PeeringDB Workshop

How is PeeringDB organised? // Track 1

arnold@peeringdb.com
Agenda

• Please always use the tutorial DB at https://tutorial.peeringdb.com

• What is PeeringDB?
• Organisation
  • History
  • Association
  • Committees
What is PeeringDB?

Mission statement: “PeeringDB, a nonprofit member-based organization, facilitates the exchange of user maintained interconnection related information, primarily for Peering Coordinators and Internet Exchange, Facility, and Network Operators.”
Why should I have a record in PeeringDB?

- As a network a PeeringDB record makes it easy for other networks to find you, and helps you to establish peering / interconnection.
- As a colocation provider a PeeringDB record creates visibility, and helps you to attract additional networks and IXes.
- As an IX a PeeringDB record provides information about your participants, and colocations where your service is available.
- Provides a user friendly GUI and a powerful API for automation.
Governance and Membership

• PeeringDB is a United States 501(c)(6) volunteer organization that is 100% funded by sponsorships
• Healthy organization, building financial reserves and executing the long term strategic plan
• Membership rules
  • A corporation, limited liability company, partnership or other legal business entity may be a Member of the Corporation
  • Membership is determined by having both an active PeeringDB.com account and an individual representative or role subscription to the PeeringDB Governance mailing list
  • 344 addresses subscribed to the Governance mailing list (as of April 16, 2019)
  • Governance list is at http://lists.peeringdb.com/cgi-bin/mailman/listinfo/pdb-gov
  • More information available at http://gov.peeringdb.com/
Governance

• The Members
  • Any corporation, limited liability company, partnership or other legal business entity may be a Member
  • One (virtual / online) member meeting per year

• The Board
  • Sets strategic directions and overlooks financial issues
  • Half of the board is elected every year

• The Committees
  • Responsible for the day to day work
  • Admin Committee
  • Operations Committee
  • Outreach Committe
  • Product Committe
## Committees

<table>
<thead>
<tr>
<th>Admin Committee</th>
<th>Operations Committee</th>
<th>Outreach Committee</th>
<th>Product Committee</th>
</tr>
</thead>
</table>
| • Manage administration of user accounts and PeeringDB records  
• Answer support tickets  
• Cleansing and completion of PeeringDB records | • Manage PeeringDB infrastructure | • Manage marketing and social media  
• Develop and maintain presentations, workshops and webinars  
• Coordinate presentations and attendance at events | • Manage roadmap and development priorities  
• Ask for input from the community on desired features  
• Write SoWs to solicit bids to complete requested features |

Leads: Stefan Funke (Chair)  
Contact: admincom@lists.peeringdb.com  
Leads: Job Snijders (Chair) and Aaron Hughes (Vice Chair)  
Contact: pdb-ops@lists.peeringdb.com  
Leads: Greg Hankins (Chair) and Bijal Sanghani (Vice Chair)  
Contact: outreachcom@lists.peeringdb.com  
Leads: Stephen McManus (Chair) and Matt Griswold (Vice Chair)  
Product Manager: Filiz Yilmaz  
Contact: productcom@lists.peeringdb.com
• Admin Committee volunteers are based around the world in a variety of time zones with diverse language skills
• Goal is to resolve support tickets within 24 hours
Product Development Workflow

• All issues tracked using GitHub at https://github.com/peeringdb/peeringdb/issues
  • Anyone can open a feature requests or file a bug report
  • Open and transparent process for product development
  • Workflow is at http://docs.peeringdb.com/workflow/

• Product Committee issue process
  • Evaluate and prioritize the requests
  • Request a quote for development costs
  • Request budget from the board
  • Manage implementation and scheduling

• Your input is needed on features!
Become a PeeringDB Sponsor!

