Security, Stability and Resiliency .CR

NIC Costa Rica

n!cr

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Where to get...

- Highly secure system
- Fault tolerant
- Fully distributed
- Economically feasible

Existing Infrastructure:
How can we use it better?

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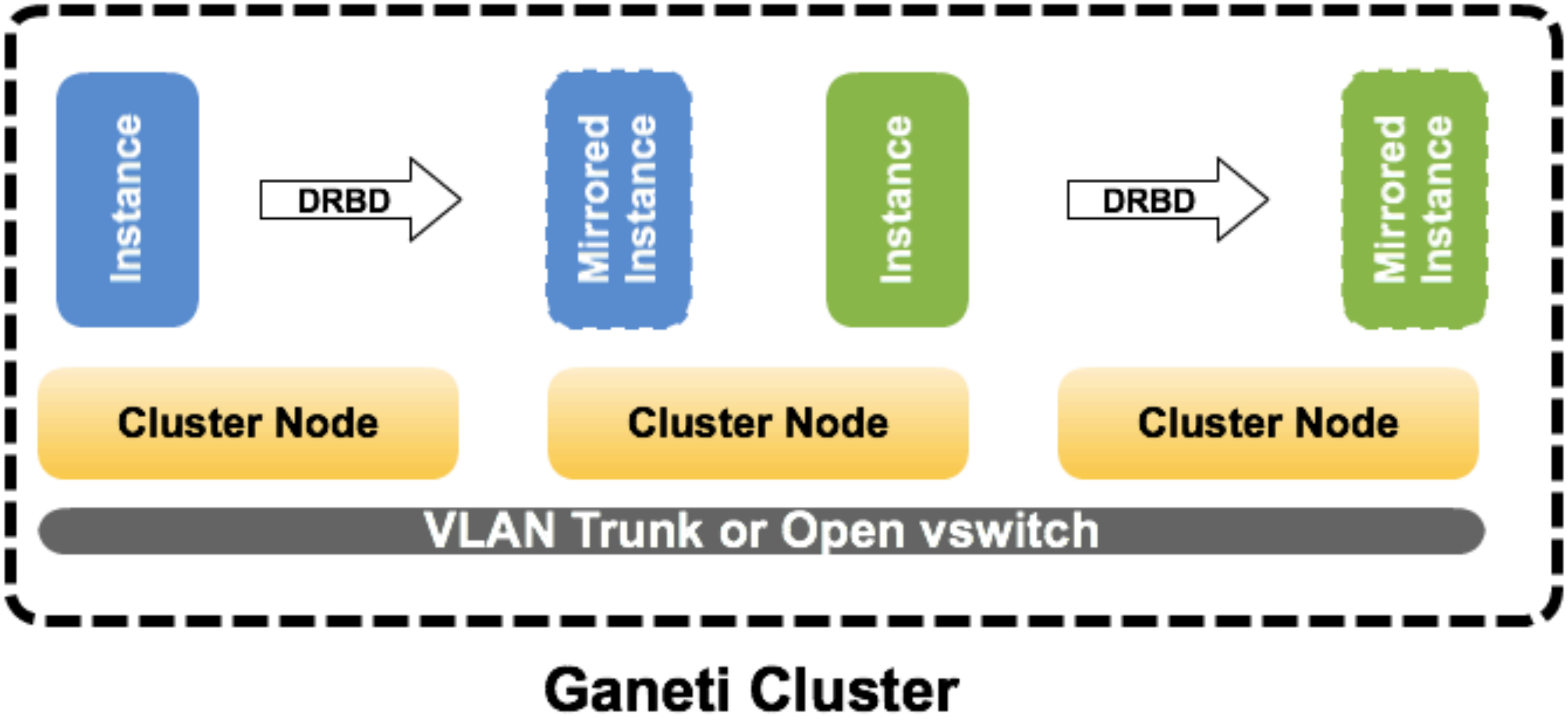
Existing infrastructure: Areas of improvement

