



Increasing .CZ DNS reliability

DNS infrastructure upgrade Contribution of ISP

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Strengthening of the team

- <https://www.nic.cz/page/321/kariera-v-cznic/>
 - network & DNS specialist
 - system engineer



Basics for .CZ DNS – anycast

- more servers with one IP address
- BGP routes requests to nearest location
- load balancing, latency reduction
- automated traffic redirection during outages
- optimal placement of DNS servers



Basics for .CZ DNS – anycast

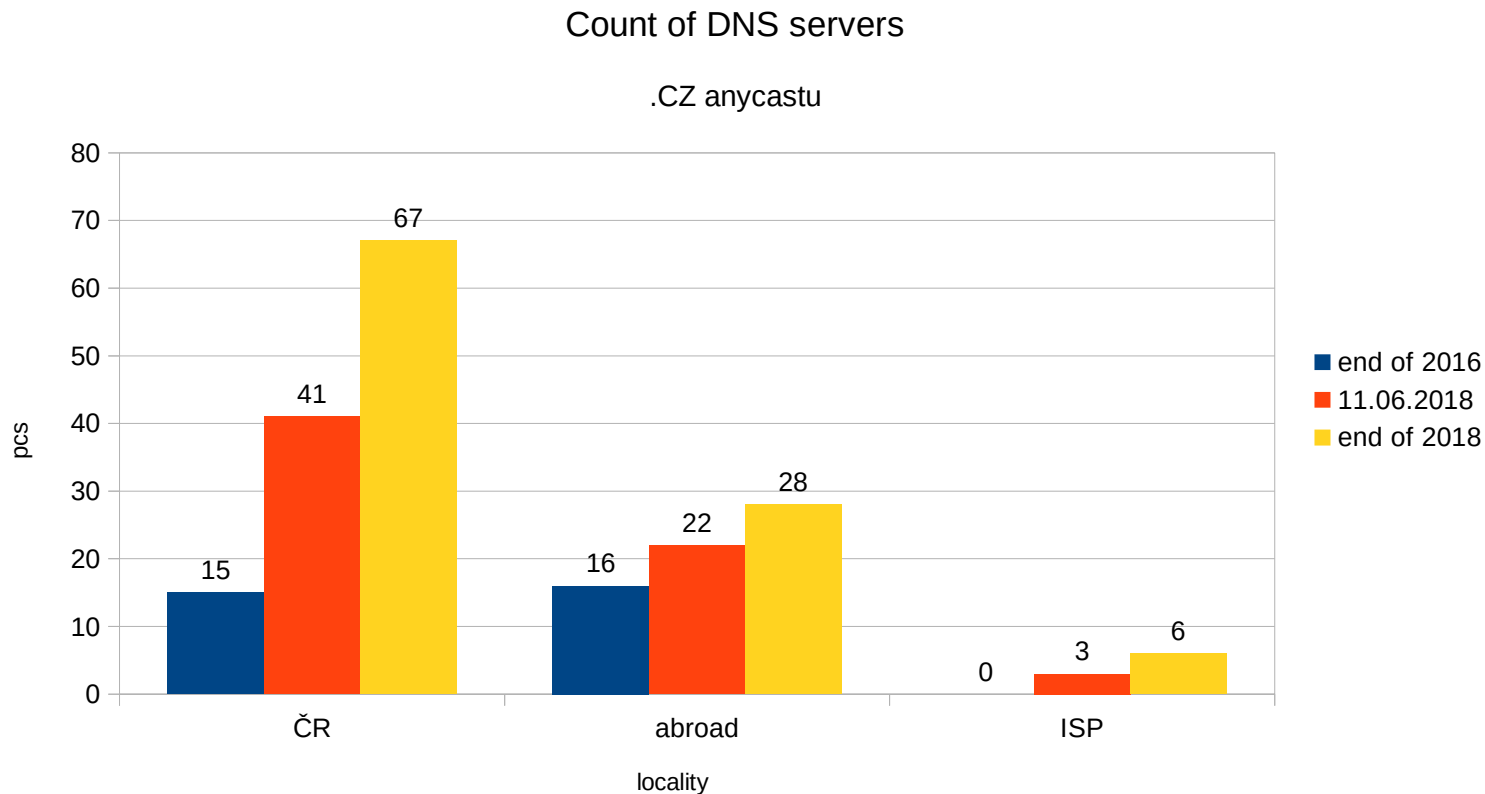


Motivation for DNS anycast upgrade

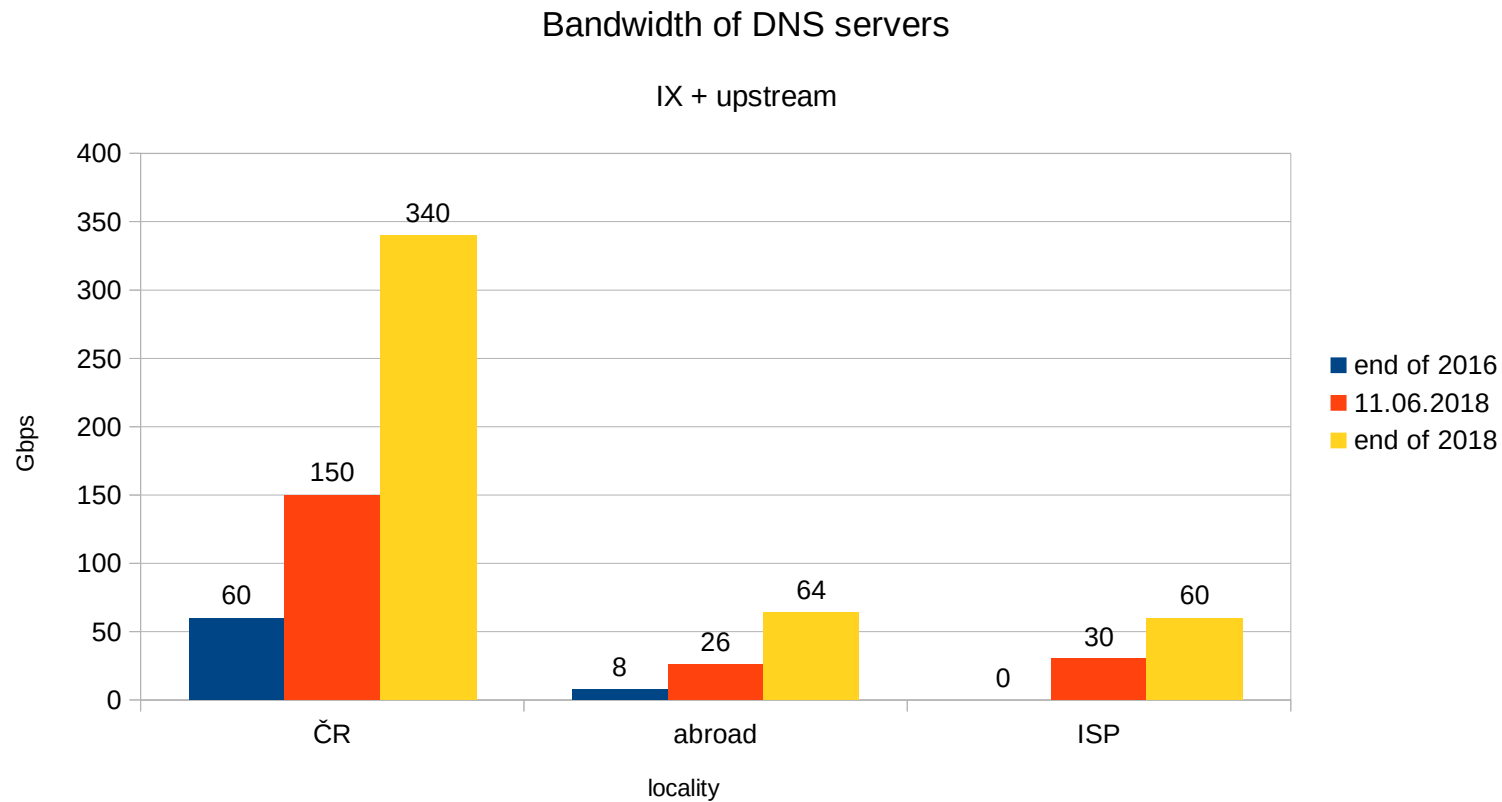
- performance limits
 - ~ 20 000 000 -> 100 000 000 QPS
 - ~ 60+ -> 200+ Gbps
- DoS strenght & frequency growth
 - Tbps level
 - distributed (IOT)
 - fatal impact



