The RIPE Database Requirements Task Force - Draft

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1. What is the RIPE Database?

The RIPE Database is a public repository of Internet number resources registration information and was built to facilitate coordination between network operators in the RIPE NCC Service Region (Europe, Middle East, parts of Central Asia). Since August 1992, the RIPE Database has served as the authoritative public registry for the registration of Internet number resources distributed in its service region. The database also provides information about resources distributed prior to the RIR system.[1]

In its early days, the database's data was provided on a voluntary basis before the RIPE NCC started allocating IP addresses and putting in place data collection processes.

There were several iterations of the RIPE Database as its structure and functionality evolved. New features and objects were added throughout the years making the data more complex. It is also interesting to note that some data was also migrated out of the database such as information about 2nd level ccTLD domain names.

In 1995, the Internet Routing Registry (IRR) was created. This subset of the RIPE Database provides routing information and its purpose is to ensure stability and consistency of the Internet-wide routing by sharing information between network operators.

More recently the RPKI Database was created to offer verifiable proof of holdership of resources' registration by a Regional Internet Registry (RIR).

2. The difference between the RIPE Database and the RIPE Registry

The RIPE community has tasked the RIPE NCC to maintain a repository of all allocated Internet number resources in its service region. This information is stored in the RIPE Registry and the RIPE Database. Some of this data is confidential between the RIPE NCC and the resource holder and some of it is made publicly available via the RIPE Database.

The RIPE Registry contains all data, private and public, about resources and resource holders in its service region and is maintained by the RIPE NCC. The RIPE Database provides a public view of some of the RIPE Registry's data and also contains data that is separate from the registry (e.g. abuse-c contact information). The information disclosed in the RIPE Database aims to facilitate cooperation and coordination between network operators and other stakeholders for a variety of operational tasks including troubleshooting and preventing outages.

The RIPE Database is maintained by both the RIPE NCC and resource holders. Its usage is covered by the RIPE Database Terms and Conditions.

[1] For more information see "Legacy Internet Resources": https://www.ripe.net/manage-ips-and-asns/legacy-resources

The RIPE NCC is responsible for allocating resources to its members as well as avoiding discrepancies between the RIPE Registry and the RIPE Database.

Resource holders are responsible for updating information regarding their resource usage in the RIPE Database.

3. Why are we reviewing the RIPE Database functionality now?

The RIPE Database is providing essential information to the RIPE community, so that they can keep networks and the Internet running in our service region. Many stakeholders are dependent on the accuracy and availability of the data stored in the database to do their job properly, especially regarding cyber security. Some of the database users have been part of the RIPE community for years, such as ISPs or IXPs, and some of them are relatively new to the community, such as Law Enforcement Agencies (LEAs) or Regulators. These user groups have different needs and expectations regarding the database which are creating frictions within the community. Also, changing privacy requirements and whether personal data is needed in RIPE Database[2] is an on-going topic inside the RIPE community. Although there was consensus on this subject in the past, this is less obvious at the moment.

While the RIPE Database Working Group and RIPE NCC are able to solve a lot of the operational issues, a high-level approach was needed to establish a consensus at a general level about the database's functionality.

The RIPE Database Requirements Task Force (DBTF) has been formed to tackle this challenge and provides here a list of high-level requirements and recommendations that attempt to resolve on-going and possible future issues regarding the database's functionality and data.

The task force did its best to anticipate the community's needs by taking a holistic approach for each requirement and steering away from technicalities.

Please note that the implementation of these requirements and recommendations are not addressed in this document. These could be carried out by another task force or the relevant working groups.

4. Requirements

Authoritative and Accurate Registry of Internet Number Resources

RIR function – authoritative by NCC – must be accurate/up to date

The need to maintain an accurate public record of the holders of Internet number resources is common to all Regional Internet Registries (RIRs) and was outlined in RFC 7020:

[2] Defined in Article 3 of the RIPE Database Terms and Conditions (https://www.ripe.net/manage-ips-and-asns/db/support/documentation/terms)

“A core requirement of the Internet Numbers Registry System is to maintain a registry of allocations to ensure uniqueness and to provide accurate registration information of those allocations in order to meet a variety of operational requirements.”

The results of the task force’s user survey conducted in January 2019 confirms that having access to trustworthy and accurate information is one of the most valued aspects of the RIPE Database for users.