- Better leverage of existing devices
- Move to a virtualized environment
- Adjust the existing services to benefit from the new platform
- Scalable enough to adapt to new projects: e.g. full site replication

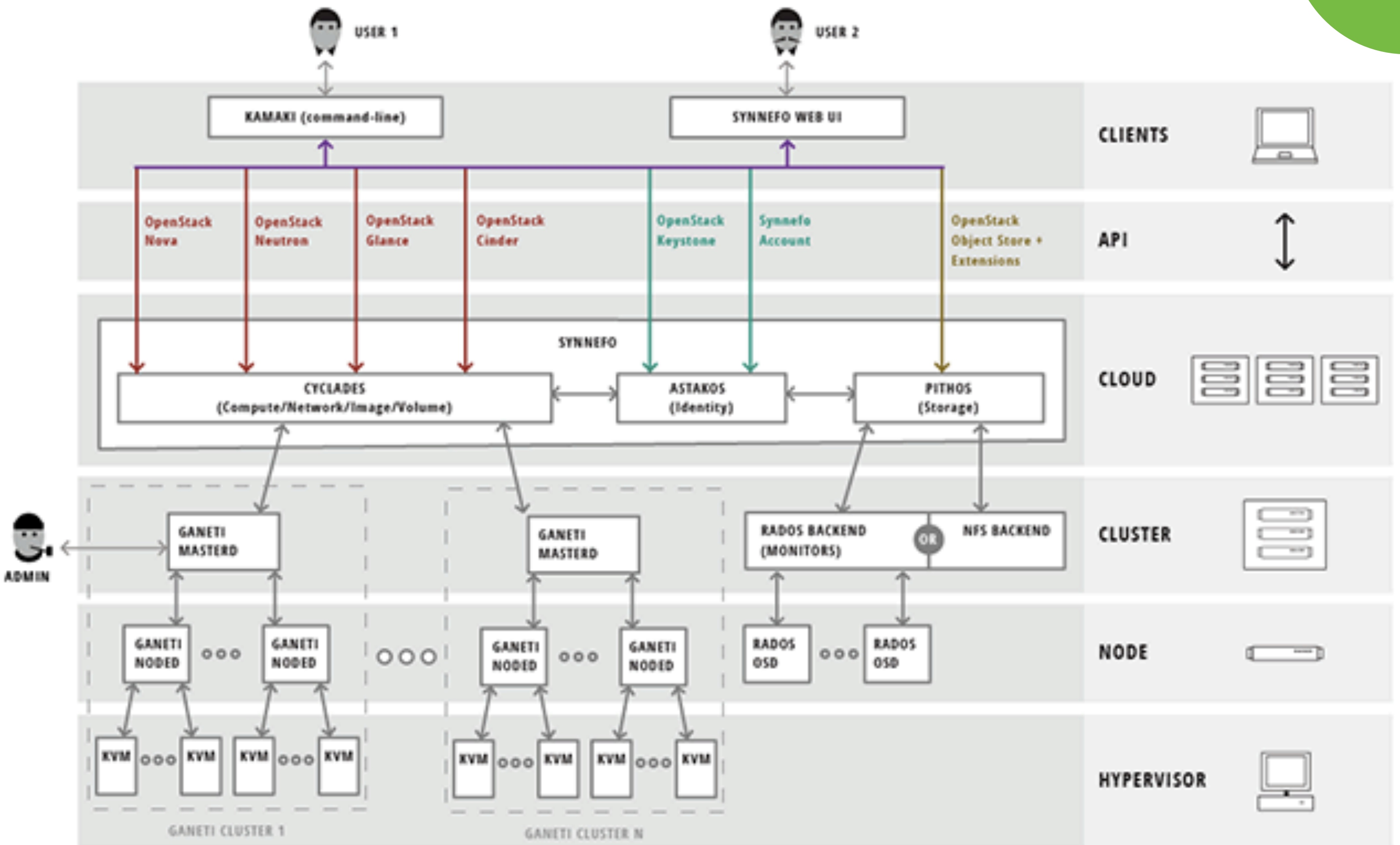
Virtualization Platform: GANETI

- Cluster virtualization management system
- Based on Xen or KVM
- Designed by Google for Google (Open Source since 2007)
- Ability to provide an HA environment via DRBD disk replication
- Can start with a single node and scale up easily
- Live instance operations