- **Diamond Sponsorship** - $25,000 / year
  - Limited to 2 sponsors
  - Very large logo on top line of Sponsors page with URL
  - Diamond Sponsor badge display on all records
  - Social media promotion

- **Platinum Sponsorship** - $10,000 / year
  - Large logo on second line of Sponsors page with URL
  - Platinum Sponsor badge display on all records
  - Social media promotion

- **Gold Sponsorship** - $5,000 / year
  - Medium logo on third line of Sponsors page
  - Gold Sponsor badge display on all records
  - Social media promotion

- **Silver Sponsorship** - $2,500 / year
  - Small logo on fourth line of Sponsors page
  - Silver Sponsor badge display on all records
  - Social media promotion

Contact sponsorship@peeringdb.com for sponsorship info!
• Please always use the tutorial DB at https://tutorial.peeringdb.com

• Registering
  • Yourself
  • Your organization

• Adding information
  • About your organization
  • About your network / Autonomous System
  • Adding your peering policy

• Internet Exchanges and Facilities
  • Add where your network is present

• Retrieve information
  • Present what you have learned about another network
Registering

Specifically, we are a database of networks that are peering, where they are peering, and if they are likely to peer with you. If you don’t know what peering is, and/or you don’t currently engage in peering, this probably won’t have any meaning for you.

You are currently viewing a read-only view of the data contained here. If you are a peering network who would like to create an account, you may register for one here. Please register ONLY if you are a peering network.

Still have questions? Read our FAQ

© 2004-2019 PeeringDB
All Rights Reserved. By using this service, you agree to adhere to our AUP.
2.11.0 - Privacy Policy

Sponsors
Partners
Resources
Status
Documentation
API Documentation
Contact Us
support@peeringdb.com

Global System Statistics
14277 Peering Networks
6017 Public Exchange Points
25991 Unique Public Exchange Presences
3017 Private Facilities
23647 Private Facility Presences
Registering

- Choose an username
- Password must be at least 10 characters long
- Use a real work e-mail address
  - Ideally the one you registered the ASN with
- And put in your first and last name
- You receive a confirmation email
- Click on the link in the email
You can choose a language
• If your language is not available yet and you want to help – let us know!
• Not all languages are fully translated

To re-send the confirmation email, click the button

Further options here:
• Change email address
• Change password

You have to click the link in the email to continue!
Registering

• Once your email is confirmed:
  • Get affiliated with an organization
    • Your company
    • Which is already in PeeringDB
  • Or is new to PeeringDB
    • Can be an ISP – enter your AS number!
    • Or a Datacenter
    • Or an Internet Exchange

**Affiliate with organization**

To affiliate with an existing organization, please enter the ASN or organization name below.
To register a new network organization, please enter the ASN and organization name below.
To register a new facility or exchange organization, please enter the organization name below (ASN is optional).

**ASN:** 645XX
**Organization:** Some Name

In case the RIR entry cannot be retrieved for your ASN, please contact support@peeringdb.com for assistance.

Existing affiliations
Registering

Affiliate with organization

To affiliate with an existing organization, please enter the ASN or organization name below.
To register a new network organization, please enter the ASN and organization name below.
To register a new facility or exchange organization, please enter the organization name below (ASN is optional).

ASN
Organization
Affiliate

In case the RIR entry cannot be retrieved for your ASN, please contact support@peeringdb.com for assistance.

Existing affiliations

Your affiliation with ACME Alternative Hosting has been approved.

• Once approved, you can edit your organization
• Click on your organization to continue...
### Your Organization

- Enter information about your organization – click on edit

**ACME Alternative Hosting**

Some of the data on this page is incomplete, please update the fields marked with 🔄 to improve data quality.

<table>
<thead>
<tr>
<th>Website</th>
<th>Address 1</th>
<th>Address 2</th>
<th>Location</th>
<th>Country Code</th>
<th>Notes</th>
</tr>
</thead>
</table>

**Facilities**

<table>
<thead>
<tr>
<th>Name</th>
<th>Country City</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Networks**

<table>
<thead>
<tr>
<th>Name</th>
<th>ASN</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACME Alternative Hosting</td>
<td>64501</td>
</tr>
</tbody>
</table>

**Exchanges**

<table>
<thead>
<tr>
<th>Name</th>
<th>Country City</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Manage
• Lets focus on the left side of the screen
• Enter the required information (use either your Sheet or your real company information)
• Use the notes field to promote your company as a peer (if you want to)
  • You can use Markdown (see handout for URL)
Your Organization

- You can also change your company name
- Enter some information and click “Save”
Now it gets interesting

With your basic company information now in, let’s add information about your network

Click on your network name – beside your AS number on the right side

ACME Alternative Hosting Inc.

