



Graphical Management Tool for Kea DHCP and BIND DNS

Marcin Siodelski

Senior Software Engineer, [ISC.org](https://www.isc.org)
email: marcin@isc.org

APNIC'62, September 8, 2026



Photo by Carlos Delgado, CC BY-SA 3.0, via Wikimedia Commons
(Cropped from original)

Who is ISC?



Non-profit established in 1994 to provide open source software and services in support of the Internet infrastructure.

Currently, these include:

- **BIND 9** - the DNS software, includes dig
- **Kea DHCP** (which replaced ISC DHCP, which is now EOL)
- **F Root** - a free service for bootstrapping the DNS root
- **Stork** - a graphical management tool for Kea DHCP and BIND DNS

ISC innovations included **Anycasting** and **Response Policy Zones**. ISC staff contribute actively to development of open technical standards and have written **114 IETF RFCs**.

We have a **staff of 46**, based around the world but mostly in Europe, with headquarters in New Hampshire, USA.

We are **funded almost entirely by users of our software**, who pay us to provide them with technical support services.

Some of the new features in Stork described here have been developed **with funding from the ICANN Grant Program**.

Who is Marcin?

Senior Software Engineer working with ISC since 2012.

One of the early developers in the **Kea DHCP** project, designer and implementer of several popular features (e.g., **High Availability, Configuration Backend**).

Co-authored several IETF documents in DHC WG, including **RFC 8415** (rewrite of the DHCPv6 specification).

Since 2019 one of the main developers in the **Stork project**. Currently working on new features concerning **DNS servers monitoring and management**.

Sport enthusiast and ultra-marathoner.



What is Stork?



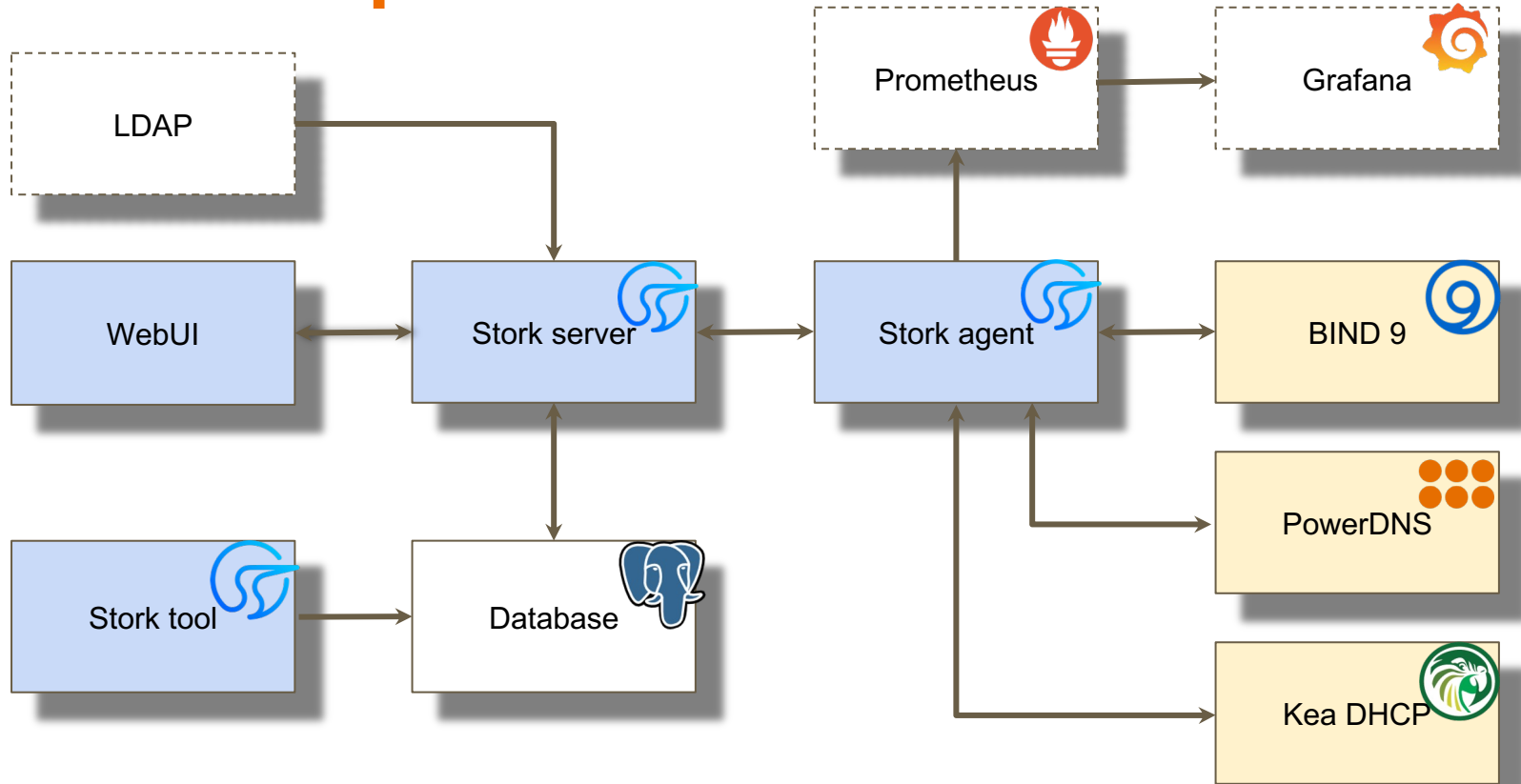
MPL 2.0-licensed open source, released several years ago, under active development, very popular among **Kea DHCP** users.

