

# DevOps for 24 X 7 SaaS and disaster recovery



**Shikha Srivastav**  
*Distinguished Engineer, IBM SaaS,  
Master Inventor*



**Amitabh Prasad**  
*Software Architect, IBM*

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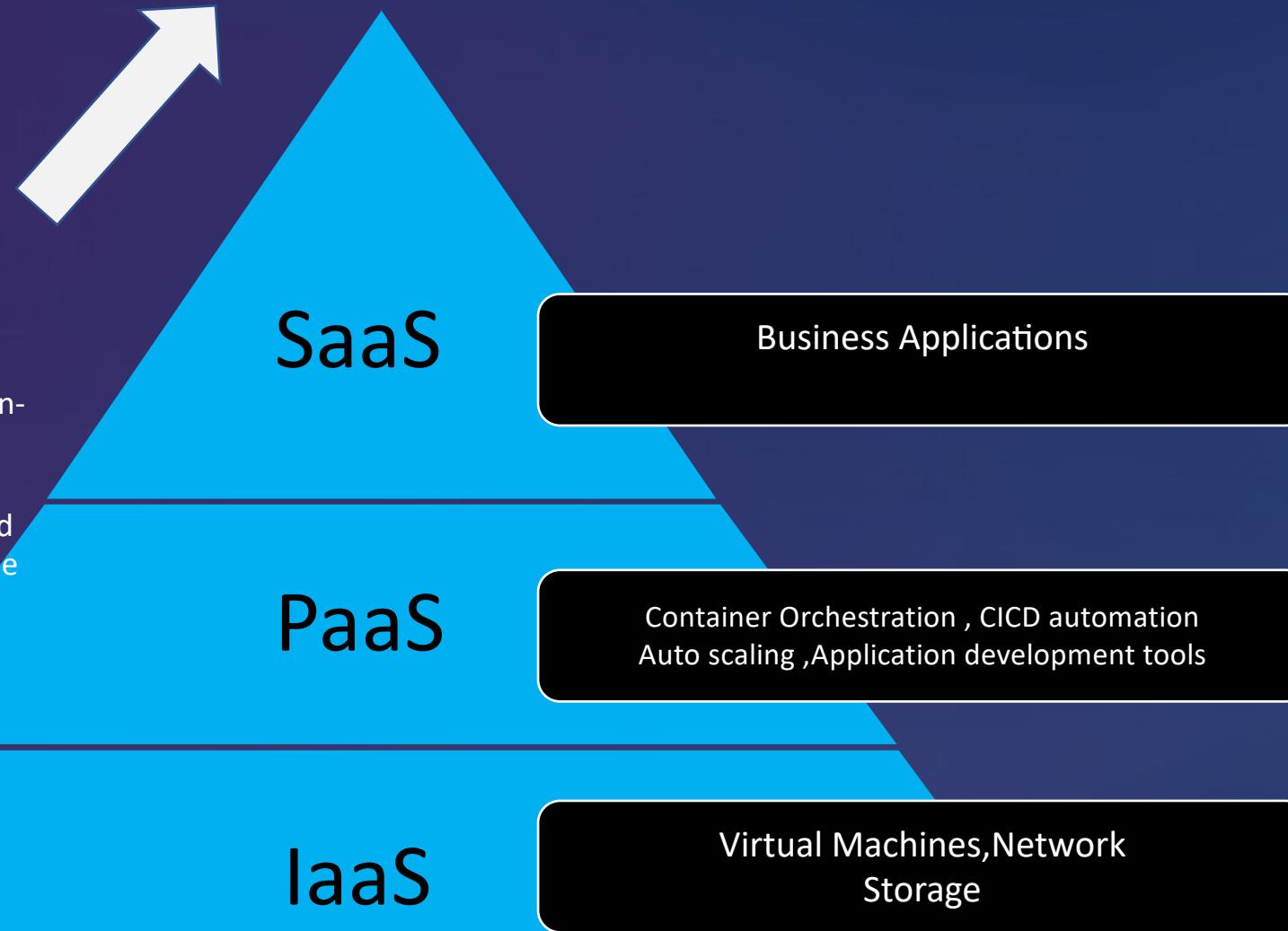
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# Agenda

- What is SaaS and the challenges
- Business Continuity and disaster recovery is critical
- Disaster Recovery Models
- What we learned
- Patterns based on our learning

# What is SaaS

- Stable - providing consistent acceptable performance
- Available - providing 24X7 availability
- Reliable - for customers to leverage SaaS in their mission-critical business needs
- Resilient - allowing updates (security, features, bugs), and upgrades with zero downtime
- Secure and Compliant



