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How We Built a Cloud On K3s: The Learnings Of Growing Up Fast

Anaïs Urlichs

Alex Jones

Who are we?




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Alex Jones
Principal Engineer, Civo
CNCF TAG App Delivery Lead
@AlexJonesax 



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Site Reliability Engineer, Civo
CNCF Ambassador
 @urlichsanaïs

Who are we?



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- ★ Managed Kubernetes provider
- ★ Community focused
- ★ K3s in production at scale

The Civo logo, which consists of the word "CIVO" in a bold, blue, sans-serif font. The letter 'V' is stylized with a small gap in the middle.

Why build a cloud?



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- ★ Large market segment with a desire for simplicity & affordability
- ★ No managed K3s service that provides fast launch times
- ★ There is a need for a cloud native first provider





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Why K3s?

What is K3s?



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K3S

A lightweight Kubernetes distribution

512mb of RAM to run a server

Single binary

<40MB in size

Bundled with technologies

Why K3s?

- ★ Reduced installation complexity
- ★ Higher cluster density per compute node
- ★ Simplified backup/recovery system
- ★ Faster launches
- ★ Less preallocated resources required
- ★ Reduction in operational knowledge to support



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Supercluster overview



Supercluster design: compute



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Regional Hyper Converged Infrastructure



2xIntel Gold Xeon 20 core CPU
384GB 2666Mhz DRAM
100 Gb Networking



OPEN
Compute Project®



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Tenant cluster overview

Tenant cluster design: clustering

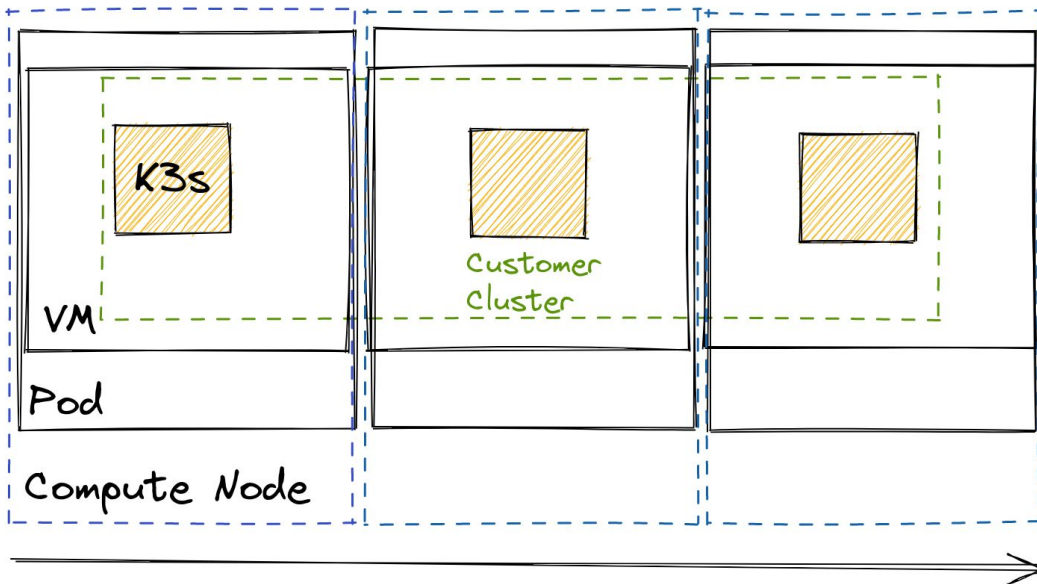


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Tenant cluster design: virtualisation