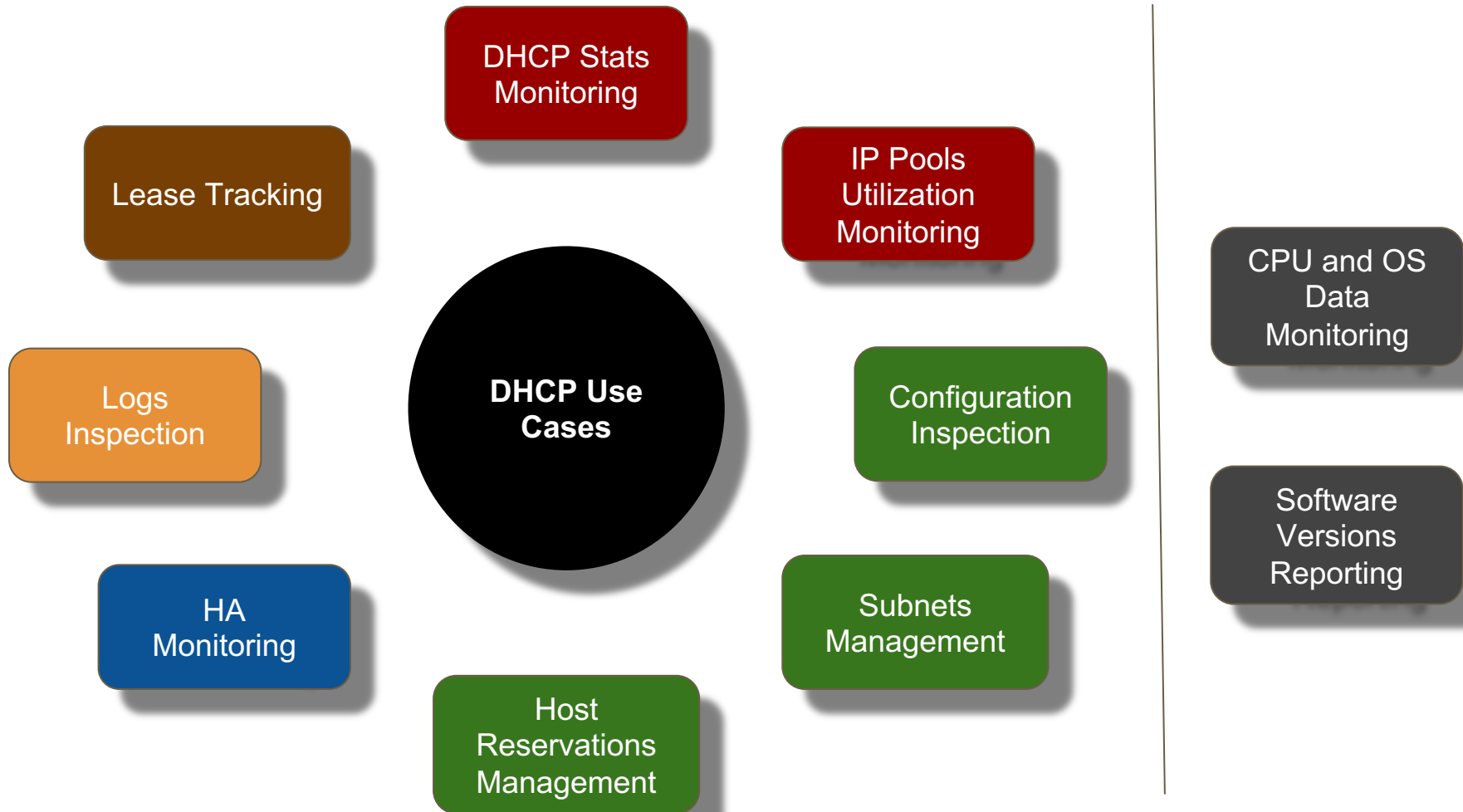
Provides a consolidated management view of all your DHCP servers.