GANETI Platform: Basic Deployment

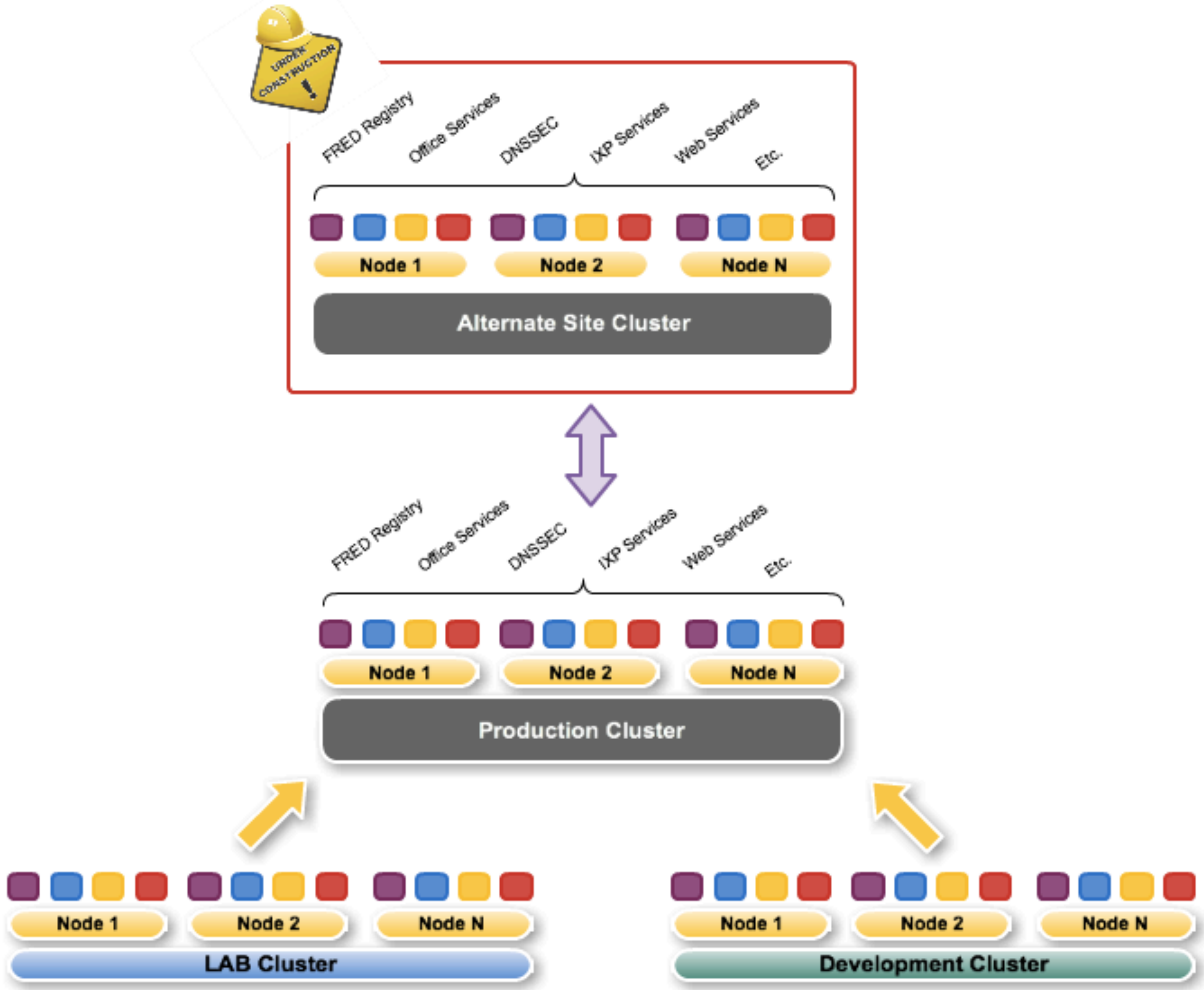


GANETI Platform: Complex Deployment



Source: https://www.synnefo.org/about/

GANETI Platform: Our Deployment



!cr Ganeti Distribution