# What it takes

Collaboration and Communication

Continuous Integration

Continuous Delivery

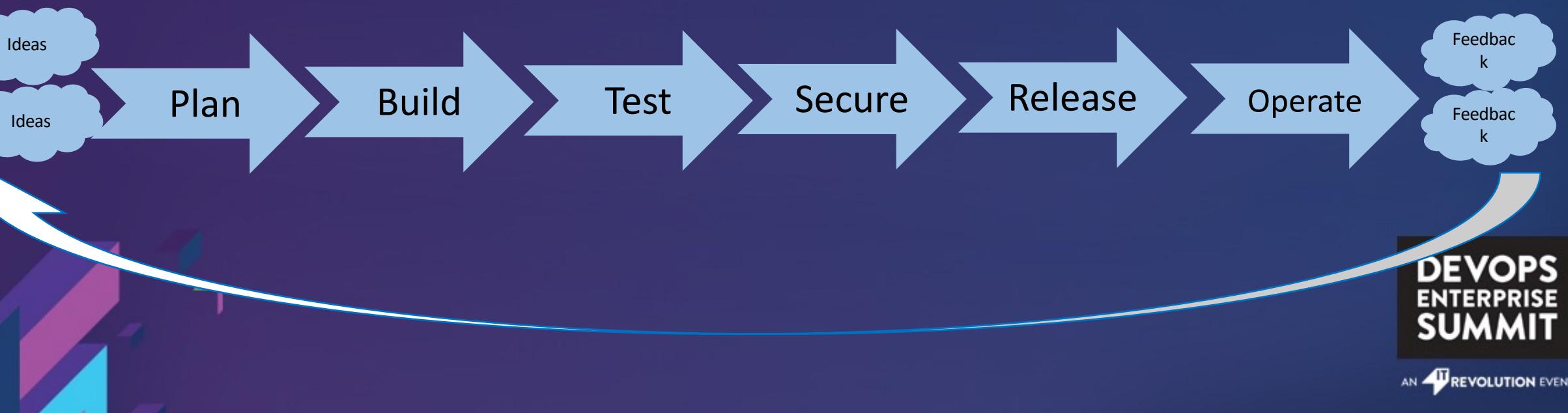
Observability

Change and incident management

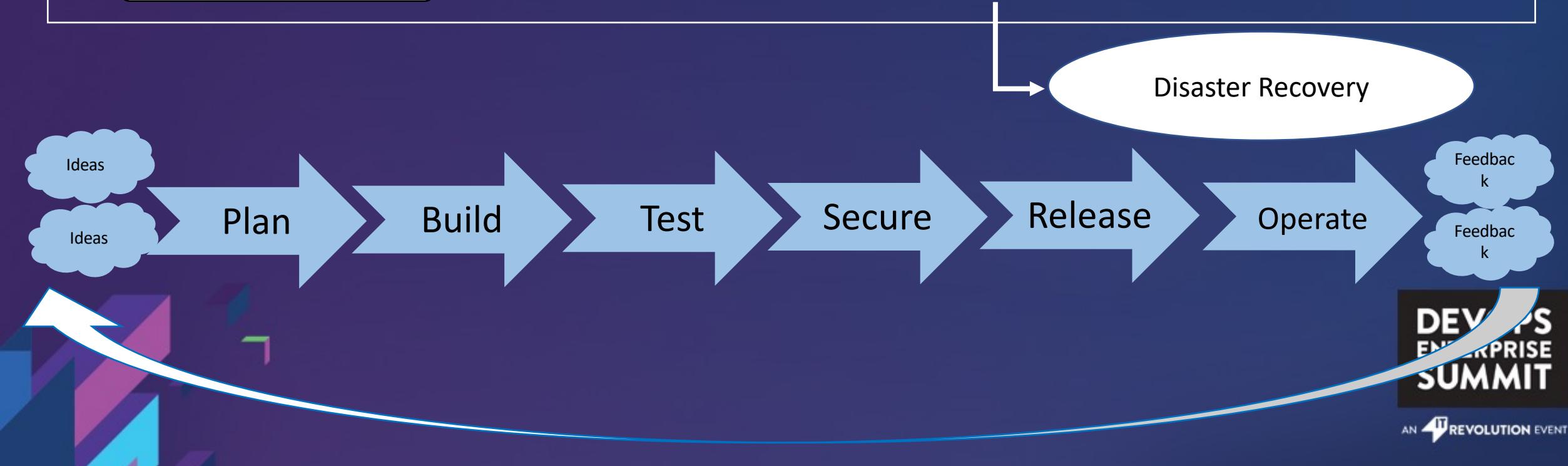
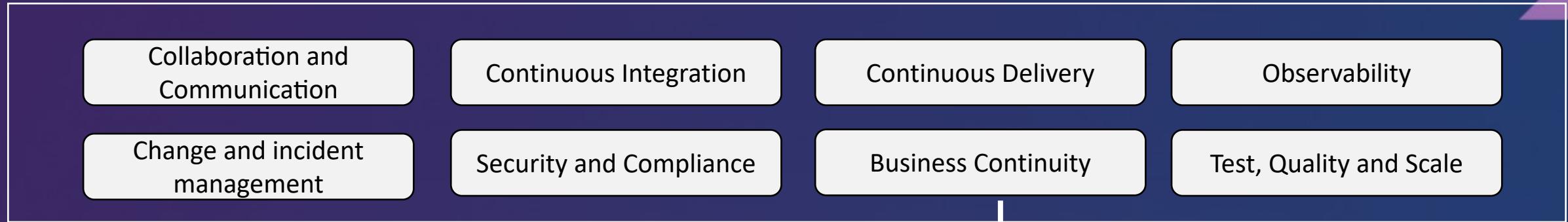
Security and Compliance