<table>
<thead>
<tr>
<th>Website</th>
<th><a href="http://www.acme.example">http://www.acme.example</a></th>
</tr>
</thead>
<tbody>
<tr>
<td>Address 1</td>
<td>Vienna</td>
</tr>
<tr>
<td>Address 2</td>
<td></td>
</tr>
<tr>
<td>Location</td>
<td>Vienna 01000</td>
</tr>
<tr>
<td>Country Code</td>
<td>Austria</td>
</tr>
<tr>
<td>Notes</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Facilities

<table>
<thead>
<tr>
<th>Name</th>
<th>Country</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Nothing matched your filter
You may filter by Name, Country or City

Networks

<table>
<thead>
<tr>
<th>Name</th>
<th>ASN</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACME Alternative Hosting</td>
<td>64501</td>
</tr>
</tbody>
</table>
Network Information

- Again, click on „Edit“ (top right)
- Here is a lot of information to enter
- Most is self-explanatory
- But some is not that obvious
  - Title here is your network name
  - Does not have to be the same as your company name
  - Some companies run more than one network
  - Or use a different name for their networking business
Network Information

- Use this field for an alternative name
- Or an „old“ name if you changed names
- Or leave it empty
- Company website – remember this is PeeringDB
  - Put in the URL your peers should see
- AS number – your main one
  - If you have more, you can add a 2nd entry later
  - This field will probably be removed

---

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organization</td>
<td>ACME Alternative Hosting Inc</td>
</tr>
<tr>
<td>Also Known As</td>
<td></td>
</tr>
<tr>
<td>Company Website</td>
<td><a href="http://www.example.com">http://www.example.com</a></td>
</tr>
<tr>
<td>Primary ASN</td>
<td>64501</td>
</tr>
<tr>
<td>IRR Record</td>
<td></td>
</tr>
<tr>
<td>Route Server URL</td>
<td><a href="http://www.example.com">http://www.example.com</a></td>
</tr>
<tr>
<td>Looking Glass URL</td>
<td><a href="http://www.example.com">http://www.example.com</a></td>
</tr>
<tr>
<td>Network Type</td>
<td>Not Disclosed</td>
</tr>
<tr>
<td>IPv4 Prefixes</td>
<td>0</td>
</tr>
<tr>
<td>IPv6 Prefixes</td>
<td>0</td>
</tr>
<tr>
<td>Traffic Levels</td>
<td>Not Disclosed</td>
</tr>
<tr>
<td>Traffic Ratios</td>
<td>Not Disclosed</td>
</tr>
<tr>
<td>Geographic Scope</td>
<td>Not Disclosed</td>
</tr>
<tr>
<td>Protocols Supported</td>
<td>Unicast IPv4, Multicast, IPv6</td>
</tr>
<tr>
<td>Last Updated</td>
<td>2018-12-12T12:48:07Z</td>
</tr>
<tr>
<td>Notes</td>
<td>Markdown enabled</td>
</tr>
</tbody>
</table>
Network Information

- IRR Record
  - Your AS-Macro (also called AS-Set)
  - You have registered in IRR database
  - Of your RIR (Regional Internet Registry)

- Route Server URL - if you have one

- Looking Glass URL
Network Information

- Fill in the rest
  - Either according to your sheet
  - Or choose your real network
- In „Notes“ you can use Markdown
  - You can give your peers free text information
  - Like details about your peering policy
  - More about your peering policy further down below
Now we add information about Peering!

Important: Allowing IXP Update helps maintaining DB accuracy

So please allow if you trust your IXPs

Currently the so-called IX-F importer is disabled
Tools for the IXP Update

- **Preview** lets you see what will happen with the next import.
- **Postmortem** shows what happened at the last import.
- Use the dropdowns to publish your peering policy.
- In case of selective/restrictive you may use the notes field above.
• Very important!
• To inform peers how to contact you
  • In a number of roles
• You can add as many as you need
  • „Add Contact“ to store and next
  • Public, for logged in users, or private
• You do not have to fill out all fields
• But please:
  keep contact info up to date
• Do not forget to „save“ when complete
Review what you have entered

• You now have entered:
  • Information about your organization, like:
    • Address
    • Website
    • Free form text
  • Network information
    • Your AS number
    • Number of prefixes you announce,
    • Traffic info
  • Peering information, like peering policy
  • Contacts for your peers
• Please check if everything is correct
Add peering at an IXP

- Click on „Edit“ at the top right again
- Enter an IXP name in Exchange
  - And select the IXP you are connected to from the list
- Enter speed, IPv4 and IPv6
- Select “RS Peer“ if you are peering with the route server
- Click on „Add Exchange Point“!
- And then click on „save“.
Presence at a datacenter

- Now again click on „edit“
- Scroll down and enter a city or datacenter name in „Facility“
- Select the facility you are in from the list and....
- ...click on „Add Facility“
- When you have added all facilities click on „Save“
Check what you have entered

- Click on the name of the IXP you entered
- Find your entry in the list
- Do the same for the facilities you are in
Now lets see if others find you...