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Transition of Existing Services

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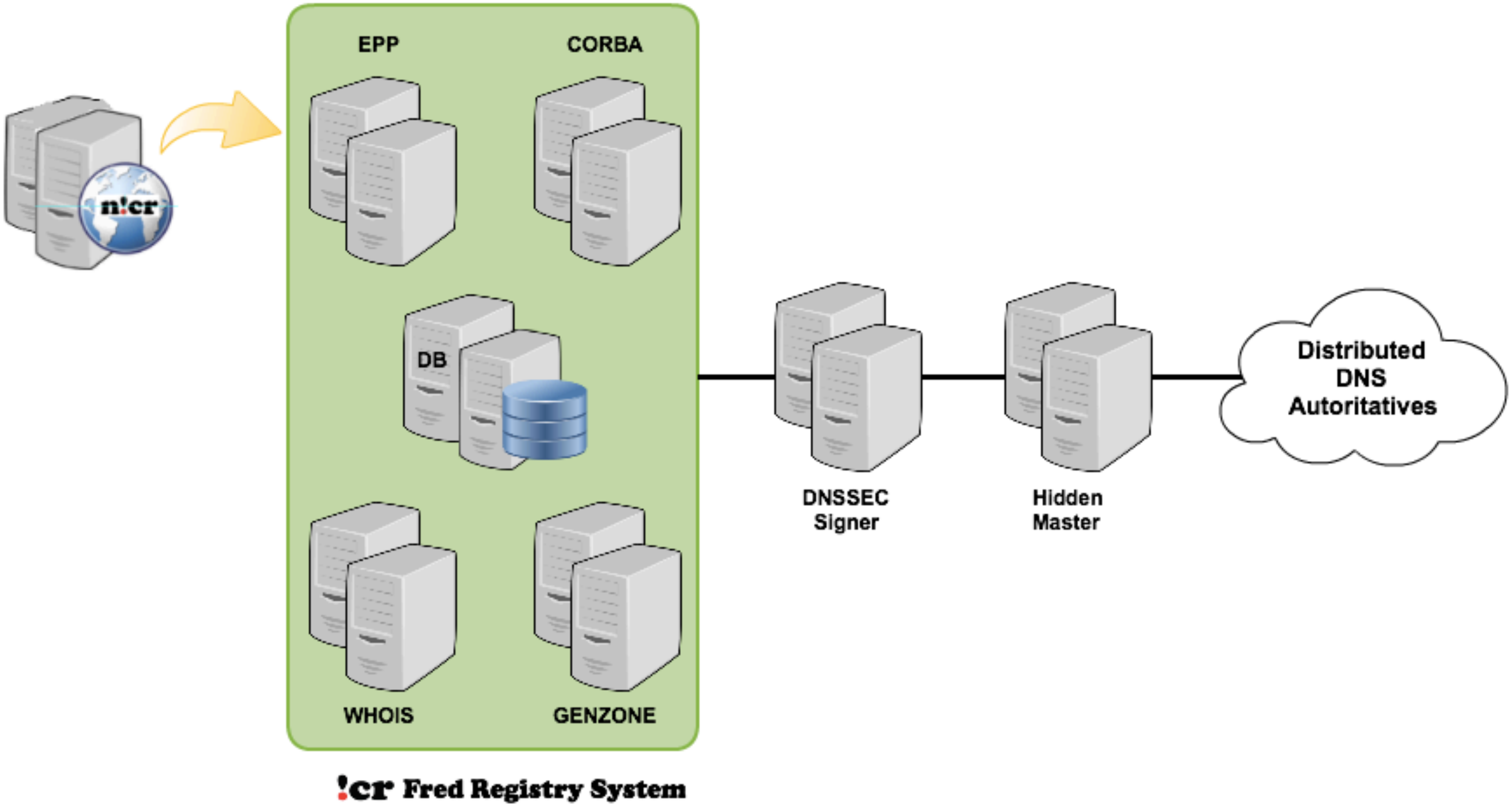
Existing Services: FRED Registry System