Baseline requirements for registration information of Internet Number

In order to understand the level of information currently required to be registered in the RIPE Database, the task force analysed three policies relating to the registration of Internet number resources (IPv4, IPv6, ASNs). Here are some takeaways:

- All three RIPE policies require assignments and allocations to be registered in the RIPE Database
- The indicated reasons for the registration requirement are a) ensuring uniqueness of IP addresses, b) supporting network operations
- Only the IPv4 policy provides some guidance on the level of the required registration information
- Privacy consideration aspects are included in the IPv4 and IPv6 policies.

The IPv4 policy provides more detailed guidance on how End User resources should be registered in the RIPE Database. The ASN policy does not describe how detailed the ASNs registrations done by the RIPE NCC should be.

The task force believes that to ensure uniqueness and to provide accurate registration as defined in RFC 7020 the following information[3] should be available in the RIPE Database:

- Full legal name of resource holder
- Full address of resource holder
- Contact information for matters of an administrative nature, and for matters of a technical nature

These requirements should be applied consistently to all types of Internet number resources regardless of their type and status.

A note on transfers: most IP address transfers (excluding legacy) fall under RIPE policies and follow the same rules as allocations and assignments in terms of how the data is registered in the RIPE Database. Registration accuracy is particularly important in this case as the RIPE Database has authority over who holds which Internet number resources.

The task force recommends looking into streamlining registration information stored in the RIPE Database, so that they are aligned to current policies and future needs.

In order to ensure the uniqueness of resource usage and registration accuracy, the task force recommends that the legal address of resource holders who are legal persons be published in the RIPE Database. This will also be beneficial for coordination and cooperation within the

[3] These requirements are mentioned in ripe-508: https://www.ripe.net/publications/docs/ripe-508

RIPE community regarding resources management. However, the task force is aware that there are legal and technical constraints attached to this proposal and recommends that the RIPE NCC look into implementation possibilities.

To ensure that the information published in the RIPE Database is correctly updated by resource holders, we recommend that the RIPE NCC continue to carry on ARC (Assisted Registry Checks) on a regular basis.

Other Operational Functions

The RIPE Database is also used for other related functions that are not directly related to its core function and where the RIPE NCC manages the data produced on a best effort basis.

One of the main secondary usages of the RIPE Database include:

- IPAM for Internet Number Resources holders

[Text still being developed]

Historical Data and Obsolete Functionality

Since 2013, the RIPE Database has been storing historical data following a request from the RIPE community.

This includes:

- Every time an object is updated the old version gets saved. A standard query will return the most recent version. The old versions are available by using the history query flags.
- If an object is deleted and re-created, a query will return only the most recent version. Deleted objects are not returned in historical query results.
- Objects that are supposed to contain personal data are excluded from historical queries

Although measures to minimise the exposure of personal data in historical queries are in place, and objects that are meant to contain personal data are filtered out from results to the queries, personal data might still be returned in other attributes.

The task force recommends deleting historical data that don't serve any operational purposes and ask the community for feedback to determine which data falls into this category.

Reverse Domain Name System (rDNS)

The DNS Reverse Mapping is a DNS based service to map IP addresses back to domain names. The reverse DNS tree is structured to follow the address 'hierarchy' for both IPv4 (on octet boundaries) and IPv6 (on nibble boundaries). There is no formalised DNS mapping service for ASNs.

Since the DNS reverse mapping is closely tied to the address space, delegations usually go to the party registered as holder for that particular address space. Providing DNS reverse mapping management functions (which do not include DNS name service itself) can be seen as a genuine function of both an RIR and an LIR. The RIPE Database is used as a

provisioning and documentation tool for reverse DNS for IP addresses under RIPE NCC management. This enables the use of the core address registry for provisioning authorisation purposes (reverse mapping follows inetnum: and inet6num:).

There are operational procedures, including technical checks, that guide the operation of the reverse DNS by the RIPE NCC. Those have been developed and maintained under guidance from the DNS and Database working groups. Other, non-DNS specific, general rules apply to the objects used for provisioning reverse DNS to the database.

[Text still being developed]

Publishing routing policies by network operators (RIPE IRR)

The RIPE Routing Registry is a subset of the RIPE Database which holds information about routing on the Internet. Since the RIPE Database is authoritative for both IP addresses and AS numbers which have been allocated or assigned by the RIPE NCC, it provides a natural way to publish authoritative information about how number resources are routed on the Internet.