Integrates **BIND 9** and **PowerDNS** server implementations, with **increasing** number of DNS monitoring and management capabilities.

Easy to deploy solution that leverages an agent installed on each Kea, BIND 9 or PowerDNS server to report information to a centralized platform, which displays the information in graphical form.

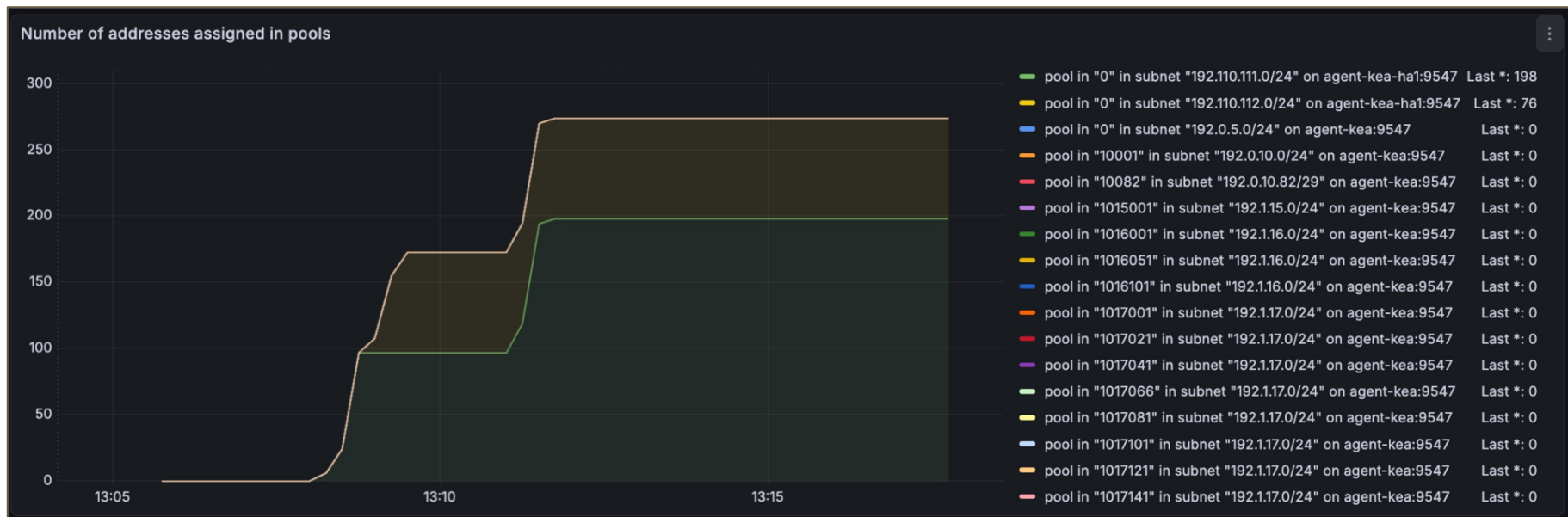
Stork Components





DHCP Traffic Monitoring in Grafana

DHCP Stats
Monitoring



Subnets Listing

Configuration
Inspection

IP Pools
Utilization
Monitoring

Subnets

Show Filters ☒ + New Subnet Refresh List

?

Clear

Daemon

▼

Kea Subnet ID

DHCP Version ▼

Q

111.

