



Sabine Dolderer (DENIC eG) December 7th, 2006

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DENIC Name Server Setup

Goals of DENIC's Name Server Setup

- Diversity of locations
- Diversity in technology (hardware/software)
- High stability, security and availability
- Reliability, security and authenticity of the information
- Support of scalability and extensibility through the setup
- Support of IPV6
- Support of "Best Current Practices for Root Name Servers" (RFC2870)

DENIC Name Server Locations (NSLs)

11 name server Setups all over the world

5 Unicast Setups in Frankfurt (DE), Stuttgart (DE), Santa Clara (US), Amsterdam (NL), London (UK)



- 1 Anycast Setupt with Locations in Berlin (DE), Frankfurt (DE), Vienna (AT), Stockholm (SE), Tokyo (JP), Elmsford (US)
- 3 new locations until the end of 2006: Seoul (KR) -> active Miami (US) -> active São Paolo (BR) -> nearly active

DENIC Name Server Setup

DENIC's Name Server Setup

- Redundant management server in the registry server locations (RSL)
- Administrative access to the NSL only over secured network layer
- Each NSL consists of one management server and at least three DNS server
- Identical hard- and software configuration within a NSL
- Diversity of hard- and software platform between different NSLs
- Diversity of the hosting and Internet provider
- 8 reloads a day

DENIC Name Server Setup

DENIC's Name Server Setup

- Zone file distribution incremental, secured, centrally controlled
- Alternative DNS-Software available on all servers
- Recent version of the zone files at least of a day are available to do rollback
- Load on each server has to be maximum 5% of the possible load to provide enough reserves

Nameserver Setup

The NSLs operate at least three identical name servers per location.



Extensive Redundancy / High Availability

- Intra-location equivalence: equal HW and SW setup of the name servers within a location (several types of HW, SW & operating systems)
- Inter-location diversity: different HW, SW and operating systems are active across locations

Excess Capacity

- Switches at <1% of forwarding capacity and system load
- Processing reserve on all components

Advanced Security

- Out-of-band management only; Intensive logging
- Separate management interfaces on every component (heavily filtered)
- No management network access on any other interfaces
- Shut down of unused switch ports in "dead" VLAN







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DENIC Name Server Setup - Management



DENIC Status (Zonefile) 06.12.2006

- Domains: 10.326.432 (incl. 330.773 IDN-Domains)
- Average 3.000 new domains each day
- Zone entries: 21.840.312
- Zonefile size: ~ 800 MB
- Used memory: ~ 2,5 GB (bind)

DENIC Monitoring

DNS Monitoring

- 24/7 automatic monitoring of key indicators
- Longtime capacity observation
- Consistent checks of the zones before delivery
- Authentication of the zones after delivery
- Integrated alarm system
- External, neutral monitoring by RIPE NCC (dnsmon.ripe.net)



Status of external Services

DENIC Monitoring - 24 Hour



DENIC Monitoring: Load dns-us2



DENIC Monitoring: Longtime Capacity (3 Year Stat)



DENIC Monitoring Zonefile Distribution...