- Previously deployed as a centralized set of components

- Distribution of the different components
  - Different security policies can be applied
  - Increase availability in case of failure
  - Different HA approaches for some components
  - Load Sharing

- Migration with no disruption or downtime

Existing Services: FRED Registry System



Existing Services: DNSSEC

- Transition to a different DNSSEC signing process

- Requirements:
  - Secure
  - Efficient
  - HA system to benefit from new technology
  - Possibility to be used by our customers
  - Well documented
  - Possibility to create backups
  - Auditable

DNSSEC: Smart Cards + SW Signing

- Migration Process started with ICANN & NSRC DNSSEC Workshop in CR, April 2014

- Fully deployed in October 2014

- Smart Cards being used for KSKs & ZSKs generation
  - Key bundles generated include several ZSK rotations

- 2048b Keys

- Modified Richard Lamb's CD for Keys' generation + modified version of script & dnssec-signzone for SW signing

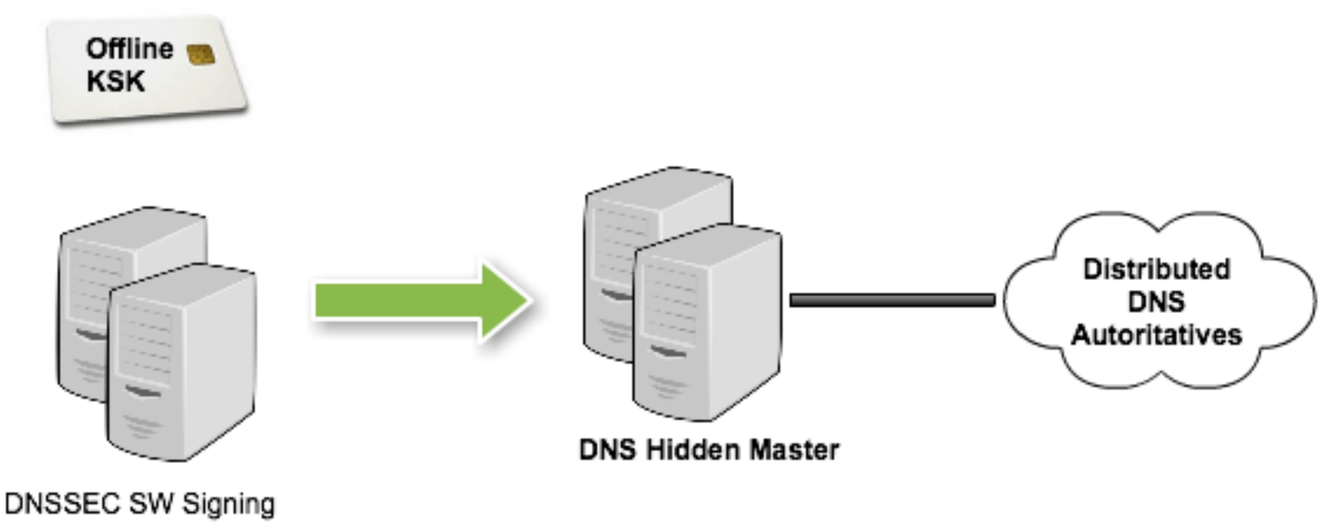
DNSSEC: Smart Cards + SW Signing

- 2 Full Key Ceremonies, one for .CR and another one for the subzones

- Time taken for full signing: 20 seconds

- KSK and its backups never leave the SCs, kept offline in safe

Existing Services: DNSSEC



Distributed .CR DNS System

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.CR DNS Distribution: Name Servers

