PeeringDB

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 longterm 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
  - 364 addresses subscribed to the Governance mailing list (as of Feb 14, 2022)
  - 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
    - Next meeting is Tuesday, April 12th, at 1600 UTC
- 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 Committee
  - Product Committee
- https://docs.peeringdb.com/gov/

Board of Directors and Officers

Chris Caputo – Secretary & Treasurer (Non-Board Member)

Patrick Gilmore – Director (Term Expires 2023)

Aaron Hughes – President (Term Expires 2022)

Christopher Malayter – Director (Term Expires 2023)

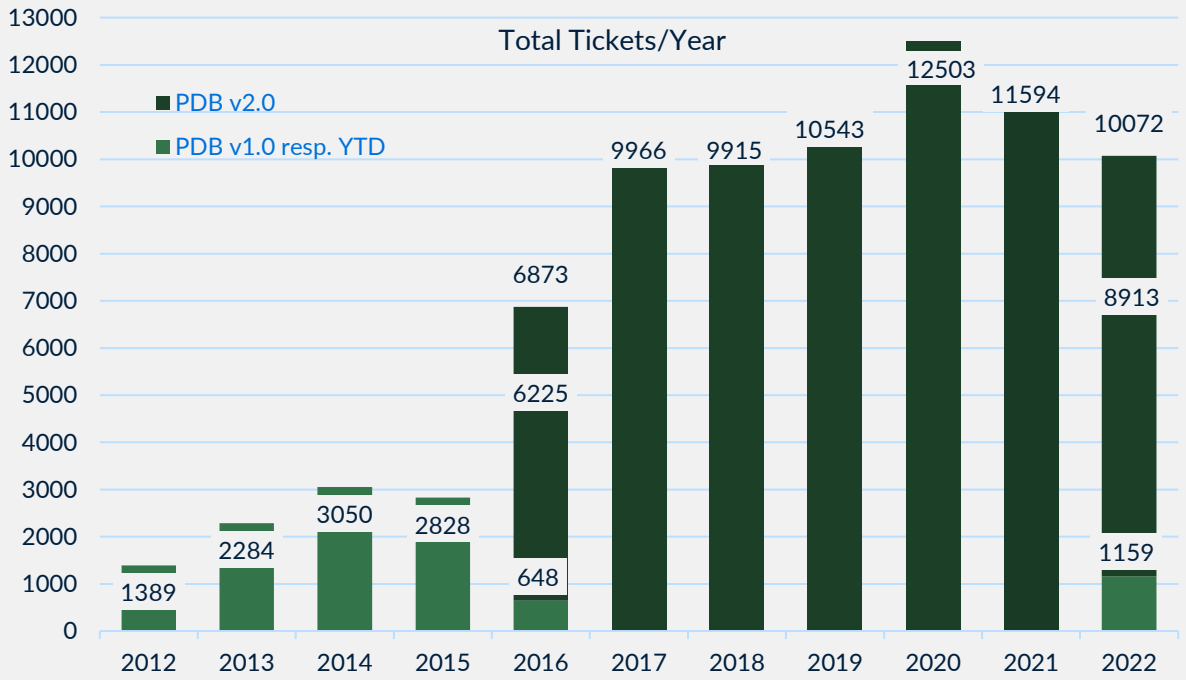
Bijal Sanghani – Director (Term Expires 2023)

Job Snijders – Vice President (Term Expires 2022)

Committees

Admin Committee	Operations Committee	Outreach Committee	Product Committee
• 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: Patrick Gilmore (Chair) and Darwin Costa (Vice Chair) Contact:admincom@lists.peeringdb.com	Leads: Job Snijders (Chair) and Aaron Hughes (Vice Chair) Contact: pdb-ops@lists.peeringdb.com	Leads: Ben Ryall (Chair) and Bijal Sanghani (Vice Chair) Contact: outreachcom@lists.peeringdb.com	Leads: Stephen McManus (Chair) and Matt Griswold (Vice Chair) Product Manager: Leo Vegoda Contact: productcom@lists.peeringdb.com