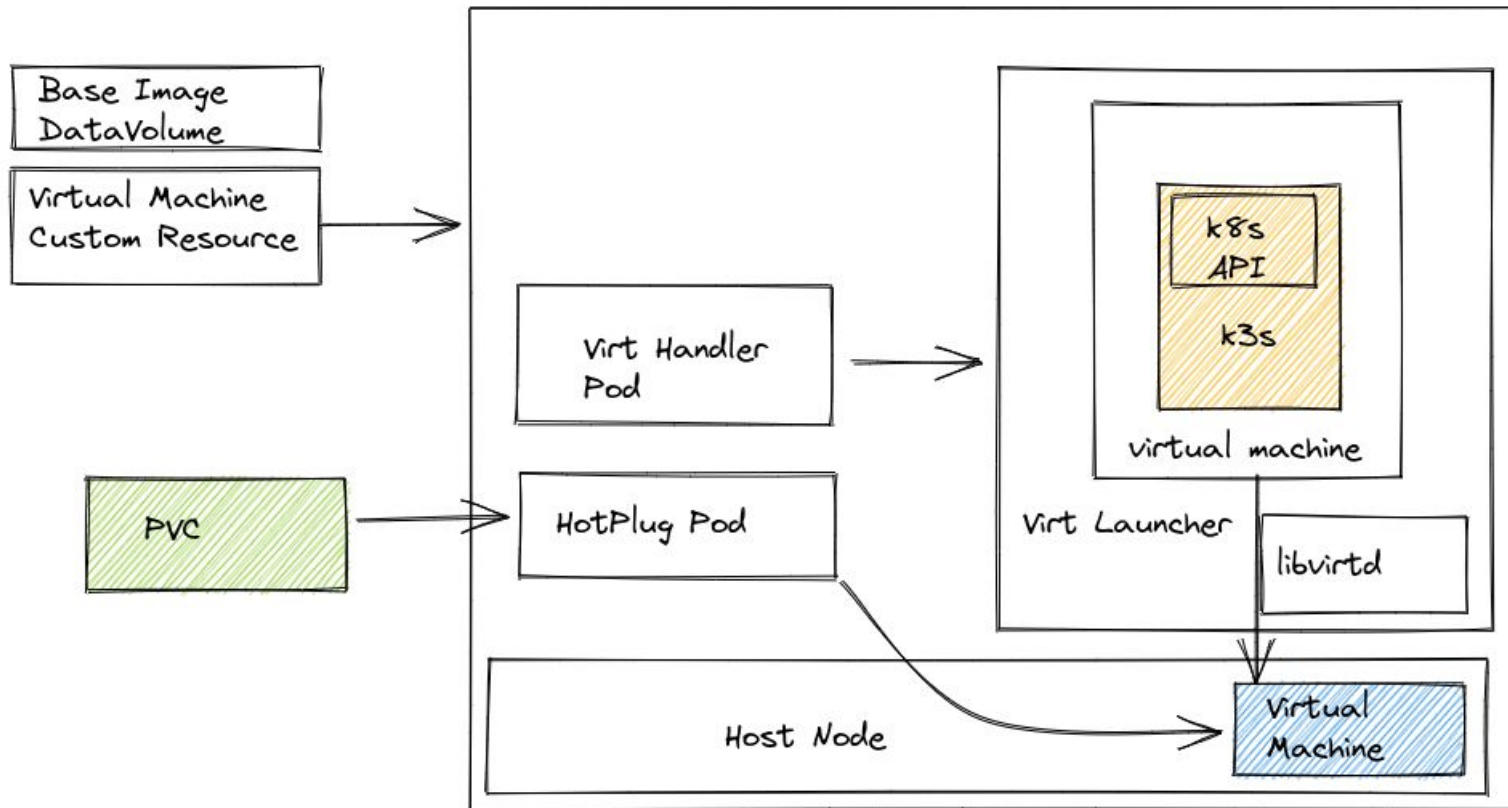


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Tenant cluster design: virtualisation



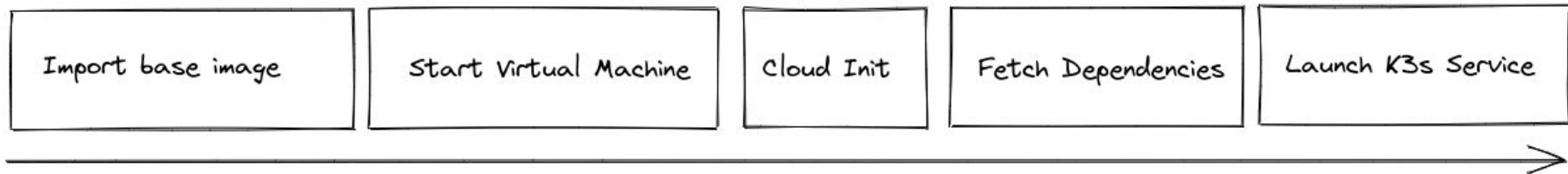
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Sub 90 second launch times