⌵

Subnet ↑↓	Name ↑↓	Addresses			Prefixes			Pools	Shared Network ↑↓	Daemon
		Total ↑↓	Assigned ↑↓	Used % ↑↓	Total ↑↓	Assigned ↑↓	Used % ↑↓			
192.110.111.0/24	valletta	208	25	12%	-	-	-	Out of pool addresses 192.110.111.2-192.110.111.199	esperanto	[4] DHCPv4@agent-kea-ha3 [8] DHCPv4@agent-kea-ha2 [1] DHCPv4@agent-kea-ha1

1 of 1 pages << < 1 > >> 10 ▼ Total: 1 subnet

192.110.111.0/24

valletta

Q

111.

⌵

Manage Subnets, Pools and Reservations

Subnets
Management

Host
Reservations
Management

(23) OPTION_DNS_SERVERS



☐ Always Send

Add ipv6-address



✖ Delete Option

ipv6-address

2000:db8



Add More Options

Pools

4001:db8:1:0:abcd::4001:db8:1:0:abcd:ffff:ffff:ffff



Address Range

First Address

4001:db8:1:0:abcd::

Last Address

4001:db8:1:0:abcd:ffff:ffff:ffff

Monitor High Availability Status

High Availability

	This Server	Partner
▼ Relationship #1	primary ⚠	standby at [10] DHCPv4@agent-kea-ha2 ❗
Heartbeat status ⓘ	ok ✓	failed ❗
Control status ⓘ	online ✓	unknown ❗
State ⓘ	partner-down ⚠	unavailable ⚠

Open and View Log Files

Logs
Inspection



Log /var/log/kea/kea-dhcp4-ha1.log from the daemon [8] DHCPv4@agent-kea-ha1

```
2026-08-05 16:44:11.723 INFO [kea-dhcp4.subnet-cmds-hooks/51206.281473281091648] SUBNET_CMDS_SUBNET_LIST successfully
retrieved list of 3 IPv4 subnets
2026-08-05 16:44:16.724 INFO [kea-dhcp4.commands/51206.281473281091648] COMMAND_RECEIVED Received command 'statistic-
get-all'
2026-08-05 16:44:16.725 INFO [kea-dhcp4.commands/51206.281473281091648] COMMAND_RECEIVED Received command 'subnet4-
list'
2026-08-05 16:44:16.725 INFO [kea-dhcp4.subnet-cmds-hooks/51206.281473281091648] SUBNET_CMDS_SUBNET_LIST successfully
retrieved list of 3 IPv4 subnets
2026-08-05 16:44:18.003 WARN [kea-dhcp4.ha-hooks/51206.281473213067616] HA_HEARTBEAT_COMMUNICATIONS_FAILED server1:
failed to send heartbeat to server2 (http://172.24.0.110:8004): Connection refused
2026-08-05 16:44:18.003 WARN [kea-dhcp4.ha-hooks/51206.281473213067616] HA_COMMUNICATION_INTERRUPTED server1:
communication with server2 is interrupted
2026-08-05 16:44:18.004 INFO [kea-dhcp4.commands/51206.281473281091648] COMMAND_RECEIVED Received command 'config-get'
2026-08-05 16:44:18.006 INFO [kea-dhcp4.commands/51206.281473281091648] COMMAND_RECEIVED Received command 'status-get'
2026-08-05 16:44:19.696 INFO [kea-dhcp4.commands/51206.281473281091648] COMMAND_RECEIVED Received command 'reservation-
get-page'
2026-08-05 16:44:19.697 INFO [kea-dhcp4.host-cmds-hooks/51206.281473281091648] HOST_CMDS_RESERV_GET_PAGE reservation-
get-page command called (parameters: { "limit": 1000, "source-index": 1, "subnet-id": 0 })
2026-08-05 16:44:19.697 INFO [kea-dhcp4.host-cmds-hooks/51206.281473281091648] HOST_CMDS_RESERV_GET_PAGE_SUCCESS
reservation-get-page command success (parameters: { "limit": 1000, "source-index": 1, "subnet-id": 0 })
2026-08-05 16:44:19.698 INFO [kea-dhcp4.commands/51206.281473281091648] COMMAND_RECEIVED Received command 'reservation-
get-page'
2026-08-05 16:44:19.699 INFO [kea-dhcp4.host-cmds-hooks/51206.281473281091648] HOST_CMDS_RESERV_GET_PAGE reservation-
```

Lease Tracking (new in 2.5.1)

Lease Tracking

?