Business Continuity

Test, Quality and Scale

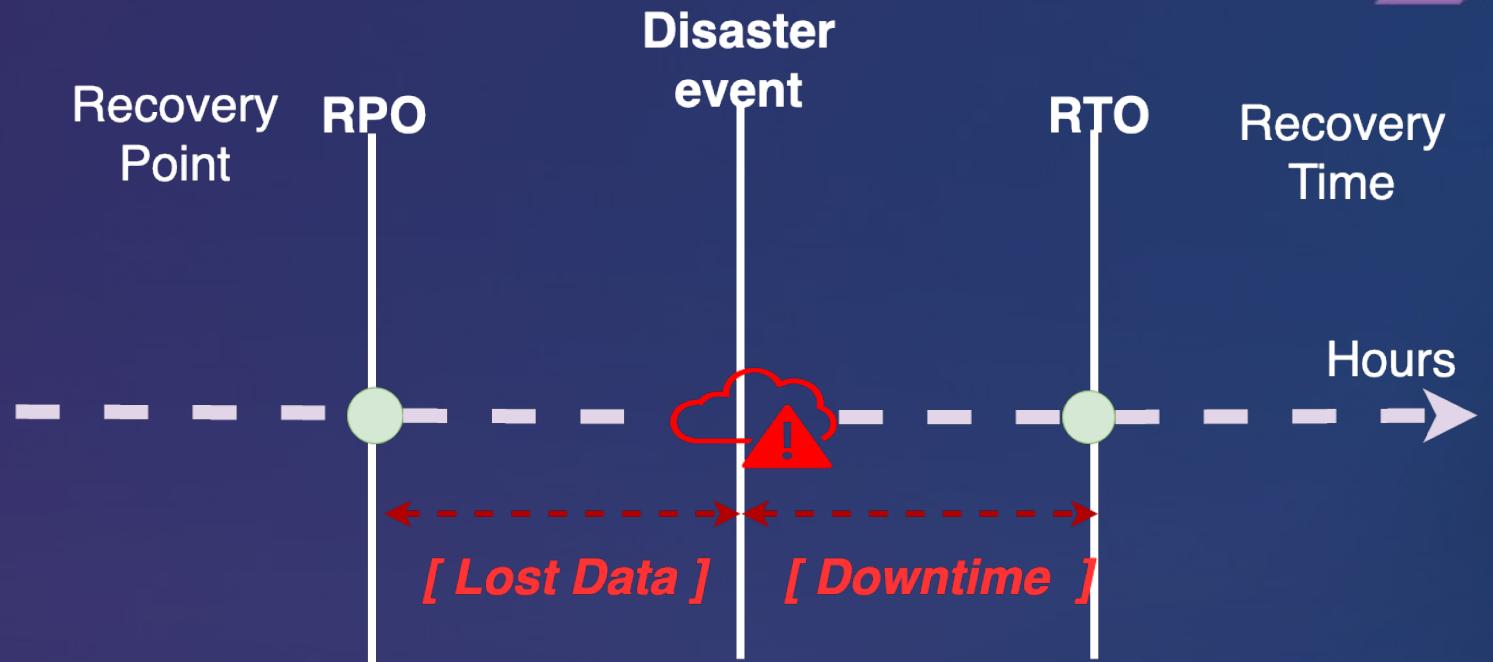


# What it takes



# Disaster Recovery

- Service needs to meet SLA
- Service Recovery most critical in Cloud
- Recovery Point Objective (RPO): the amount of data that will be lost
- Recovery Time Objective (RTO): the amount of downtime a business can tolerate.



# Key Considerations for Disaster Recovery

WHY backup

- Business continuity

WHAT to back up

- Do you need to back up all data ?