Tenant cluster design: networking



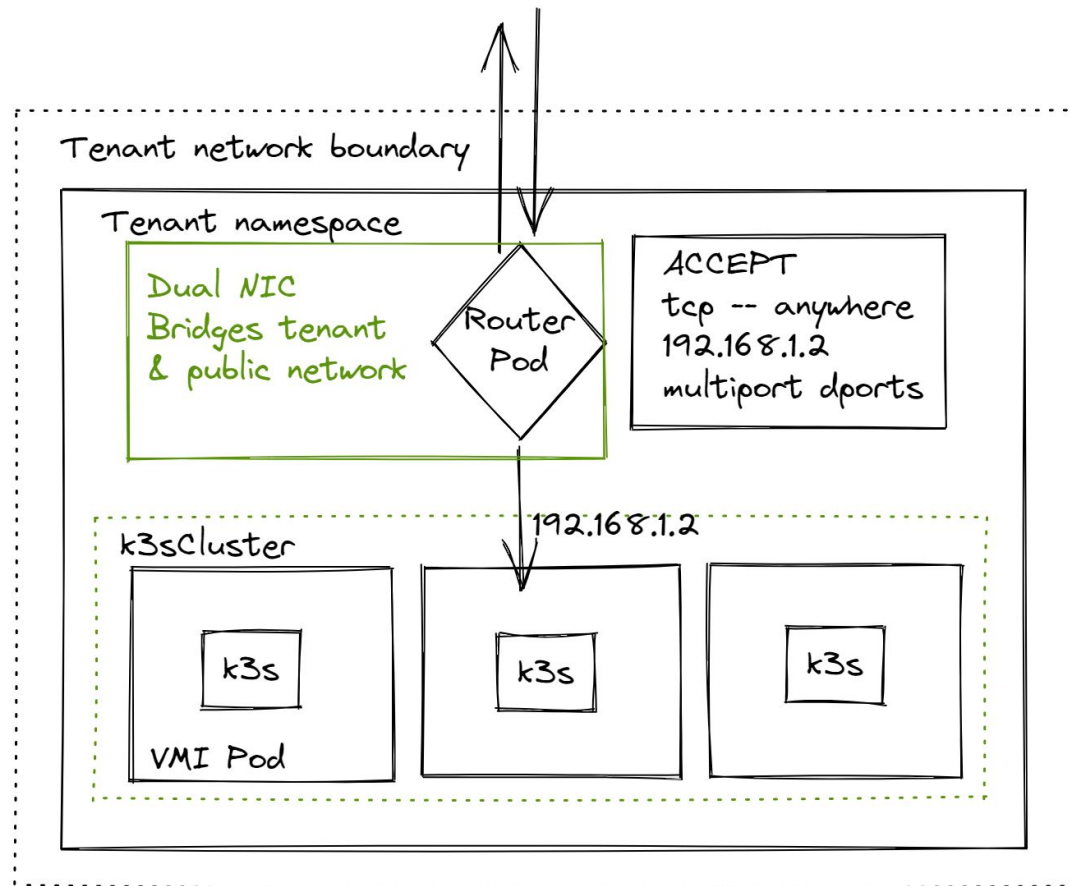
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Dedicated tenant L2 network



Tenant cluster design: compute density



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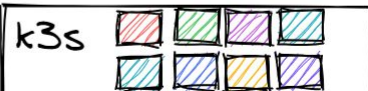
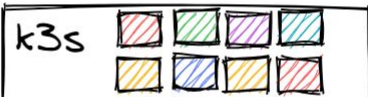


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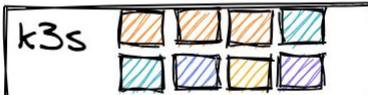
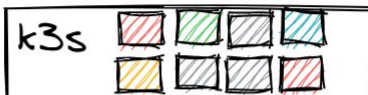
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Regional Supercluster

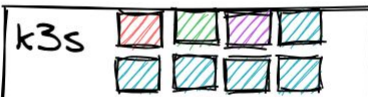
Tenant namespace



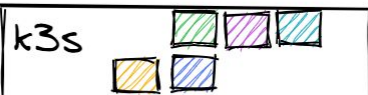
Tenant namespace



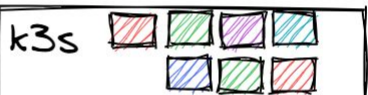
Tenant namespace



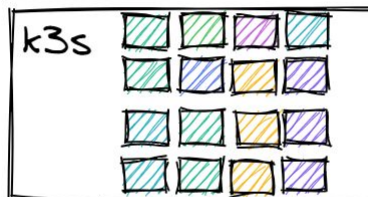
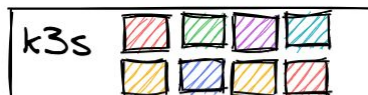
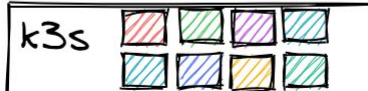
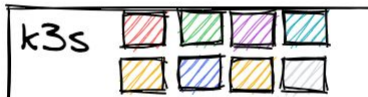
Tenant namespace