Clear

Machine
agent-kea-ha2

▼

Daemon

▼

Subnet ID

Kea Subnet ID

Lease State

▼

Q

Search IP, identifier, or hostnam

	IP Address ↑↓	Prefix Length ↑↓	HW Address ↑↓	Client ID ↑↓	DUID ↑↓	State ↑↓	Daemon	Subnet
>	192.110.111.2	—	03:00:00:00:00:00	01:03:00:00:00:00:00	—	Valid	[4] DHCPv4	[1] 192.110.111.0/24
✓	192.110.111.3	—	03:00:00:00:00:01	01:03:00:00:00:00:01	—	Valid	[4] DHCPv4	[1] 192.110.111.0/24

Client

HW Address: 03:00:00:00:00:01

text

Client Identifier:

0x01 0x03 0x00 0x00 0x00 0x00 0x01

hex

Details

Kea Subnet ID: 123

Valid Lifetime: 3600 seconds

Allocated at: 2026-08-12 12:40:21

Expires at: 2026-08-12 13:40:21

Monitor CPU and OS Data

CPU and OS
Data
Monitoring

System Information

Address	agent-kea6:8887
Hostname	agent-kea6
Agent Version	2.5.0 ✓
CPUs	12
CPUs Load	3.53 3.25 2.88
Memory	7 GiB
Used Memory	54 %
Uptime	34 days
OS	linux

Daemons

✓ DHCPv6 3.1.7 ⚠

Platform Family	debian
Platform	debian
Platform Version	12.11
Kernel Version	6.10.14-linuxkit
Kernel Arch	aarch64
Virtualization Role	guest
Virtualization System	docker

Monitor Software Versions

Software
Versions
Reporting

[4] DHCPv6 3.1.7
[3] CA 3.1.7

Kea 3.1.7

Development Kea version update (3.3.0) is available (known as of 2026-07-30).

Please be advised that using development version in production is not recommended.

Stork agent 2.5.0

2.5.0 is current Stork agent development version (known as of 2026-07-30).

Please be advised that using development version in production is not recommended.