WHERE to back up

- Security and privacy for customer data consideration

HOW to back up

- Automation for backup

RECOVERY plans in case of disaster

- Algorithm for recovery with automated steps



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# Disaster recovery models

Recovery time and recovery point reduces

**1 backup & restore**  
(\$)

**2 pilot light**  
(\$\$)

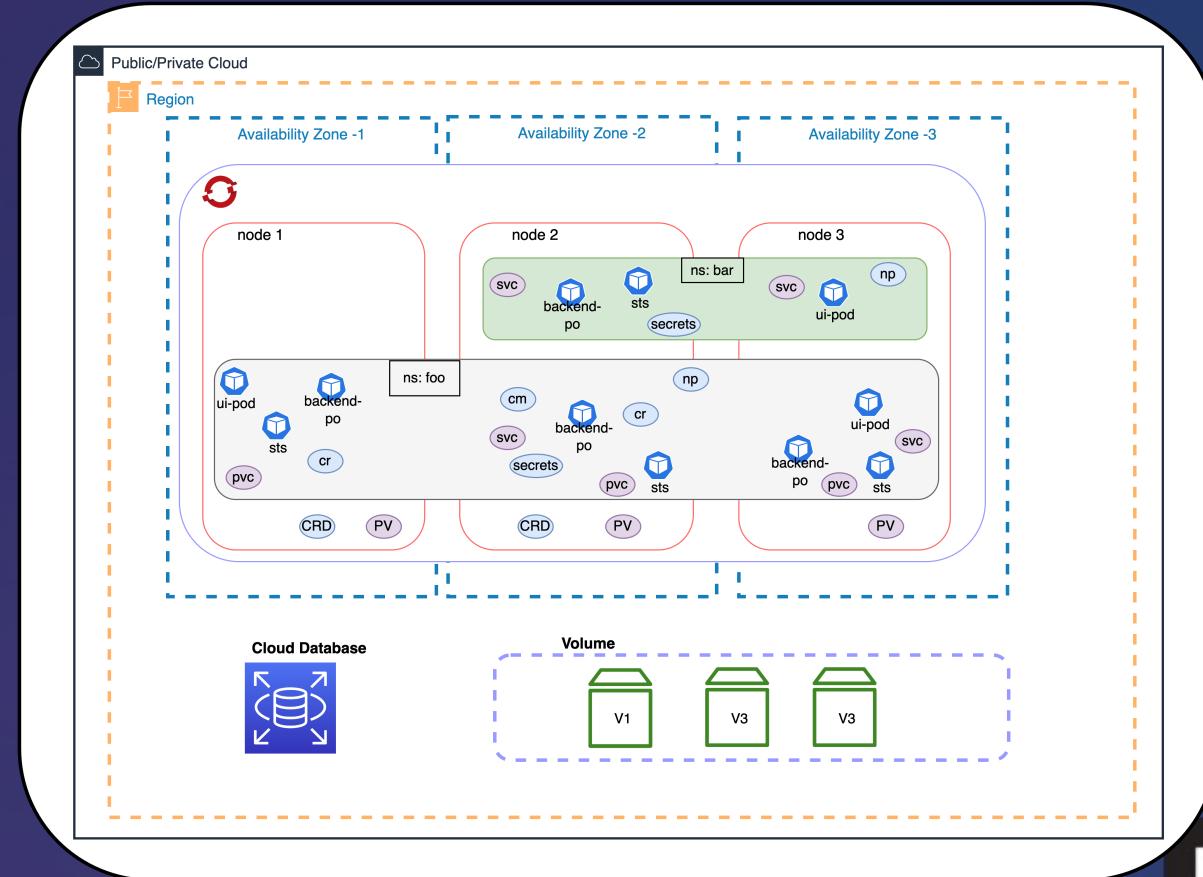
**3. warm standby**  
(\$\$\$\$)

**4 multi site active active**  
\$\$\$\$)

Cost and technical complexities reduces

# Typical SaaS characteristics

- Multi-tenant architecture
- Multi Zone deployment
- Rely on cloud services for data backup and recovery