Tenant namespace



Tenant namespace



Control Plane

Tenant cluster design: compute density



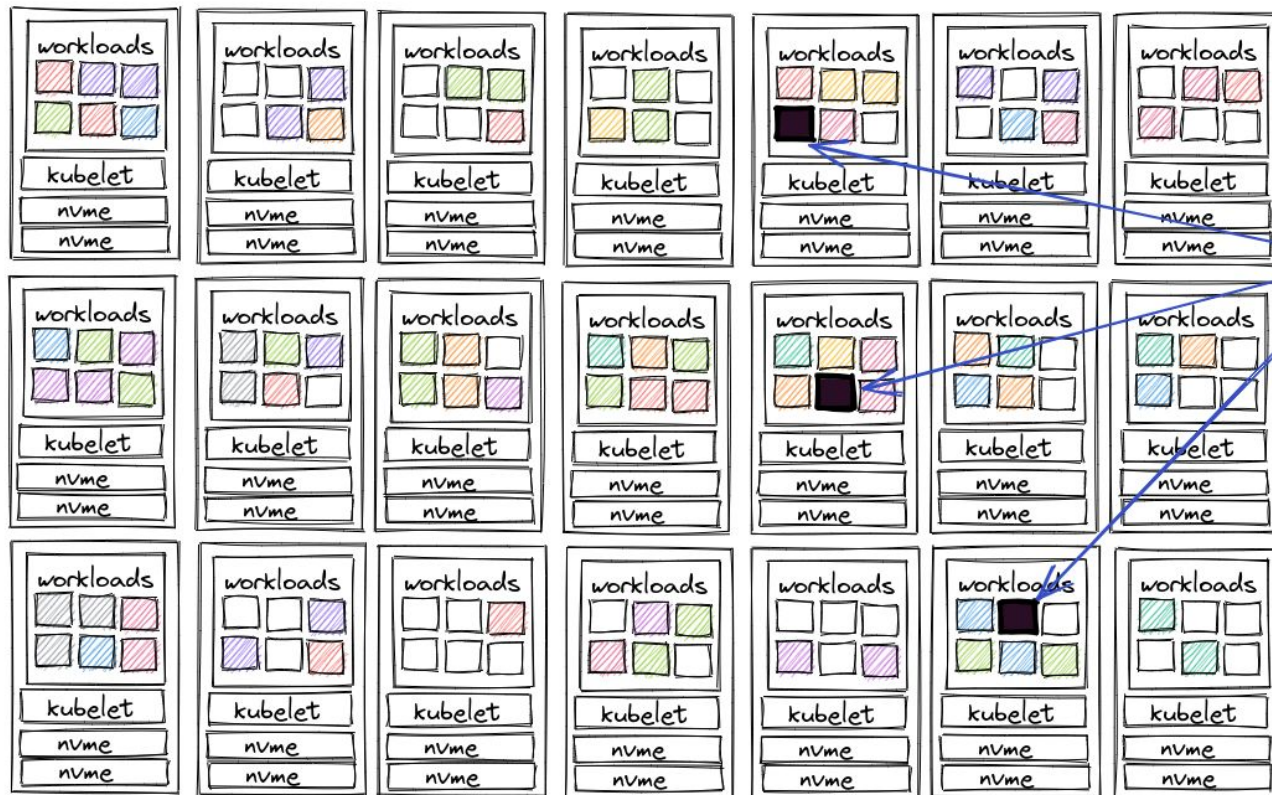
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Lessons learnt in Beta