- You never have enough Anycast ☺

- Added PCH Anycast Cloud to get presence in every continent and major IXPs around the world

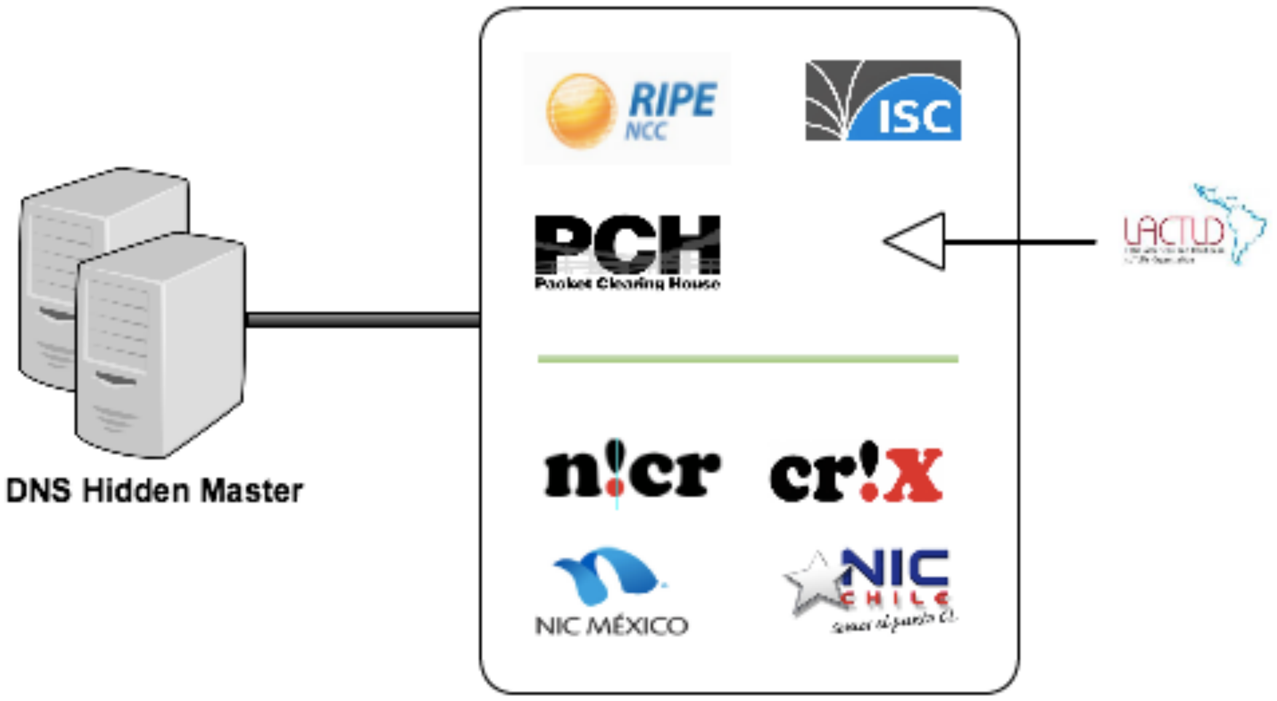
- ISC & RIPE Anycast clouds + Servers in CR, NIC.CL and NIC.MX