Status of the upgrade



Status of the upgrade



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Status of the upgrade

- ✓ 1 x 100 Gbps nod in ČR (ČRa)
- ✓ 2 x 10 Gbps nodes in Europe (UK, AT)
- 1 x 100 Gbps nod in ČR (CeColo)
- 2 x 10 Gbps nodes in Europe (DE, SE)



Performance is not the only one

- diversity
 - HW vendors
 - SW
 - OS (Ubuntu / Debian / OpenBSD)
 - BGP (BIRD / BGPD / QUAGGA)
 - DNS (KNOT / BIND / NSD)
- locations
 - geographical
 - different networks (ISP)



Local anycast - general

- authoritative DNS server with .CZ zone in the network of ISP
- one anycast prefix announcement
- using only for network of ISP
- for biggest ISP (significant DNS consumers)
 - TOP 20 ~ 80% of DNS traffic
- common in Europe (NL, BE, PT, UA, ...)



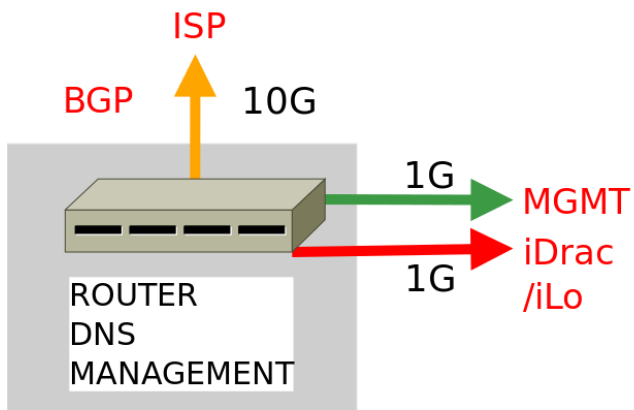
Local anycast – technical info

- 1 or 5 physical servers
- 2 or 6 mil. QPS (KNOT)
- 1 x 10 Gbps connection to ISP network for DNS traffic (interface for private BGP peering)
- 2 x 1 Gbps connection
 - oob management (installation, monitoring, zone update)
 - remote management (iLo / iDrac)

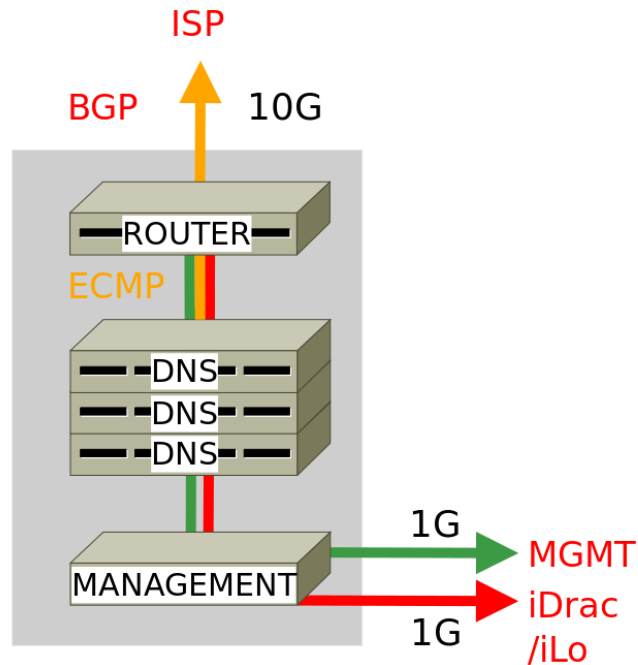


Local anycast – technical info

ISP mini



ISP



Local anycast – technical info

- why dedicated server(s)?
 - higher performance & security
 - precise configuration (tested / optimal)
 - powerful management (oob, remote)
 - dedicated connections