The RIPE DBTF recommends the following list of requirements for routing information in the RIPE Database:

- The RIPE Database will provide routing information for:
    - Address resources delegated by the RIPE NCC.
    - Address resources which fall under the terms of the "RIPE NCC Services to Legacy Internet Resource Holders" policy.
    - Other address resources which already have routing information in the RIPE database.
- Routing information is maintained by the holders of these address resources.
- The holders of these address resources will be authenticated by the RIPE NCC and only they will be authorised to manage routing information for the resources that they hold.
- Routing information for address resources delegated to holders which have not been authenticated by the RIPE NCC should be labelled as non-authoritative. This should apply to both non-RIPE NCC address resources and legacy address resources with no formal relationship to the RIPE NCC. The RIPE Community should aim to create policies to delete stale and inaccurate non-authoritative routing information.
- It should not be possible to add new routing information to the RIPE database for address resources delegated by other Regional Internet Registries.

Routing Information Classification
The routing information maintained in the RIPE database falls into two broad categories:

- Routing origin information, which documents associations between address blocks and ASNs
- Information about routing relationships between different ASNs.

Routing Origin Information

Maintaining accurate routing origin information is a requirement of the RIPE Database.

Routing Relationship Information

RPSL

[Text still being developed]

RPKI Database

[Text still being developed]

Facilitate Internet Operations and Coordination

Since its inception, the RIPE Database helped to foster communication across stakeholders as it became one of the main sources of information to help troubleshoot and develop networks in our service region. The contact information available in the database was historically provided on a best-effort basis by its users.

The RIPE DBTF has identified facilitating communication about usage of resources as one the RIPE Database requirements.

The RIPE Database should facilitate communication and cooperating among stakeholders for the following reasons:

- Operational issues such as measuring or troubleshooting networks
- Handling abuse cases, support the handling of cyber incidents, as well as support LEA investigations

Since RIPE 77, there have been concerns around the rising number of PERSON objects in the RIPE Database. It's unclear whether all these objects are needed. For example, could this requirement be fulfilled by using ROLE objects and generic email addresses. The task force suggests getting community feedback on what level of contact information is required to facilitate communication about usage of resources.

5. Recommendations

Authoritative and Accurate Registry of Internet Number Resources

The task force recommends looking into streamlining registration information stored in the RIPE Database, so that they are aligned to current policies and future needs.

The task force recommends that legal addresses of resource holders who are legal persons be published in the RIPE Database and that the RIPE NCC investigates further on how to implement the proposal.

The task force recommends that the RIPE NCC continue to carry on ARC (Assisted Registry Checks) on a regular basis.

The task force recommends deleting historical data that don't serve any operational purposes and ask the community for feedback to determine which data falls into this category.

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6. Terminology

Accuracy: In this document, the term “accuracy” refers to “registration accuracy” as defined in RFC 720: “A core requirement of the Internet Numbers Registry System is to maintain a registry of allocations to ensure uniqueness and to provide accurate registration information of those allocations in order to meet a variety operational requirements. Uniqueness ensures that IP addresses and AS numbers are not allocated to more than one party at the same time.

Assisted Registry Checks: The Assisted Registry Check (ARC) is the name for the RIPE NCC's "audit" and "additional allocation audit" activities. During the ARC review, the RIPE NCC performs a variety of consistency checks to assess the quality of LIRs' registry data.

Internet Number Resources: IPv4 addresses, IPv6 Addresses and Autonomous System Numbers.

Registration: The documentation of Internet number resources within the RIPE NCC service region.

Resource Holder: An organisation or individual that has been allocated Internet number resources in the RIPE NCC service region.

RPKI: The Resource Public Key Infrastructure (RPKI) allows Local Internet Registries (LIRs) to request a digital certificate listing the Internet number resources they hold. It offers verifiable proof of holdership of resources' registration by a Regional Internet Registry (RIR).

7. Relevant Policies and Documents

- The RIPE Registry
- The RIPE Database Terms and Conditions
- The Internet Numbers Registry System
- IPv4 Address Allocation and Assignment Policies for the RIPE NCC Service Region (Section 4.0 and 6.2)
- IPv4 Address Allocation and Assignment Policies for the RIPE NCC Service Region (Section 3.3, 5.3 and 5.5.)
- Autonomous System (AS) Number Assignment Policies (Section 6.0)