- Write your AS number on a sheet of paper
- All stand up and form a circle
- Give the person opposite to you your AS number
- and receive their AS number
- Use PeeringDB to learn about
  - Their organization
  - Their network
You should answer the following questions:

- What is the main business of their organization / network
- What is their peering policy
- What is the size of the networks in terms of:
  - Traffic
  - Prefixes
- Where are they present
  - IXPs
  - Facilities
- Would you peer with them?
  - According to your own peering policy
  - Why? / Why not?
Present what you have learned

• Present to the group what you have learned
• About the organization and network you have received
• The person who has entered the information checks
  • If everything is correct
  • If anything important is missing
Add your facility

- If you run your own datacenter
- Why not add it to PeeringDB?
- Go to your organization page
- Scroll down to „Manage“
- Choose „Add Facility“
Add your facility

Add a new Facility to your Organization. Note that the newly created Facility will need to be approved by PeeringDB staff before it will appear in the search results or the API listings.

To be listed as a Facility in PeeringDB we would expect that you offer colocation, data center and/or meet-me-room services to the public.

- Fill in applicable fields
- CLLI and NPA-NXX: deprecated
- Click "Submit Facility"
- Entry will be reviewed
- And added or declined
Suggesting a facility

- For facilities *not your own*
- But you are in or know about
- Choose „Suggest Facility“
- Needs to be reviewed by PeeringDB staff
Suggesting a facility

- Fill in applicable fields
- CLLI and NPA-NXX: deprecated
- Click „Suggest Facility“
- Entry will be reviewed
- And added or declined

Suggest Facility to be added to the database. Your suggestion will be reviewed by the PeeringDB Administration Committee. It will then either be finalized and entered into the database, or declined. No further action is required on your part.

In order to be approved we would expect that the suggested Facility offers colocation, data center and/or meet-me-room services to the public.
Adding users

• You do not have to be the only person working with PeeringDB
• Other users from your organization may also register!
• Users can be „admin“ or „member“
  • The first user automatically will be an „admin“
• Administrators are allowed to edit all fields (of your organization)
• Members rights can be as restrictive or as open as you need them to be
• Let’s try it out
• Request affiliation with the organization you just presented
Affiliate with an organization

- Go to your profile page (1)
- Request affiliation
  - Either use the AS number (2)
  - Or name and select (3)
  - Click on „Affiliate“ (4)
- Admin of organization gets an email if there is one. Otherwise PeeringDB support
- Checks, and either approves or denies
Approve affiliation requests

• Go to your organization page
• Scroll down to the „manage“ section
• Click on the „Users“ tab
• Either approve or deny new users
User administration

- Users can be admins or members
- Use the dropdown to change
- For members – you can add permissions
- Use the permissions tab to grant create, update and/or delete to selected of any entities
- Do not forget to „save“ your changes
Removing Users

- Be sure you are logged in as an admin
- Go to your organization page
- Scroll down to the „manage“ section
- Click on the „Users“ tab
- Click on „Remove“ on the right side
- And do not forget to „save“
- The user is only deleted from your organization
- If you want to remove a user completely, email PeeringDB support
• If you leave an internet exchange:
  – please remove your peering IP addresses

• Go to your network page
• Click on „Edit“ (top right)
• Click on the × beside the entry of
  the exchange
• Confirm and do not forget to
  „Save“
More removing...