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# What we learned

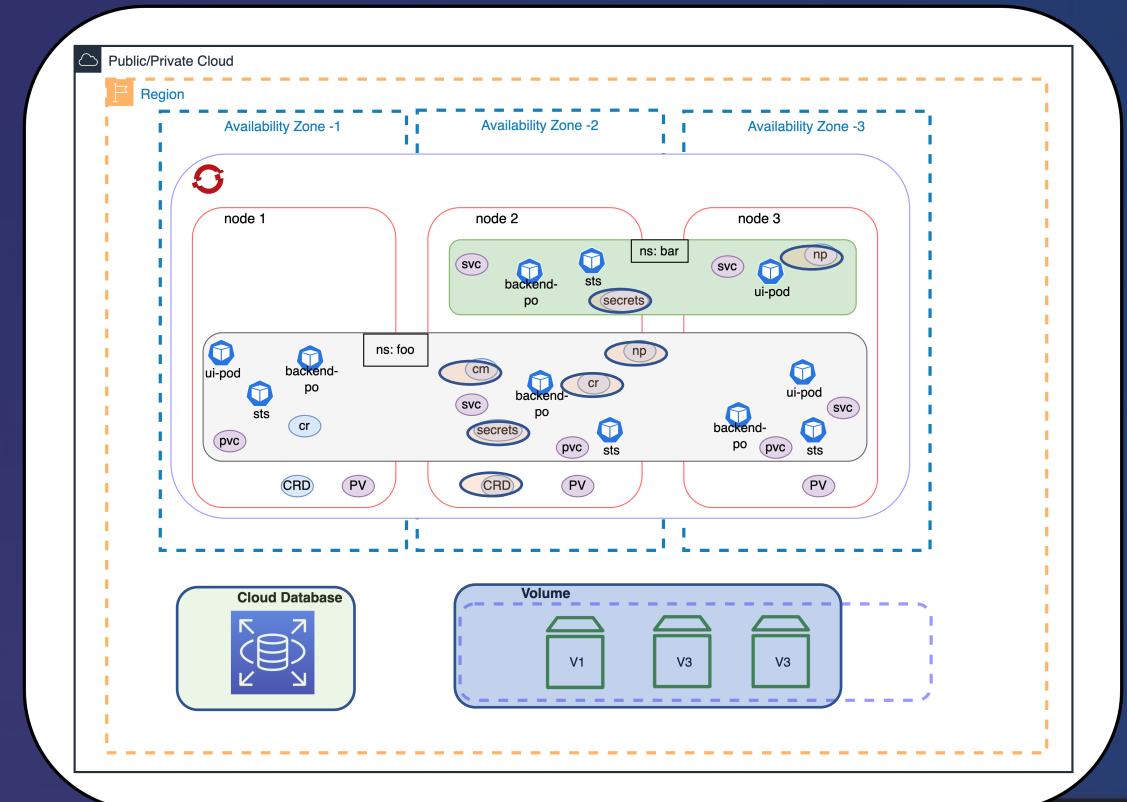
Highly available architecture with robust backup & restore for business continue

- HA architecture ensures 99.999% per year availability
- Backup & restore strategy ensure we have < 12 hrs of RPO and <12 hrs of RTO (for regional failures)
- Within same region it's < 10 min of RPO and < 6 hrs RTO

# What we learned

What to protect

- Runtime Config
- Volume
- Cloud resources (databases)



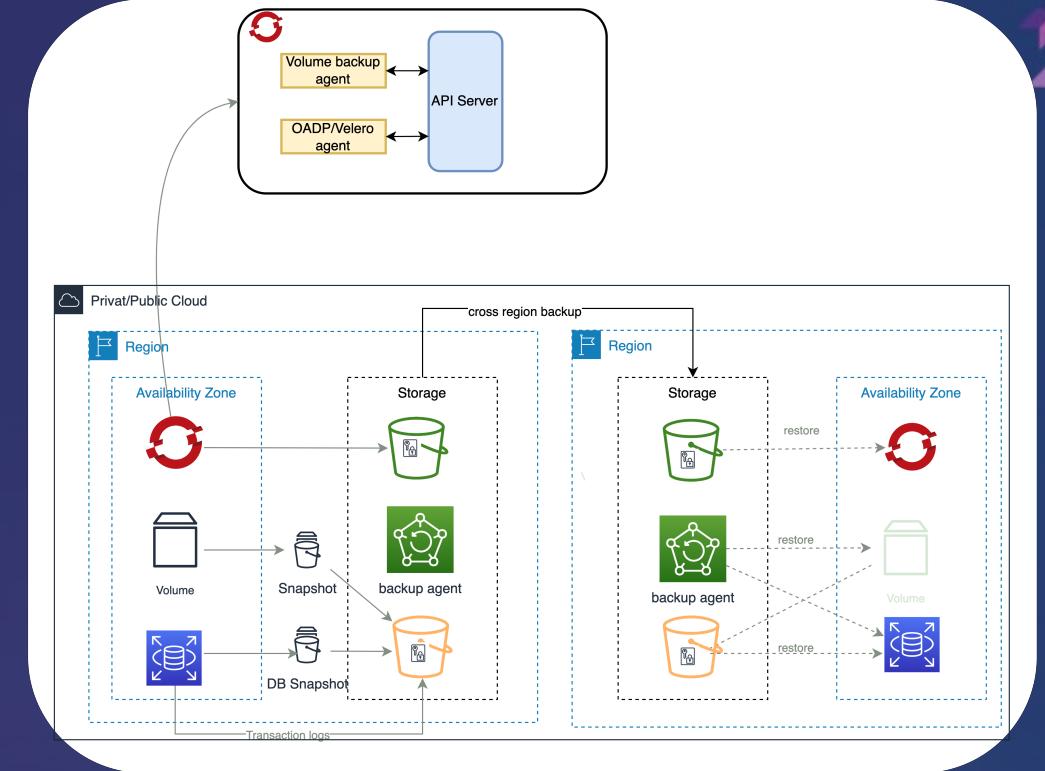
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# What we learned