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1. Deployment maturity

Problem: Deployment sequence, size and execution

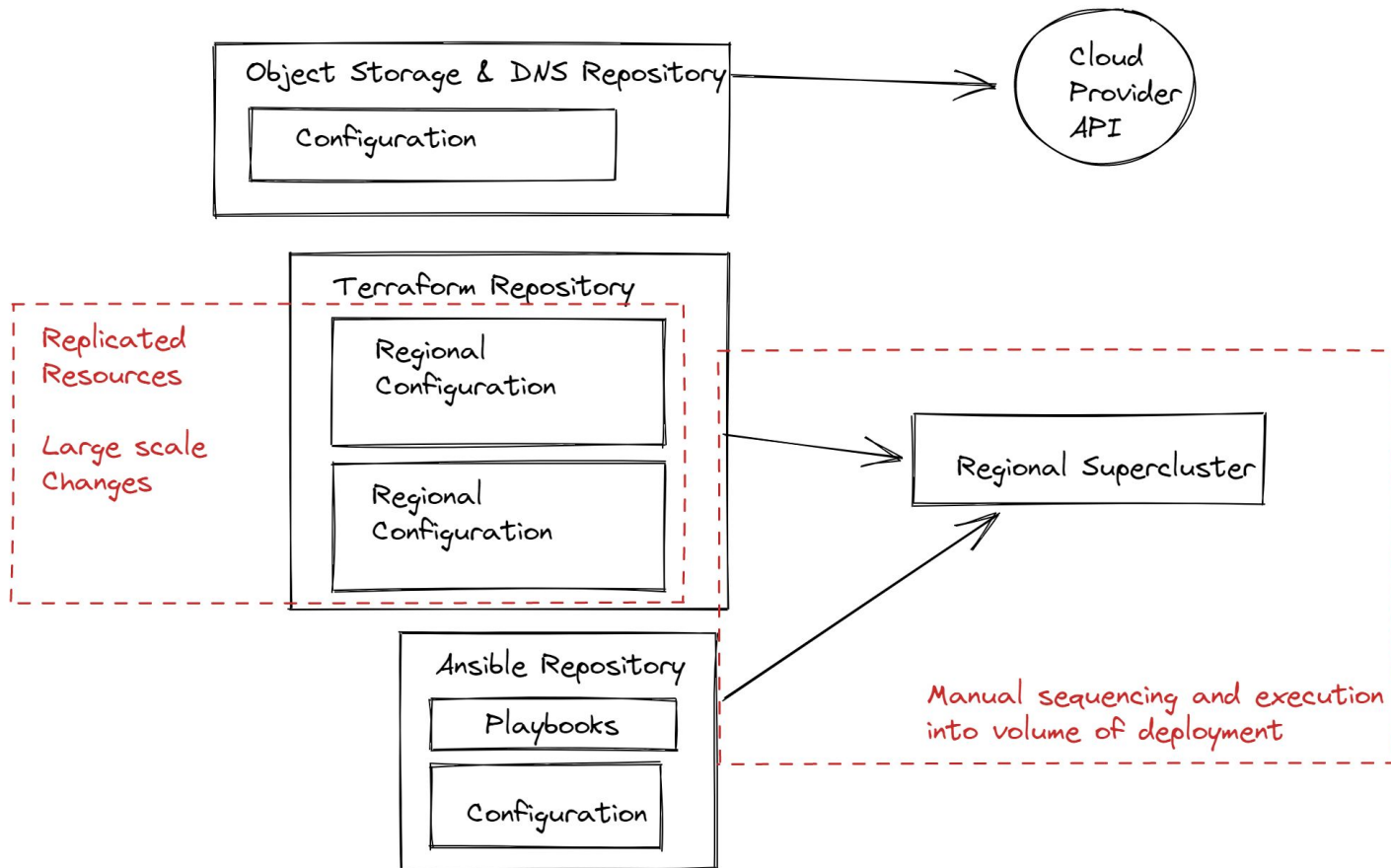


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Solution: Pipelined DRY infrastructure