Stork for DNS - motivations

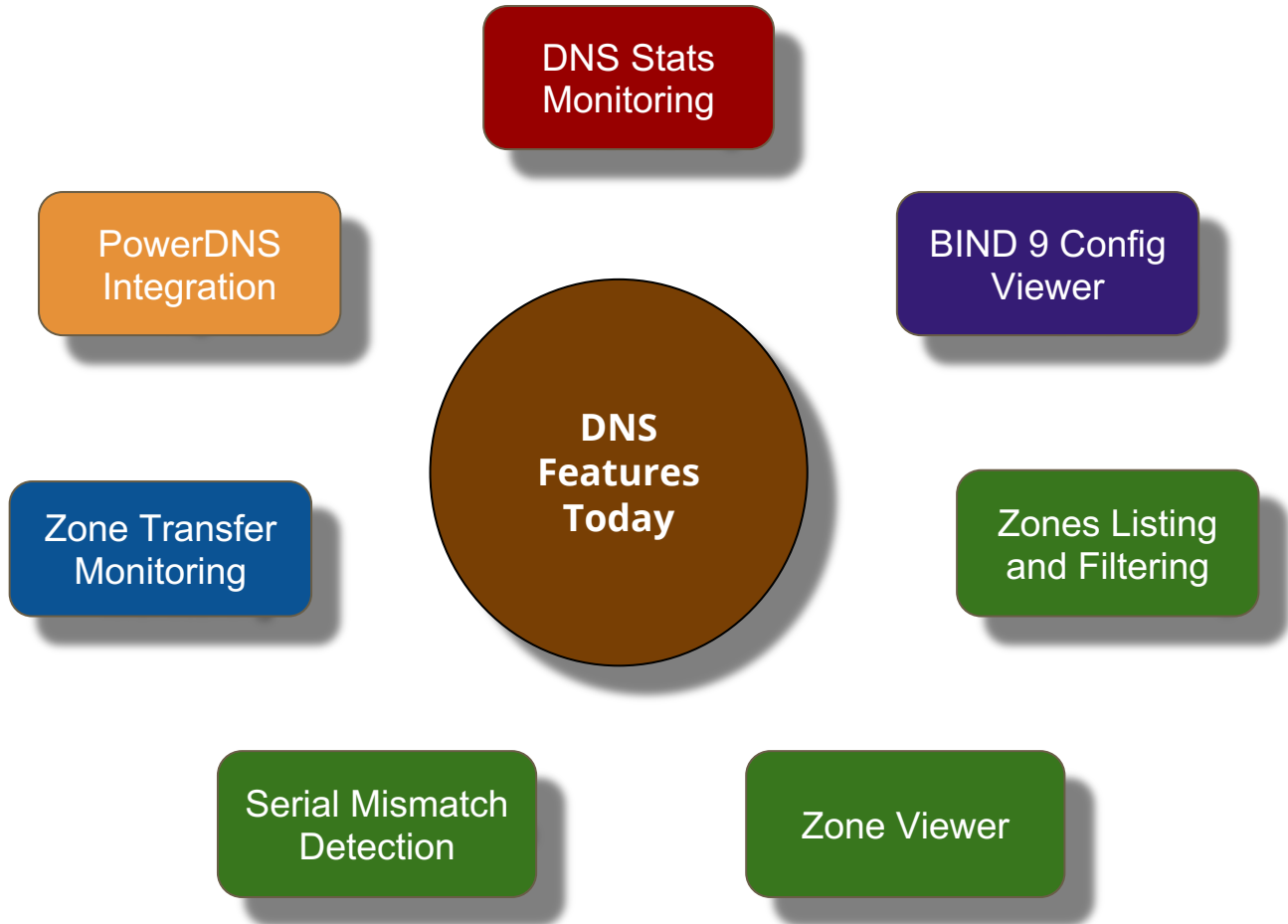
DNS is a critical network service

BIND 9 is complex, with many infrequently needed configuration statements

Effective service monitoring requires capturing and monitoring real-time usage data and analyzing log messages

There are many available tools that troubleshoot specific problems, but these are not organized into a **coherent tool set**

Available open source tools look at a single DNS server, whereas most deployments have at least a **primary and several secondaries**, and it is common to have a system with **dozens of DNS servers**.



Stork as Prometheus Exporter (Grafana)

DNS Stats
Monitoring



BIND 9 Config Viewer

Toggle between reduced configuration including only BIND 9 configuration options, and the full configuration also including the views and zones.

/etc/bind/named.conf

↻ Refresh

☒ Show Zones and Views

```
51
52 zone "bind9.example.org" {
53     type secondary;
54     allow-transfer {
55         "any";
56     };
57     zone-statistics full;
58     file "/etc/bind/db.bind9.example.org";
59     primaries {
60         192.0.0.1;
61     };
62 };
```

Zones Listing and Filtering

Serial Mismatch Detection

Show Filters ☐

Fetch Status

Fetch Zones

Refresh List

?

Clear

Toggle builtin zones

Zone Type

RPZ

Daemon

[9] named@agent-bind9-2

Serial

Zone Class

Daemon Name

Zone name or v

Zone Name	Serial	Zone Type
> test	1	primary
bind9.example.org	2024031401	secondary, primary

Daemon	View	Zone Type	Serial
[9] named@agent-bind9-2	_default	secondary	2024031401
[10] named@agent-bind9	guest	primary	2024031501

IN2025-10-01 14:10:06

Serial

2024031401

2024031501

Zone Viewer

Type
AAAA



(root) for [2] named@agent-bind9-2 , view: _default



Cached from DNS server on 2026-08-04 18:21:17 ?



Clear

Type

AAAA



Name or Data

Show Filters



Refresh from DNS

1 of 565 pages



1

2

3

4

5



10



Total: 5643 records

Name

TTL

Class

Type

Data

a.nic.aaa.

172800

IN

AAAA

2001:dcd:1::9

b.nic.aaa.

172800

IN

AAAA

2001:dcd:2::9

c.nic.aaa.

172800

IN

AAAA

2001:dcd:3::9

ns1.dns.nic.aaa.