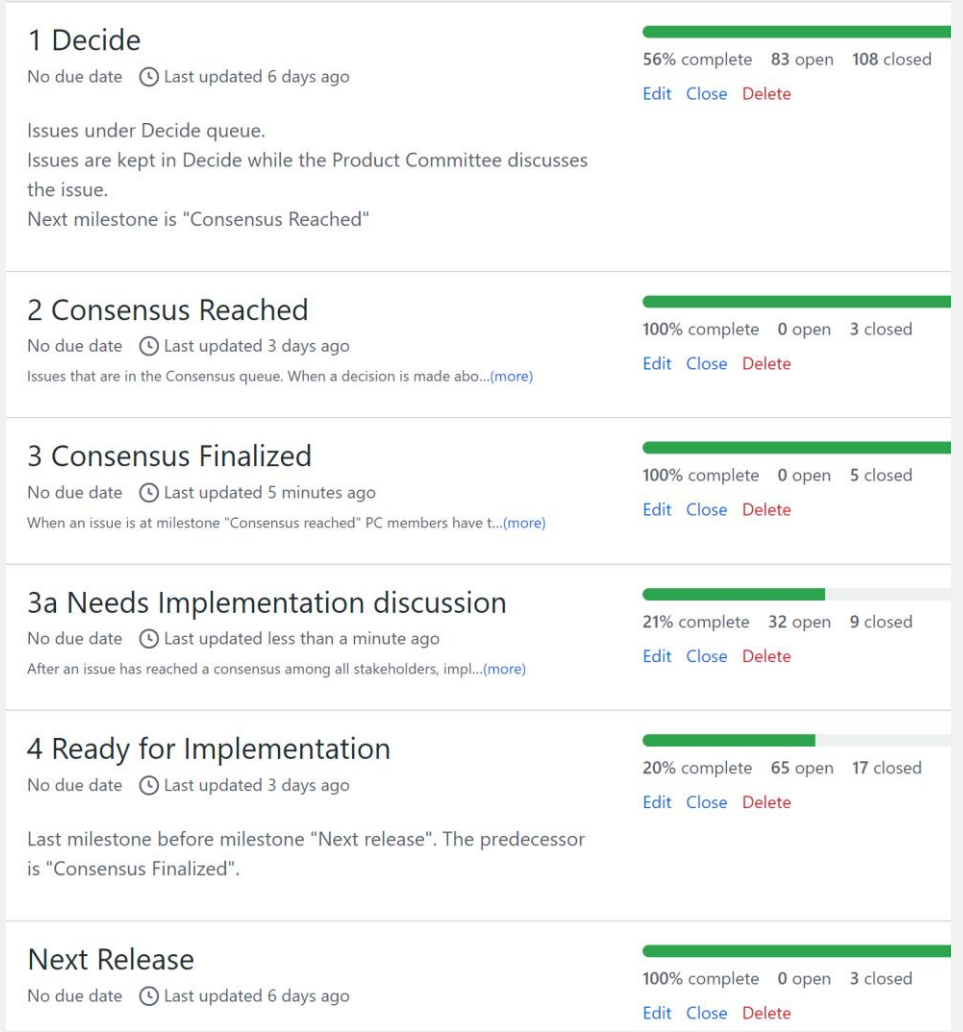
Support Ticket Statistics



- 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

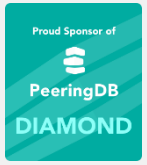
Product Development

- All issues tracked using our GitHub repository
  - Anyone can open a feature requests or file a bug report
  - Open and transparent process for product development
  - Documented Decision making and Workflow process
- 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!



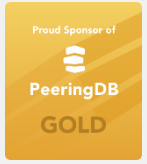
Become a PeeringDB Sponsor!

- 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

Microsoft Diamond Sponsor

Organization	Microsoft Corporation
Also Known As	8068 8069
Company Website	
Primary ASN	8075

DE-CIX Frankfurt Platinum Sponsor

Organization	DE-CIX Management GmbH
Long Name	Deutscher Commercial Internet Exchange
City	Frankfurt
Country	DE
Continental Region	Europe
Media Type	Ethernet

Proud Sponsor of **PeeringDB** Gold

Contact sponsorship@peeringdb.com for sponsorship info!

Thank you to our sponsors!

Diamond Sponsor

amazon Microsoft

Platinum Sponsors

APNIC FOUNDATION DE-CIX Meta NTT YAHOO!