How to protect

- Backup agents
  - Valero Operator to backup up configs
  - Volume backup agent
    - tag volumes
- Backup of volumes & Cloud services



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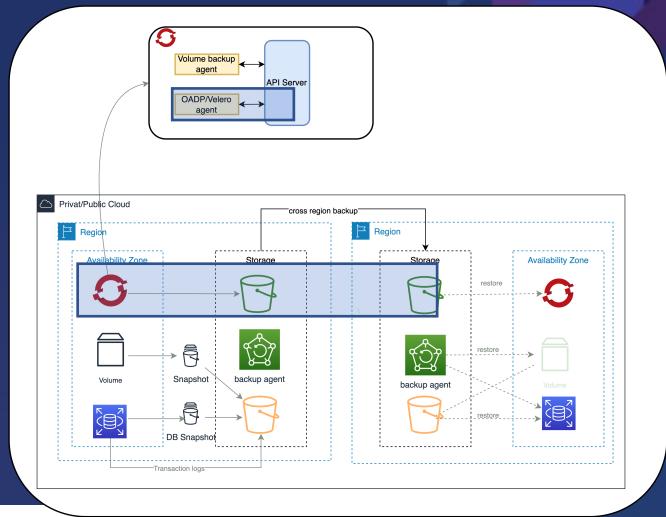
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# Patterns we established based on our learning

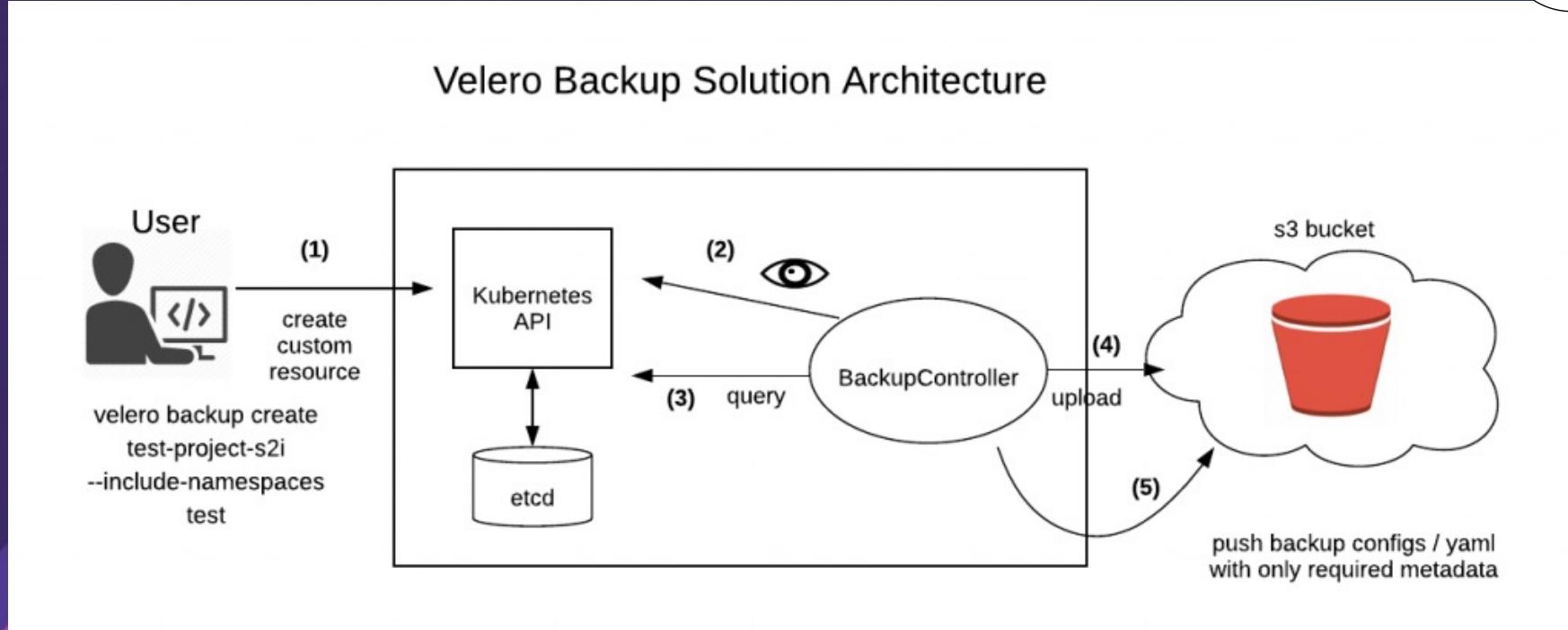
- Backup Runtime Kubernetes Objects
- Configure Cloud Data store backups
- Enable Volume replication
- Handle non-cloud data store
- gitOps to redeploy static and runtime objects