172800

IN

AAAA

2610:a1:1071::2

XFR Monitoring (new in 2.5.1)

Zone Transfer Monitoring

Show Filters



Refresh List



Clear

Status



Serial

Primary



Secondary



Search



Include local transfers

	Started At ↑↓	Zone	View	Serial	Duration ↑↓	Rate ↑↓	Status ↑↓	Primary	Secondary
>	2026-08-04 16:00:49	(root)	_default	2026080400	4.412 seconds	299.6kB/s	completed ✓	192.5.5.241	[6] agent-bind9-2
>	2026-08-04 16:00:49	drop.rpz.example.com	_default	201702121	12 milliseconds	24.5kB/s	completed ✓	[5] agent-bind9	[6] agent-bind9-2
>	2026-08-04 16:00:49	drop.rpz.example.com	trusted	201702121	4 milliseconds	73.5kB/s	completed ✓	[5] agent-bind9	172.24.0.54
>	2026-08-04 16:09:13	bind9.example.org	_default	0	1 minute 15.007 seconds	N/A	failed ⚠	192.0.0.1	[6] agent-bind9-2

XFR Monitoring (cont.)

▼ 2026-08-04 16:00:49 (root) _default 2026080400 4.412 seconds 299.6kB/s completed ✓ 192.5.5.241 [6] agent-bind9-2

Transfer Details

Created at: 2026-08-04 16:01:52
Started at: 2026-08-04 16:00:49
Completed at: 2026-08-04 16:00:54

Statistics

Messages received: 79
Records received: 24882
Bytes received: 1321839

Log message

Transfer completed: 79 messages, 24882 records, 1321839 bytes, 4.412 secs (299600 bytes/sec) (serial 2026080400, expire option 604059)

Completed

▼ 2026-08-04 16:09:13 bind9.example.org _default 0 1 minute 15.007 seconds N/A failed ⓘ 192.0.0.1 [6] agent-bind9-2

Transfer Details

Created at: 2026-08-04 16:09:13
Started at: 2026-08-04 16:09:13
Completed at: 2026-08-04 16:10:28

Statistics

Messages received: 0
Records received: 0
Bytes received: 0

Log message

Transfer status: connection refused

Failed

Planned DNS-related Features in Stork

DDNS

Remove
stale DNS
records

Zone mgmt.

Create or
update zone
and select
secondaries

Clone zone
from a
template

Records
validation

BIND config

Edit BIND
config with
suggestions
and
validation

Clone BIND
config from
another
instance

Catalog zones

Create and
manage
catalog
zones

Migrate
zones to
catalog
zones

Logs

BIND logs
monitoring
and analysis

Stork Roadmap



- **2.6.0 (Fall 2026)**
 - Zone Transfer Monitoring
 - DHCP Lease Tracking (phase 1)
 - Kea Config Backend Support (phase 1)
 - OpenID Connect (OIDC)
- **Next ***
 - Zone Edits
 - DHCP Lease Tracking (phase 2)
 - Kea Config Backend support (phase 2)

* subject for changes: existing planned features may disappear, but new ones may appear.

Feedback and feature requests welcome!



DHCP > Leases List		
Leases		
	 Clear	Machine ID
Search IP or identifier		
IP Address ↑↓	HW Address ↑↓	DUID ↑↓
192.110.111.2	03:00:00:00:00:00	—
192.110.111.3	03:00:00:00:00:01	—
192.110.111.4	03:00:00:00:00:02	—
192.110.111.5	03:00:00:00:00:03	—
192.110.111.6	03:00:00:00:00:04	—
192.110.111.7	03:00:00:00:00:05	—
192.110.111.8	03:00:00:00:00:06	—
192.110.111.9	03:00:00:00:00:07	—

References

- Stork open development repository (report issues and feature requests here)
 - <https://gitlab.isc.org/isc-projects/stork>
- Project Design Page
 - <https://gitlab.isc.org/isc-projects/stork/-/wikis/designs>
- Download Page (Releases)
 - <https://www.isc.org/download/#Stork>
- Packages
 - <https://cloudsmith.io/~isc/repos/stork/groups/>
- Stork Administrative Reference Manual
 - <https://stork.readthedocs.io/en/stable/>
- Stork on-line Demo system
 - <https://demo.stork.isc.org/login>
- Stork on the ISC website
 - <https://www.isc.org/stork/>
- Mailing list
 - <https://lists.isc.org/mailman/listinfo/stork-users>

Questions