- Facilities, Contacts, all the same
- Click on „Edit“
- Click on the remove symbol at the entry
- Click on “Save“
Removing – more information

• Objects are only marked deleted, but stay in the DB
• You cannot simply re-add them
• Please contact support@peeringdb.com if you need help
The PeeringDB API
Workshop // Track 3

arnold@peeringdb.com
Agenda

• Please always use the tutorial DB at https://tutorial.peeringdb.com

• Introduction
• jq
• JSON
• HTML Operations
• Record Types
  • Basic Records
  • Derived Records
Introduction

• Why API (Application Programming Interface)?
  • The GUI is nice for human beings
  • Automation needs structured data

• Makes it easy to integrate PeeringDB in your environment
- Light-weight and flexible command-line processor
- awk, sed and grep equivalent to JSON data
- A jq program is a filter
  - Needs an input and produces an output
  - Maybe piped
  - Looks weird sometimes, like "add/length" produces average of an array
  - Simplest filter is "." which is the Identity
    - Maybe used to pretty print JSON output
- See [https://stedolan.github.io/jq/manual](https://stedolan.github.io/jq/manual) for an introduction
JSON

- Open standard file format
- Short for JavaScript Object Notation
- Filenames use the extension .json
- Language independent data format
- Basic data types
  - Number
  - String
  - Boolean
  - Array
  - Object
  - null
Basics

• In general https://peeringdb.com/api/OBJ
  • OBJ is case insensitive
  • So called endpoint: /api/OBJ

• Output always fits in one object
  • Meta is optional
  • Data always an array

```json
{
  meta:
    {
      status:
        message:
    }
  data:
    [,
      {},
      {}
    ]
}
```
Authentication

- Authentication via basic HTTP authorization
- Guest access does not need any authentication
- Examples
  - `curl -sG https://username:password@peeringdb.com/api/poc`
  - `curl -u username:password https://peeringdb.com/api/poc`
  - Put credentials in ~/.netrc
    - machine peeringdb.com login username password password
- Recap: only access to contact information may be restricted
  - Endpoint /api/poc
  - You need to be authenticated for view „user“
All HTML operations are supported

- **GET**
  - Requests a representation of the specified resource
- **POST**
  - Used to submit an entity to the specified resource
- **PUT**
  - Replaces all current representations of the target resource with the request payload
- **DELETE**
  - Deletes the specified resource
• GET
  • Multiple objects
    • Endpoint /api/OBJ
  • Single object
    • Endpoint /api/OBJ/id
Optional URL parameters for GET

- **limit**
  - Integer value
  - Limits to n rows in the result set

- **skip**
  - Integer value
  - Skips n rows in the result set

- **depth**
  - Integer value
  - Nested sets will be loaded
  - See Nesting slide
Optional URL parameters for GET

- **fields**
  - String value
  - comma separated list of field names
  - only matching fields will be returned in the data

- **since**
  - Integer value
  - Retrieve all objects updated since specified time
  - Unix timestamp in seconds

- **fieldname**
  - Integer or string value
  - Queries for fields with matching value
• Of type OBJ_set
• Example: net_set will hold network objects
• Depth (for endpoint /api/OBJ)
  • 0: don't expand anything (default)
  • 1: expand all first level sets to ids
  • 2: expand all first level sets to objects
• Depth (for endpoint /api/OBJ/id)
  • 0: don't expand anything
  • 1-4: expand all sets and related objects according to level of depth specified
  • 2 is default
Nested Data / Depth

https://peeringdb.com/net/947?pretty

https://peeringdb.com/net/947?pretty&depth=0
Query modifiers

- numeric fields
  - __lt: less than
  - __lte: less than equal
  - __gt: greater than
  - __gte: greater than equal
  - __in: value inside set of values (comma separated)

- string fields
  - __contains: field value contains this value
  - __startswith: field value starts with this value
  - __in: value inside set of values (comma separated)
• Used to create an object
• Endpoint /api/OBJ
• Required parameters
  • Depending on OBJ
  • For org you need the name
  • For fac, ix, net you need the org_id
  • for fac you need the name
  • For ix you need the name and prefix
  • For net you need the asn
• Example
  • curl -sn -X POST -H "Content-Type: application/json" -d @22106.json \ https://tutorial.peeringdb.com/api/org

File 22106.json
• Used to edit object
• Endpoint /api/OBJ/id
• Updates data in OBJ/id
• You have to send all the data, not just the change
• Example
  • curl -sn -X PUT -H "Content-Type: application/json" -d @22106.json \ https://tutorial.peeringdb.com/api/org/22114
• Operation of PUT is idempotent

File 22106.json
• Used to delete objects
• Endpoint /api/OBJ/id
• Example
  • `curl -sn -X DELETE -H "Content-Type: application/json" \ https://tutorial.peeringdb.com/api/org/22114`
Object Types