- ~ 70 Name Servers

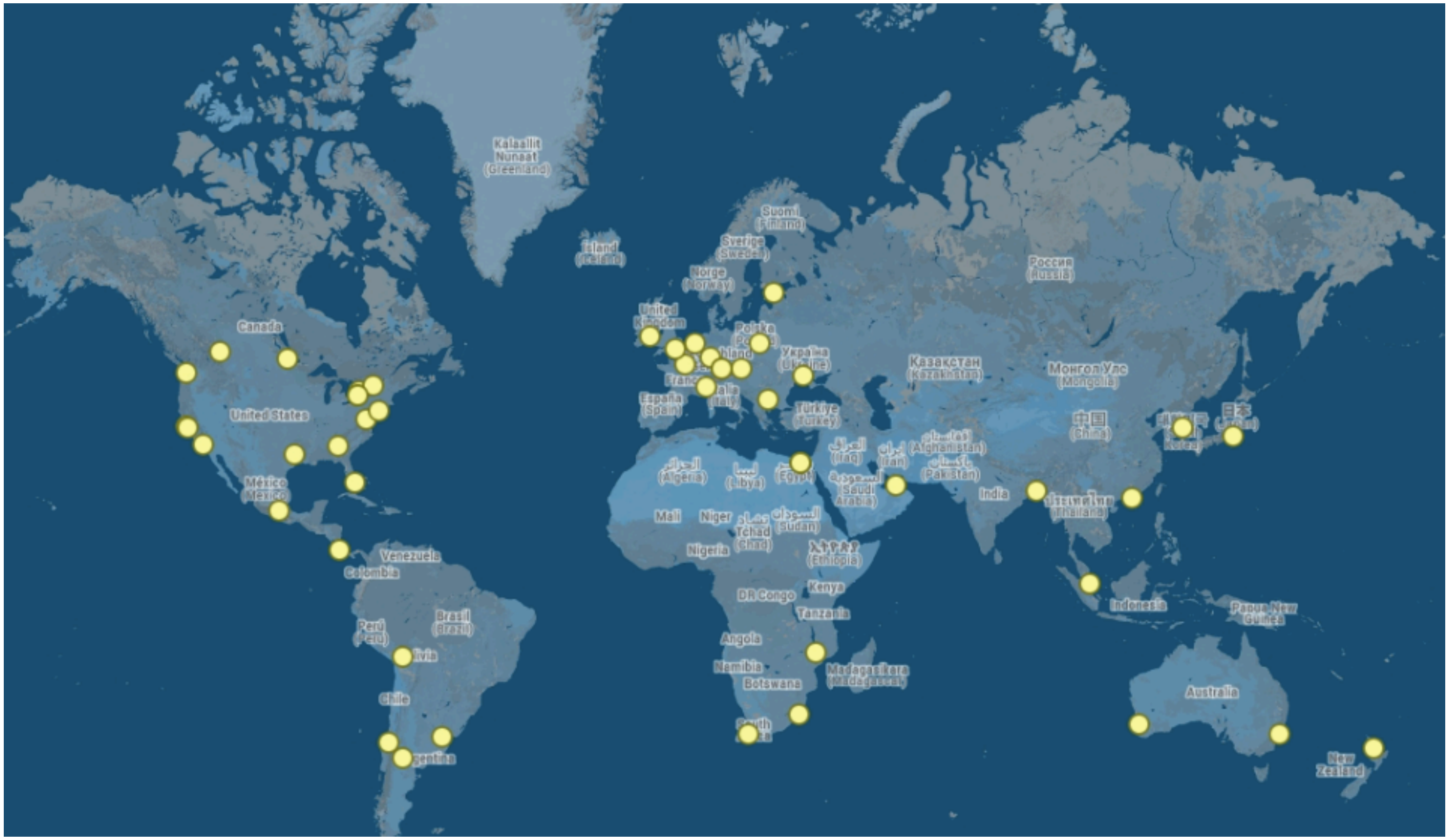
- Working with LACTLD to participate in it's Anycast project as "user & node"

