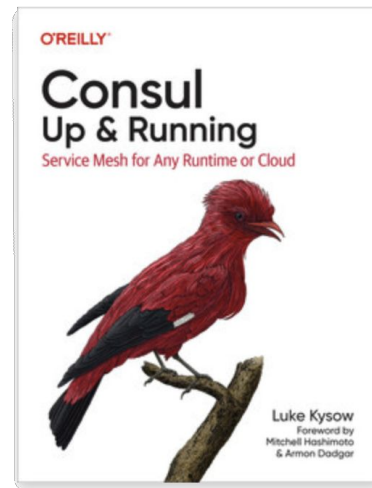
[All program materials](#)



# Additional Resources



- [Production Readiness Checklist](#)
- [Consul Up & Running](#)





# Additional Training Resources

Wanting to Learn More? A Topic Not Covered? See these

## **Developer.Hashicorp.com/consul/tutorials**

Tutorials on just about everything

## **Discuss for Consul** - <https://discuss.hashicorp.com/c/consul>

Great place for best practices, finding similar configuration questions

## **HashiCorp Consul Certification**

Even if you don't want the certification, the [Study Guide](#) is a relevant and useful curriculum to follow especially for folks new to Consul.

## **HashiCorp Instruct Labs**

Want more hands-on experience? Visit our Instruct page

<https://play.instruct.com/hashicorp>



# HashiCorp Events

Visit our events page for future events to live webinars, virtual workshops and other training courses

The screenshot displays the HashiCorp Events page. The top navigation bar includes the HashiCorp logo, a menu with links to Products, Solutions, Company, Partners, Events, Resources, and Success & Support, and a Contact sales button. The main content area features three event cards:

- HashiConf Global** (OCTOBER 19 & 20): A large event with a description "Join us for product updates, technical sessions, workshops & more" and a "Register Now" button.
- How Comcast Runs Consul Service Mesh on Amazon ECS** (OCT 6 | LIVE WEBINAR): A webinar with a description "Learn how Consul service mesh works and integrates with Amazon ECS to streamline workflows and deploy applications faster than ever." and a "Register Now" button with a right arrow.
- Terraform Cloud on AWS + Controlling Cloud Costs** (OCT 13 | VIRTUAL WORKSHOP): A virtual workshop with a description "Join HashiCorp for a Terraform hands-on workshop focused on minimizing cloud waste." and a "Register Now" button with a right arrow.

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# Thank You

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