• Basic Objects
  • org, fac, ix, net, poc, as_set

• Derived Objects
  • ixlan, ixpfx, netixlan, netfac
Basic Objects

- **org**
  - Root object for fac, ix, net
  - Holds information about organisation

- **fac**
  - Describes a facility / colocation record
  - More useful information are in derived records netfac

- **ix**
  - Describes an Internet Exchange
  - More useful information are in derived records ixlan, ixfx and netixlan

- **net**
  - Describes a network / ASN
  - More useful information are in netfac and netixlan

- **poc**
  - Describes various role accounts (point of contact)
  - Currently only for net objects

- **as_set**
  - Array of all AS-SETs corresponding to a network / ASN
  - Only introduced recently
Derived Objects

• ixlan
  • Describes the LAN of an IX
  • One IX may have multiple ixlan
  • May go away with PeeringDB 3.0

• ixpfx
  • Describes the IP range (IPv4 and IPv6) for an ixlan
  • One ixlan may have multiple ixpfx, both for IPv4 and IPv6

• netixlan
  • Describes the presence of a network at an IX

• netfac
  • Describes the presence of a network at a facility
GUI to API // org

- https://peeringdb.com/org/1187
- Add pretty and depth for human friendly output
- https://peeringdb.com/api/org/1187
- https://peeringdb.com/api/fac?org_id=1187
- https://peeringdb.com/api/net?org_id=1187
- https://peeringdb.com/api/ix/org_id=1187
GUI to API // fac

- [https://peeringdb.com/fac/752](https://peeringdb.com/fac/752)
- Add pretty and depth for human friendly output
- [https://peeringdb.com/api/fac/752](https://peeringdb.com/api/fac/752)
- [https://peeringdb.com/api/ixfac?fac_id=752](https://peeringdb.com/api/ixfac?fac_id=752)
- [https://peeringdb.com/api/netfac?fac_id=752](https://peeringdb.com/api/netfac?fac_id=752)
GUI to API // net

- https://peeringdb.com/net/13251
- Add pretty and depth for human friendly output
- https://peeringdb.com/api/net/13251
- https://peeringdb.com/api/netixlan?net_id=31
- OR https://peeringdb.com/api/netixlan?asn=196610
- OR https://peeringdb.com/api/netfac?local_asn=196610
GUI to API // ix