# Patterns

## Backup Runtime Kubernetes Objects



Velero Backup Solution Architecture

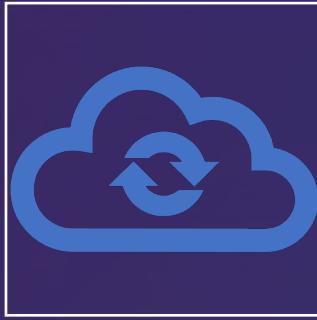


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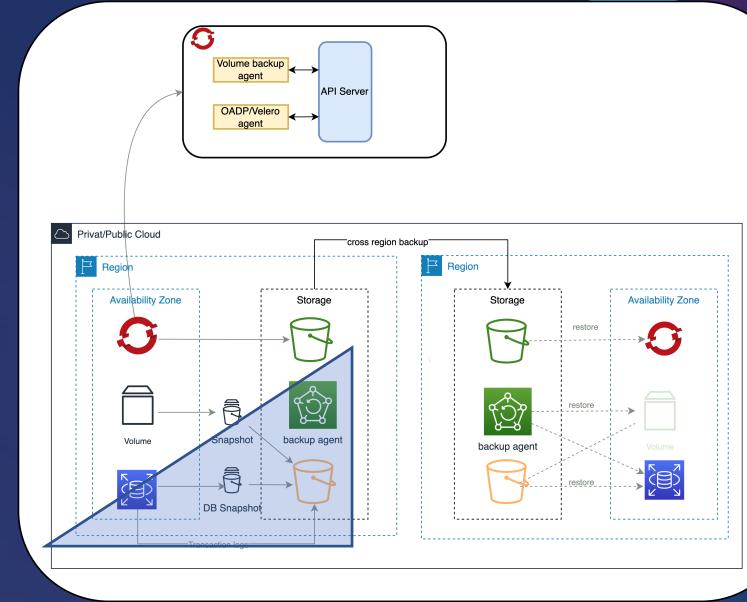
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# Patterns

## Backup Cloud resources



Use native data stores as much as possible, if in cloud make sure to use cloud native datastores  
RDS, ICD etc



Tag Cloud Data Resources instances and use them to identify resources to backup using Cloud Provider Backup or any provider specific backup techniques

This backup technique identifies all the resources to backup using tags, calls snapshot and other required api's to do backup

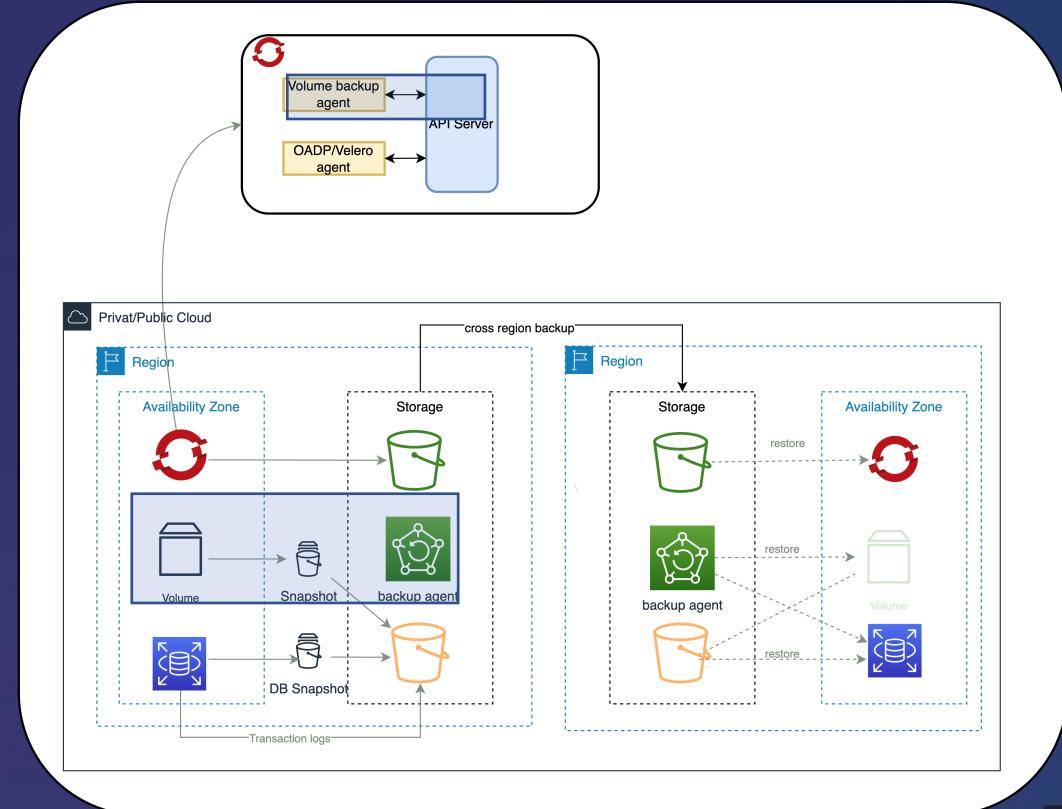
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# Patterns