IP-Adresse	SN Server/erwartet	AA-Flag	Letzte Aktion	Status	Statusänderung um	Aktualisiert um
<u>del (denic)</u>	active	Aktiviere Zone au	if DNS-Server		20.02.05 10:37:26	20.02.05 10:46:43
srvl.dns-del	2005022042	true	Es läuft keine Aktion	SUCCESS	20.02.05 10:45:35	20.02.05 10:46:43
srv2.dns-del	-1/2005022042	false	Warte auf gestarteten DNS-Server	START	20.02.05 10:45:49	20.02.05 10:46:43
srv3.dns-del	2005022029/2005022042	true	Aktivierung: Ermitteln der Seriennummer	SUCCESS	20.02.05 10:37:26	20.02.05 10:46:43
de2 (decix)	active	Aktiviere Zone au	if DNS-Server		20.02.05 10:35:29	20.02.05 10:47:01
srv1.dns-de2	2005022042	true	Es läuft keine Aktion	SUCCESS	20.02.05 10:42:47	20.02.05 10:47:01
srv2.dns-de2	-1/2005022042	false	Warte auf gestarteten DNS-Server	START	20.02.05 10:43:24	20.02.05 10:47:01
srv3.dns-de2	2005022029/2005022042	true	Aktivierung: Ermitteln der Seriennummer	SUCCESS	20.02.05 10:35:29	20.02.05 10:47:01
<u>de3 (berlin)</u>	active	Aktiviere Zone au	of DNS-Server		20.02.05 10:36:53	20.02.05 10:47:12
srv1.dns-de3	2005022042	true	Es läuft keine Aktion	SUCCESS	20.02.05 10:46:34	20.02.05 10:47:12
srv2.dns-de3	-1/2005022042	false	Warte auf gestarteten DNS-Server	START	20.02.05 10:46:45	20.02.05 10:47:12
srv3.dns-de3	2005022029/2005022042	true	Aktivierung: Ermitteln der Seriennummer	SUCCESS	20.02.05 10:36:53	20.02.05 10:47:12
de4 (ludwigsburg)	active	Aktiviere Zone au	of DNS-Server		20.02.05 10:40:12	20.02.05 10:47:29
srvl.dnz-de4	2005022042	true	Es läuft keine Aktion	SUCCESS	20.02.05 10:43:51	20.02.05 10:47:29
srv2.dns-de4	-1/2005022042	false	Warte auf gestarteten DNS-Server	START	20.02.05 10:44:13	20.02.05 10:47:29
srv3.dns-de4	2005022029/2005022042	true	Aktivierung: Ermitteln der Seriennummer	SUCCESS	20.02.05 10:40:12	20.02.05 10:47:29
atl (wien)	active	Aktiviere Zone au	if DNS-Server		20.02.05 10:42:02	20.02.05 10:46:33
sryl.dns-atl	-1/2005022042	false	Warte auf gestarteten DNS-Server	START	20.02.05 10:42:14	20.02.05 10:46:33
srv2.dns-atl	2005022029/2005022042	true	Aktivierung: Ermitteln der Seriennummer	SUCCESS	20.02.05 10:42:02	20.02.05 10:46:33
srv3.dns-atl	2005022029/2005022042	true	Aktivierung: Ermitteln der Seriennummer	SUCCESS	20.02.05 10:42:03	20.02.05 10:46:33
inl (tokio)	active	Aktiviere Zone au	of DNS-Server		20.02.05 10:40:24	20.02.05 10:47:39
sryl.dns-ipl	2005022042	true	Es läuft keine Aktion	SUCCESS	20.02.05 10:44:19	20.02.05 10:47:39
srv2.dns-ip1	2005022042	true	Warte auf gestarteten DNS-Server	START	20.02.05 10:44:46	20.02.05 10:47:39
srv3.dns-jp1	2005022029/2005022042	true	Aktivierung: Ermitteln der Seriennummer	SUCCESS	20.02.05 10:40:28	20.02.05 10:47:39
nll (amstandam)	activo	Altiviana Zona au	of DVS. Somer		20.02.05.10-38-54	20.02.05.10.47.22
sml dns-nll	-1/2005022042	false	Warte auf gestarteten DNS-Server	START	20.02.05 10:39:05	20.02.05 10:47:22
sm2.dns-nll	2005022029/2005022042	true	Aktiviarung: Ermitteln der Seriennummer	SUCCESS	20.02.05 10:38:55	20.02.05 10:47:22
srv3.dns-nll	2005022029/2005022042	true	Aktivierung: Ermitteln der Seriennummer	SUCCESS	20.02.05 10:38:55	20.02.05 10:47:22
	antina .	Alstiniana Zana av	d DNS Serror		20.02.05.10.38.50	20.02.05 10:47:49
ser (stocknoin)	1/2005022042	false	Warte auf gesterteten DNS Server	START	20.02.05 10:30:39	20.02.05 10:47:49
smil das sol	2005022042	faise	Alstiniamung: Empitteln den Seniennummen	SUCCESS	20.02.05 10:39:12	20.02.05 10:47:49
am3 das sel	2005022029/2005022042	true	Aktivierung: Ermitteln der Seriennummer	SUCCESS	20.02.05 10:38:59	20.02.05 10:47:49
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ukl (london)	active	Aktiviere Zone au	If DNS-Server	07.4 DT	20.02.05 10:38:53	20.02.05 10:46:52
srvl.dns-ukl	-1/2005022042	false	Warte auf gestarteten DNS-Server	SIARI	20.02.05 10:39:03	20.02.05 10:46:52
srv2.dns-ukl	2005022029/2005022042	true	Aktivierung: Ermittein der Seriennummer	SUCCESS	20.02.05 10:38:53	20.02.05 10:46:52
srv3.dns-ukl	2005022029/2005022042	true	Aktivierung: Ermittein der Seriennummer	SUCCESS	20.02.05 10:38:53	20.02.05 10:46:52
<u>usl (elmsford)</u>	active	Aktiviere Zone au	if DNS-Server		20.02.05 10:37:49	20.02.05 10:47:41
srvl.dns-usl	2005022042	true	Es läuft keine Aktion	SUCCESS	20.02.05 10:41:56	20.02.05 10:47:41
srv2.dns-us1	2005022042	true	Es läuft keine Aktion	SUCCESS	20.02.05 10:45:52	20.02.05 10:47:41
srv3.dnz-usl	-1/2005022042	false	Warte auf gestarteten DNS-Server	START	20.02.05 10:46:16	20.02.05 10:47:41
us2 (santaclara)	active	Aktiviere Zone au	of DNS-Server		20.02.05 10:37:53	20.02.05 10:47:11
srvl.dnz-us2	2005022042	true	Es läuft keine Aktion	SUCCESS	20.02.05 10:45:20	20.02.05 10:47:11
srv2.dns-us2	-1/2005022042	false	Warte auf gestarteten DNS-Server	START	20.02.05 10:46:00	20.02.05 10:47:11
srv3.dns-us2	2005022029/2005022042	true	Aktivierung: Ermitteln der Seriennummer	SUCCESS	20.02.05 10:37:55	20.02.05 10:47:11
t (test)	active	Fe läuft keine Al-	tion		14.02.05 13:56:55	14.02.05.15:15:29



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DNS: External Monitoring (dnsmon.ripe.net)





Thank you for your attention!

Any questions?