- [https://peeringdb.com/ix/31](https://peeringdb.com/ix/31)
- Add pretty and depth for human friendly output
- [https://peeringdb.com/api/ix/31](https://peeringdb.com/api/ix/31)
- [https://peeringdb.com/api/ixlan?ix_id=31](https://peeringdb.com/api/ixlan?ix_id=31)
- [https://peeringdb.com/api/ixpfx?ixlan_id=31](https://peeringdb.com/api/ixpfx?ixlan_id=31)
- [https://peeringdb.com/api/ixfac?ix_id=31](https://peeringdb.com/api/ixfac?ix_id=31)
- [https://peeringdb.com/api/netixlan?ix_id=31](https://peeringdb.com/api/netixlan?ix_id=31)
Basic records in detail // ix and org

```
"data": [  
  {    
    "id": 31,    
    "org_id": 1187,    
    "name": "DE-CIX Frankfurt",    
    "name_long": "Deutscher Commercial Internet Exchange",    
    "city": "Frankfurt",    
    "country": "DE",    
    "region": "Europe",    
    "media": "Ethernet",    
    "notes": "For peering with the DE-CIX Frankfurt route servers, please see:\n\n[DE-CIX Management GmbH](https://de-cix.net)\n\nFor more information, visit the DE-CIX website: [https://de-cix.net](https://de-cix.net)\n\nContact Information:\n\n**Tech Email:** support@de-cix.net\n\n**Tech Phone:** +49 69 1730 902 11\n\n**Policy Email:** sales@de-cix.net\n\n**Policy Phone:** +49 69 1730 902 12\n\n- **Network Count:** 805\n- **Created:** 2010-07-29T00:00:00Z\n- **Updated:** 2018-06-19T11:53:46Z\n- **Status:** "ok"  
  }  
]  
```
Basic records in detail // fac

```
"data": [  
  {    "id": 752,    "org_id": 8540,    "org_name": "euNetworks Group",    "name": "euNetworks Colocation Hamburg",    "website": "http://www.euNetworks.com",    "cli": "",    "rncode": "",    "npanxx": "",    "notes": "",    "net_count": 5,    "latitude": null,    "longitude": null,    "created": "2010-07-29T00:00:00Z",    "updated": "2019-09-25T22:00:34Z",    "status": "ok",    "address1": "Wendenstra\u00dfe 408",    "address2": "",    "city": "Hamburg",    "country": "DE",    "state": "",    "zipcode": "20537"  }
  ]
```
Basic records in detail // net and poc

```json
"data": [
  
  { "id": 25826,
    "org_id": 1187,
    "name": "DE-CIX Academy Educational Network",
    "aka": "DE-CIX",
    "website": "http://www.de-cix.net/academy",
    "asn": 196610,
    "looking_glass": "",
    "route_server": "",
    "irr_as_set": "AS196610:AS-DECIX-ACADEMY",
    "info_type": "Educational/Research",
    "info_prefixes": 1,
    "info_prefix": 5,
    "info_traffic": "0-20 Mbps",
    "info_ratio": "Balanced",
    "info_scope": "Regional",
    "info_multicast": false,
    "info_ipv6": true,
    "notes": "* We only peer with the route servers. Any peering request you send will be used for educational purposes",
    "policy_url": "",
    "policy_general": "Open",
    "policy_locations": "Not Required",
    "policy_ratio": false,
    "policy_contracts": "Not Required",
    "created": "2018-07-24T09:26:21Z",
    "updated": "2018-07-24T09:26:21Z",
    "status": "ok"
  }
]
```
Basic records in detail // as_set

```
{
  "meta": {},
  "data": [
    "196610": "AS196610:AS-DECIX-ACADEMY",
    "262150": "AR-EPEC2-LACNIC",
    "393223": "AS-CWICA",
    "32780": "AS-HSI",
    "196621": "AS196621:AS-CUSTOMERS",
    "327698": "AS-327698",
    "32787": "AS-PROLE",
    "327700": "AFRINIC",
    "32798": "RS-USCS-ALL",
    "5467": "AS-MIPT",
    "32806": "AS27822",
    "32808": "AS-UTBB",
    "42": "AS-PCH",
    "262189": "LACNIC",
    "46": "AS-RUTGERS",
    "262195": "AS-ITXAR1",
    "393269": "AS-DAILYMOTIONUS",
    "57": "AS-NLGPARTICIPANTS",
    "327740": "ORG-TA38-AFRINIC",
    "82": "AS-c1",
    "393280": "AS393280 in Level3",
    "72": "AS-SLB",
    "327754": "AS-RMS-Powertronics",
    "327693": "AfrINIC:AS-ECHOSP/RS-ECHOSP",
    "81": "AS-MEPENQARTH"
  ]
}
```

https://peeringdb.com/api/as-set/42

https://peeringdb.com/api/as-set
Derived records in detail // ixfac, ixlan and ixpfx

```
{
  "id": 31,
  "ix_id": 31,
  "name": "DE-CIX Frankfurt Peering LAN",
  "descr": "",
  "mtu": 1500,
  "dot1q_support": false,
  "rs_asn": 0,
  "arp_sponge": null,
  "created": "2011-06-22T00:00:00Z",
  "updated": "2016-03-14T21:57:28Z",
  "status": "ok"
}
```

```
{
  "id": 41,
  "ix_id": 26,
  "fac_id": 63,
  "created": "2010-07-29T00:00:00Z",
  "updated": "2016-03-14T20:33:57Z",
  "status": "ok"
}
```
Derived records // netfac and netixlan

```
{
    "id": 30451,
    "name": "Interxion Frankfurt (FRA1-13)",
    "city": "Frankfurt",
    "country": "DE",
    "net_id": 13251,
    "fac_id": 58,
    "local_asn": 196610,
    "created": "2018-07-24T09:25:24Z",
    "updated": "2018-07-24T09:25:24Z",
    "status": "ok"
}
```

```
{
    "id": 163,
    "net_id": 5
    "ix_id": 31
    "name": "DE-CIX Frankfurt: DE-CIX Frankfurt Peering LAN",
    "ixlan_id": 31
    "notes": "",
    "speed": 20000,
    "asn": 3303,
    "ipaddr4": "80.81.193.183",
    "ipaddr6": "2001:7f8::ce7:0:2",
    "is_rs_peer": true,
    "created": "2010-07-29T00:00:00Z",
    "updated": "2019-01-18T11:19:59Z",
    "status": "ok"
}
```