## Backup Volumes (Replication)

- Runs as pods
- Watches pvc and tags related volumes
- Backup of volumes managed by Cloud Provider's api's



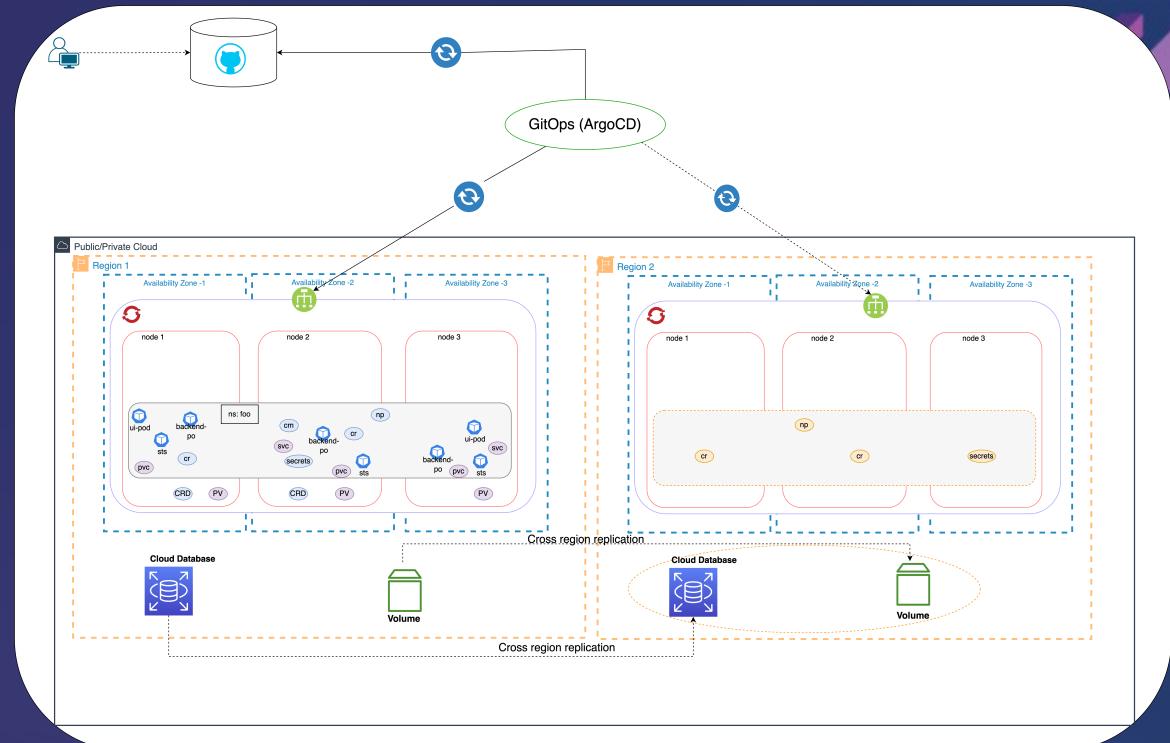
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# Patterns

## Gitops

- Used for application deployment
- Manage drifts between git repo and registered clusters
- Restore data and artifacts
- Argo CD is used to deploy rest of the application during recovery flow



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# THANK YOU

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# References



[\*\*Kubernetes volume backup for disaster recovery\*\*](#)

[\*\*Backup and Restore of Kubernetes Stateful Application Data with CSI Volume Snapshots\*\*](#)

[\*\*Speed and resiliency: two sides of the same coin\*\*](#)

[\*\*AWS backup strategies\*\*](#)

[\*\*Valero.io\*\*](#)

[\*\*Disaster Recovery with GitOps\*\*](#)

**Useful if leveraging Kubernetes as Container orchestrator:**

[\*\*Kubernetes & 12-factor apps\*\*](#)

[\*\*7 missing factors from 12 factor application\*\*](#)

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