Local anycast – technical info

- minimal server hardware parameters:
 - CPU: 8 cores
 - RAM: 32 GB
 - HDD: 2 x 300 GB
 - NETWORK: Intel X710 for DNS traffic



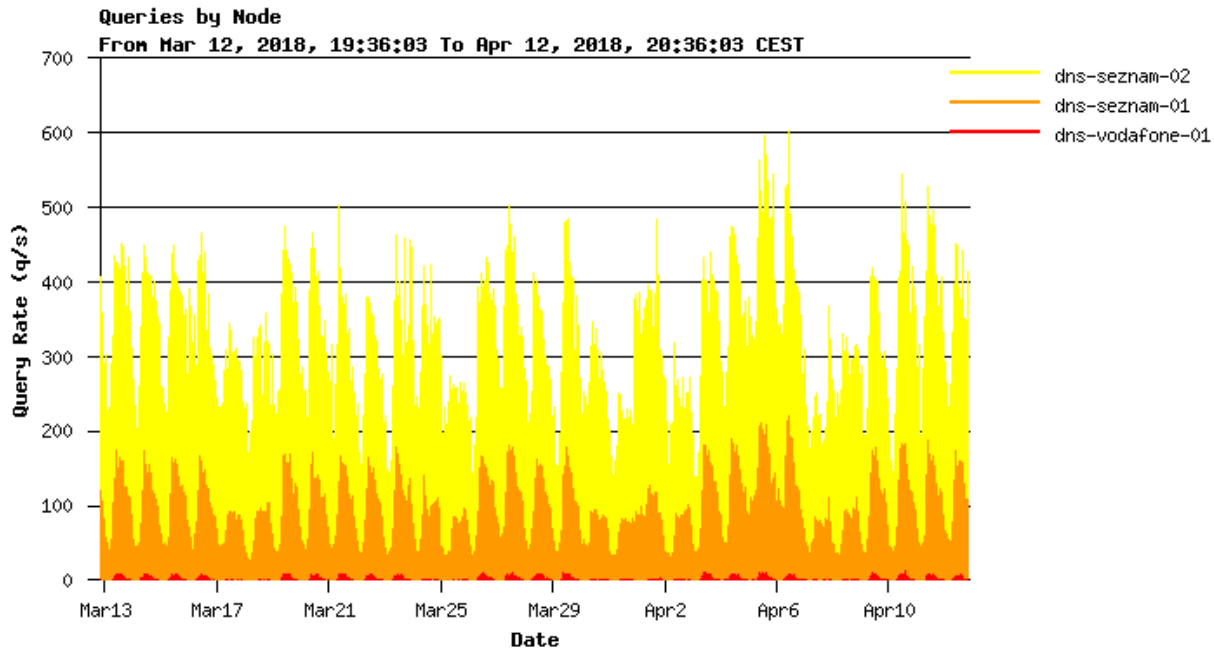
Local anycast - responsibilities

- CZ.NIC
 - complete management of the solution
 - update of the zone
- ISP
 - purchase of the hardware
 - provide DC, bandwidth, setting of BGP
 - \$ contribution to CZ.NIC
 - 5 000 / 20 000 CZK per month
 - 50% discount for FENIX members



Local anycast – in production

SEZNAM.CZ



Local anycast – in progress

cesnet
"...."

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Casablanca
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master
data in motion



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DOMÉNY CZ

Local anycast – who will be next?





Děkuji za pozornost

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