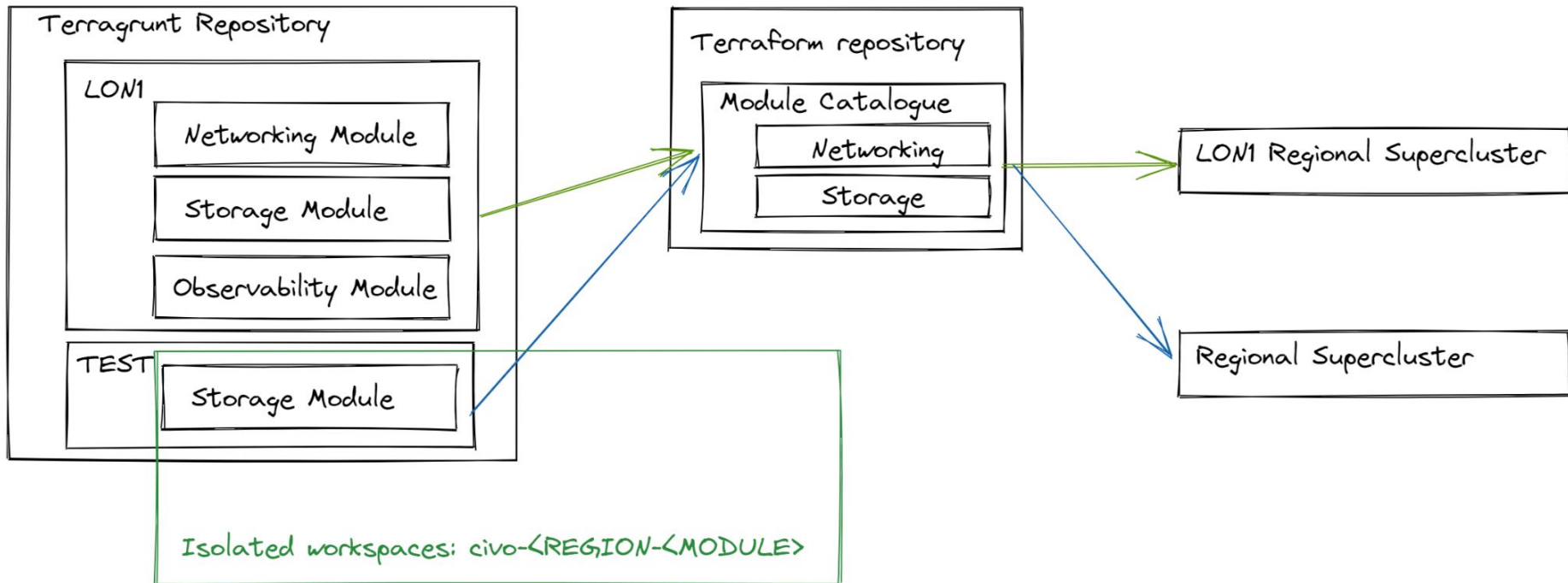


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2. Observability maturity

Problem: Black box inside tenant clusters

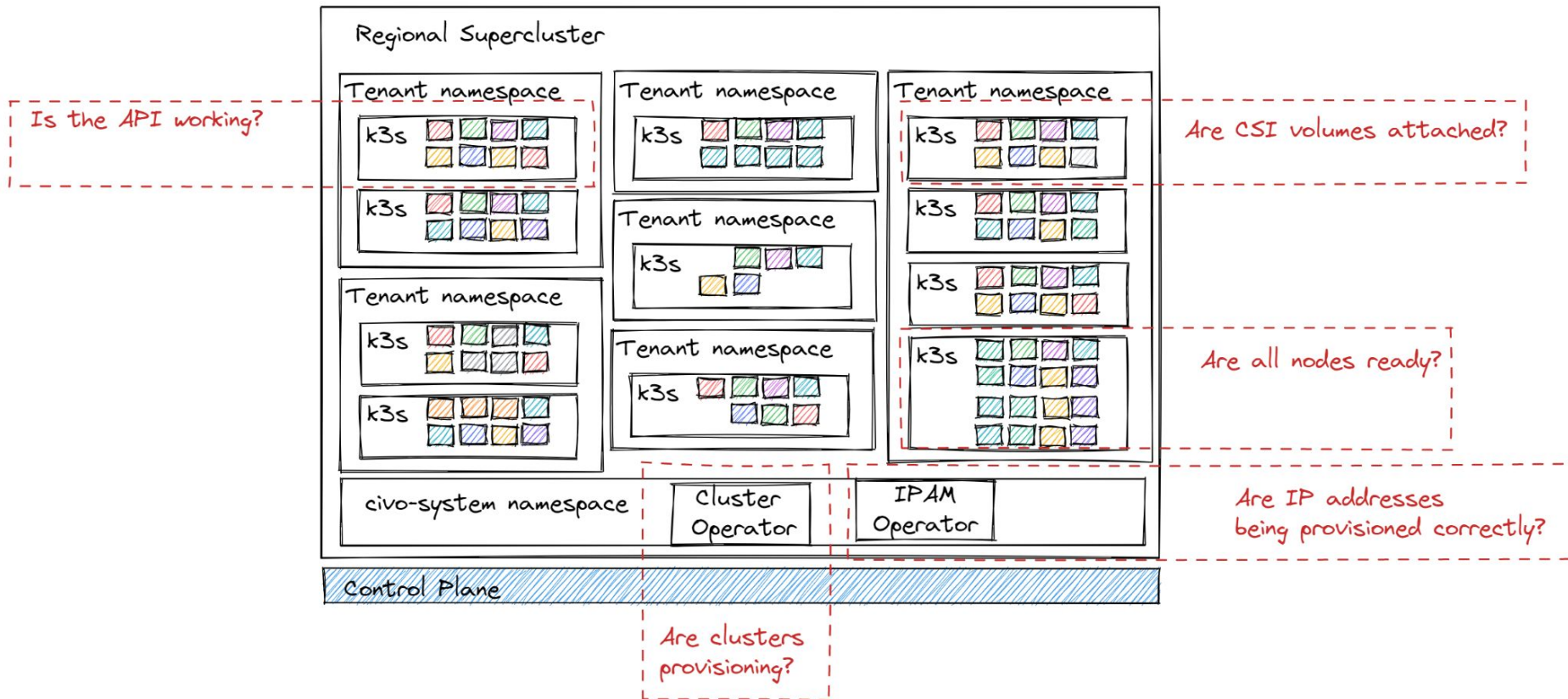


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Solution (p1): tenant cluster observability