- Direct connection to Costa Rica's National IXP, CRIX

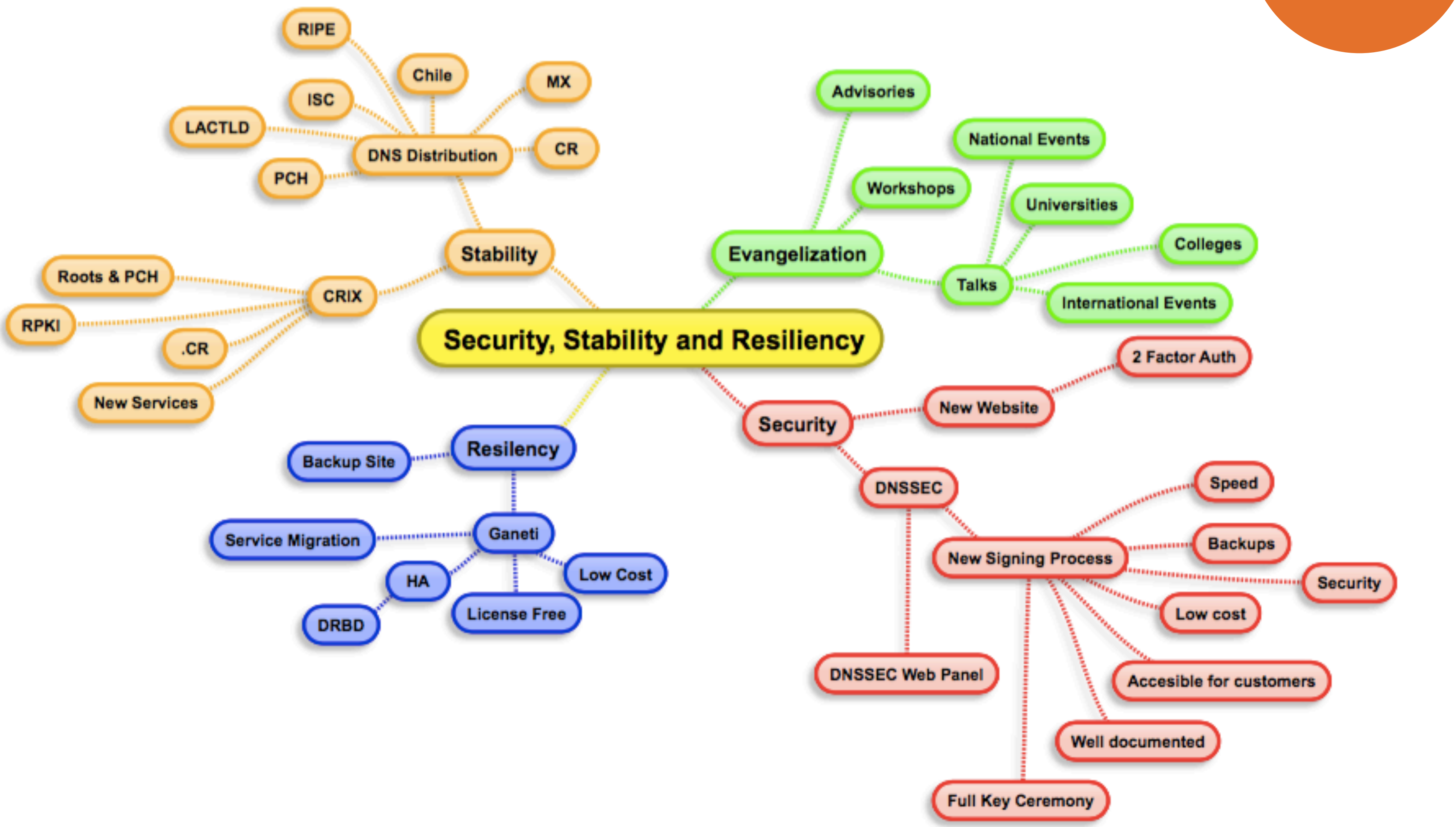
.CR DNS Distribution: Name Servers



.CR DNS Distribution: Name Servers



Conclusions: Putting it all together…



Improvement cycle never stops

Improvement
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$$$$$$$

Prepare it to grow

Ask for ideas!!!

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