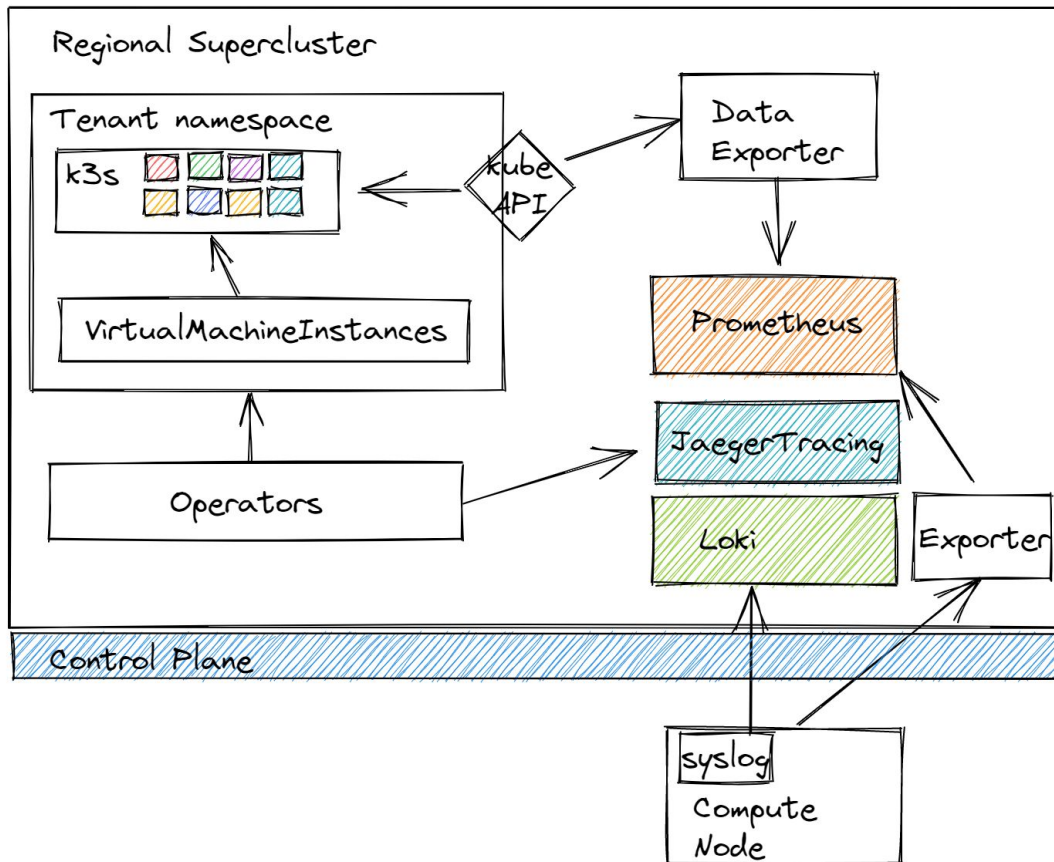


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Solution (p2): supercluster observability



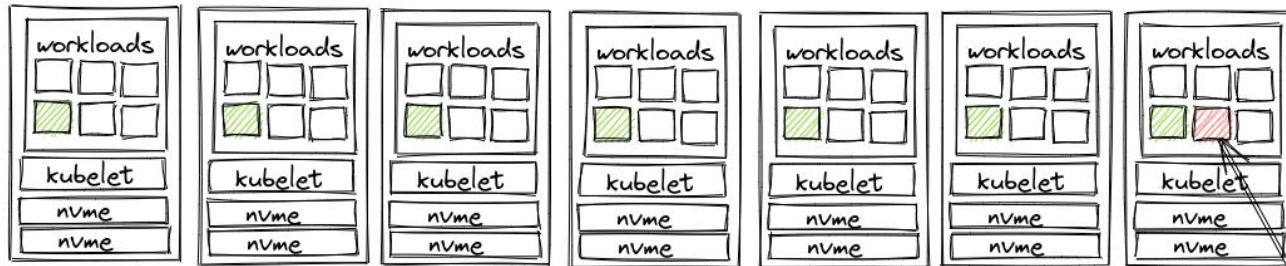
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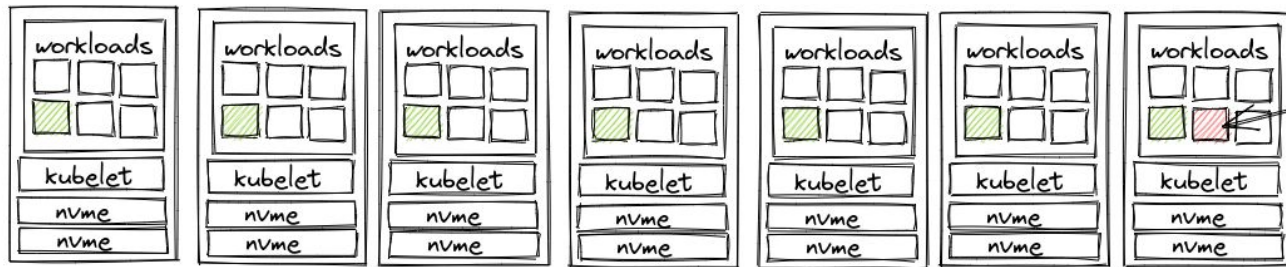
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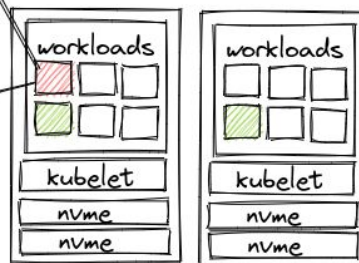


Aggregation of metrics
Reduce time debugging
Centralisation of Logs/Tracing

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Inter regional cluster





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3. SRE Culture

Problem: Intuitive autonomy

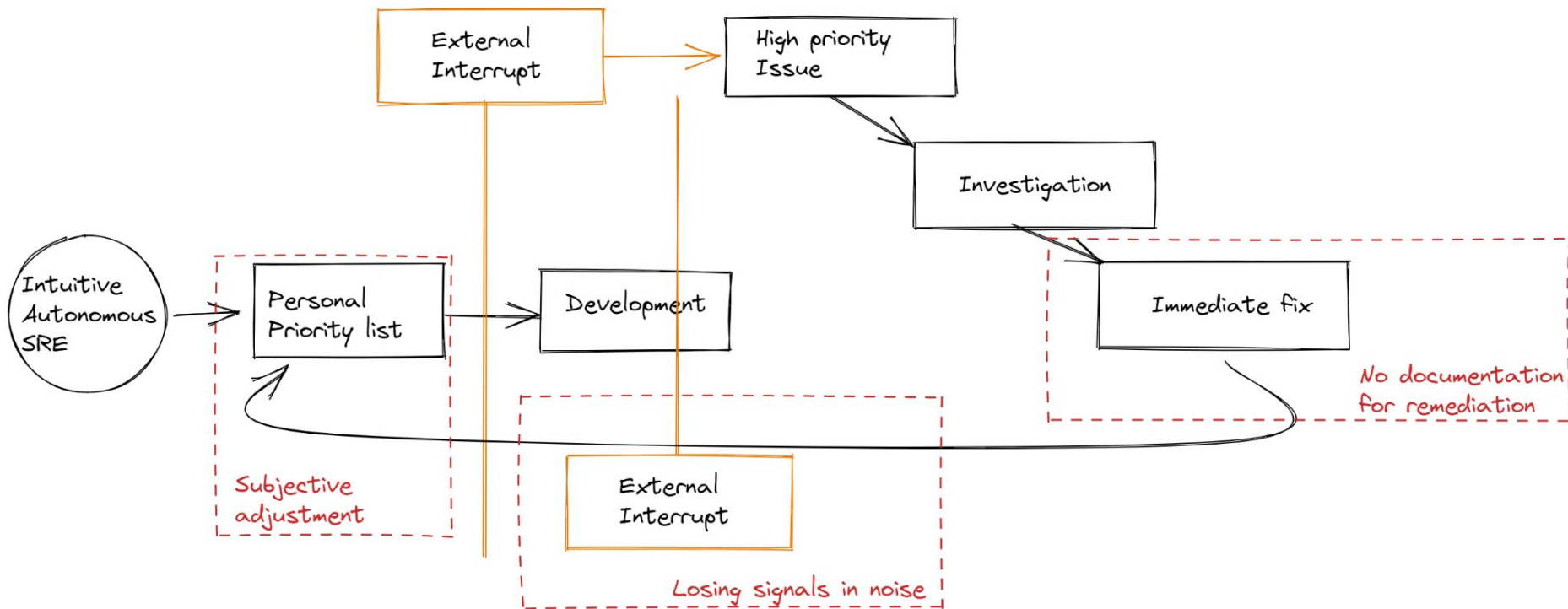


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Solution: Intuitive alignment

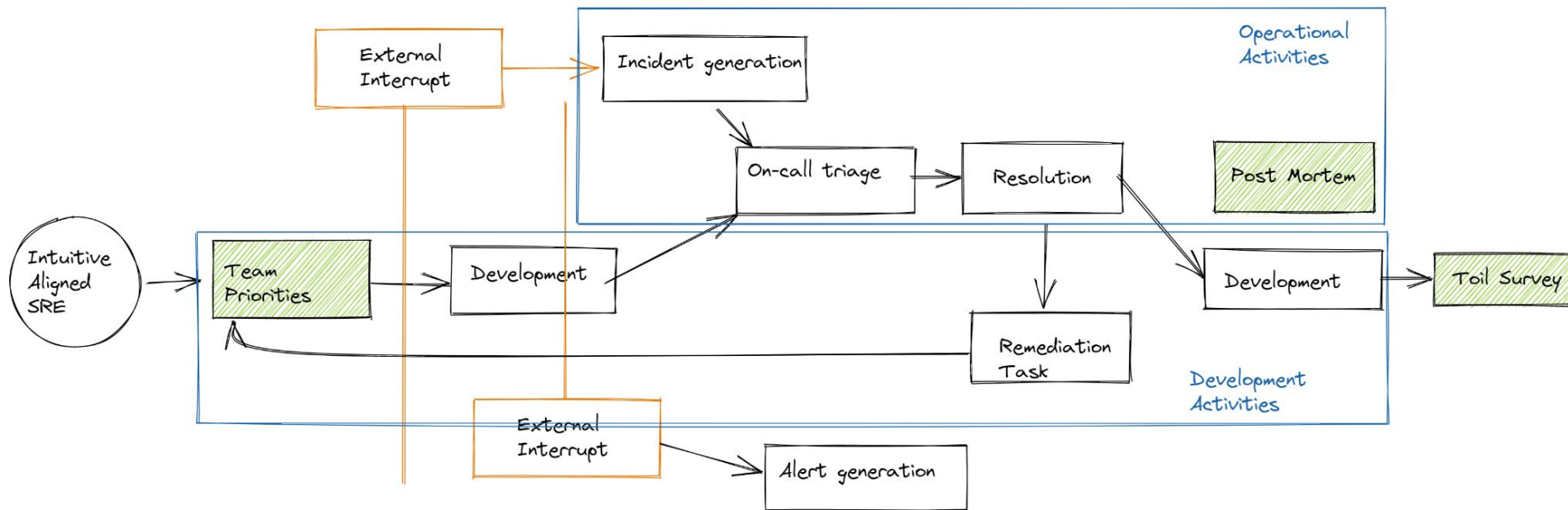


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In summary



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Thank you!

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