Gold Sponsors

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Internet Society Internet Association of Australia KDDI TELEHOUSE Seaborn STACLAR

Silver Sponsors

anexia amsix BBIX cologix DATA4 DIGITAL REALTY Convergence hub interxion A DIGITAL REALTY COMPANY

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NLIX neutral internet exchange NYIIX RACKCENTRE QIX RIPE NCC RIPE NETWORK COORDINATION CENTRE TERACO AFRICA'S DATA CENTRE zenlayer

PeeringDB Workshop

Learning the Ropes // Track 2

arnold@peeringdb.com

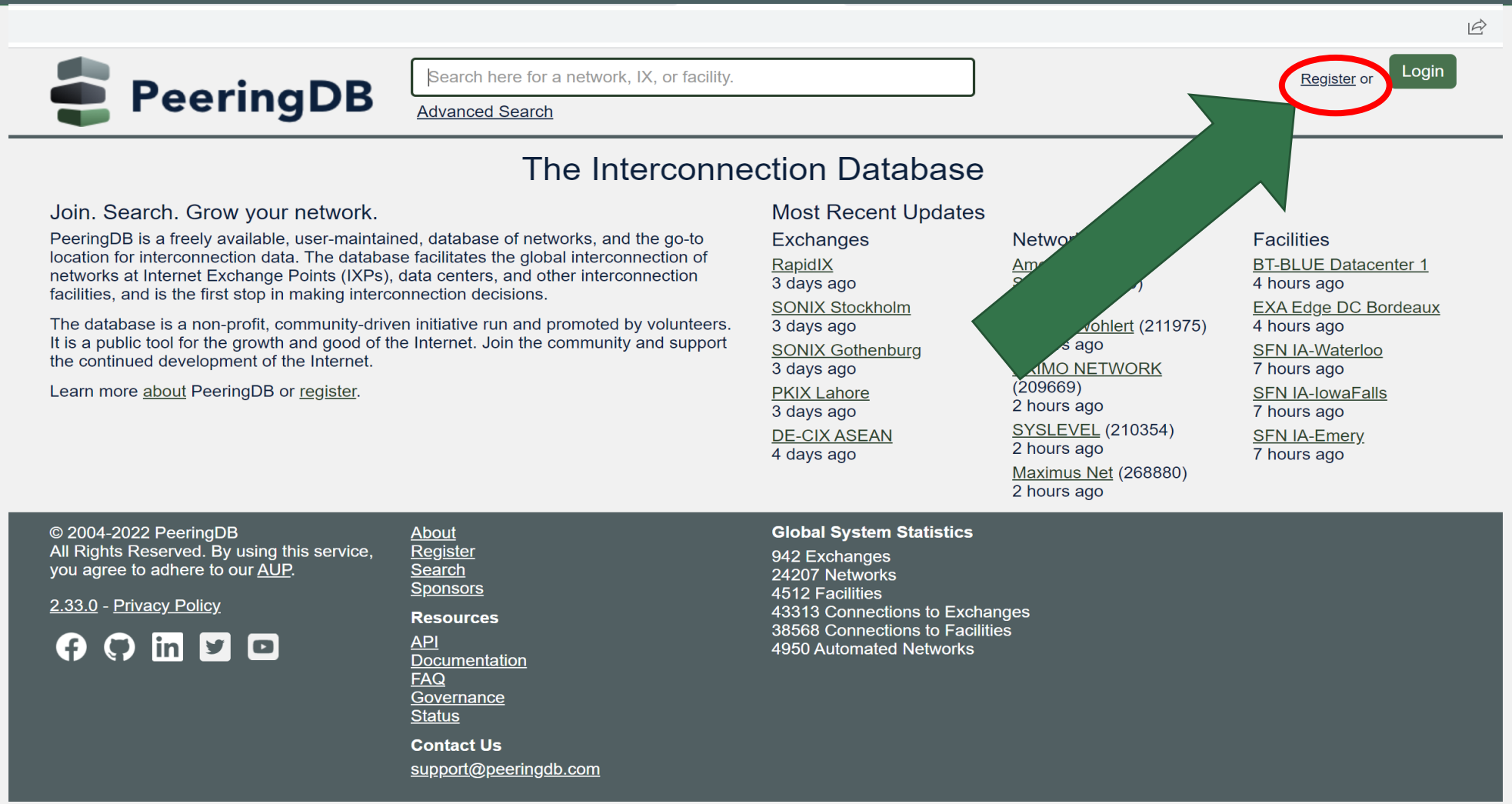
PeeringDB

Agenda

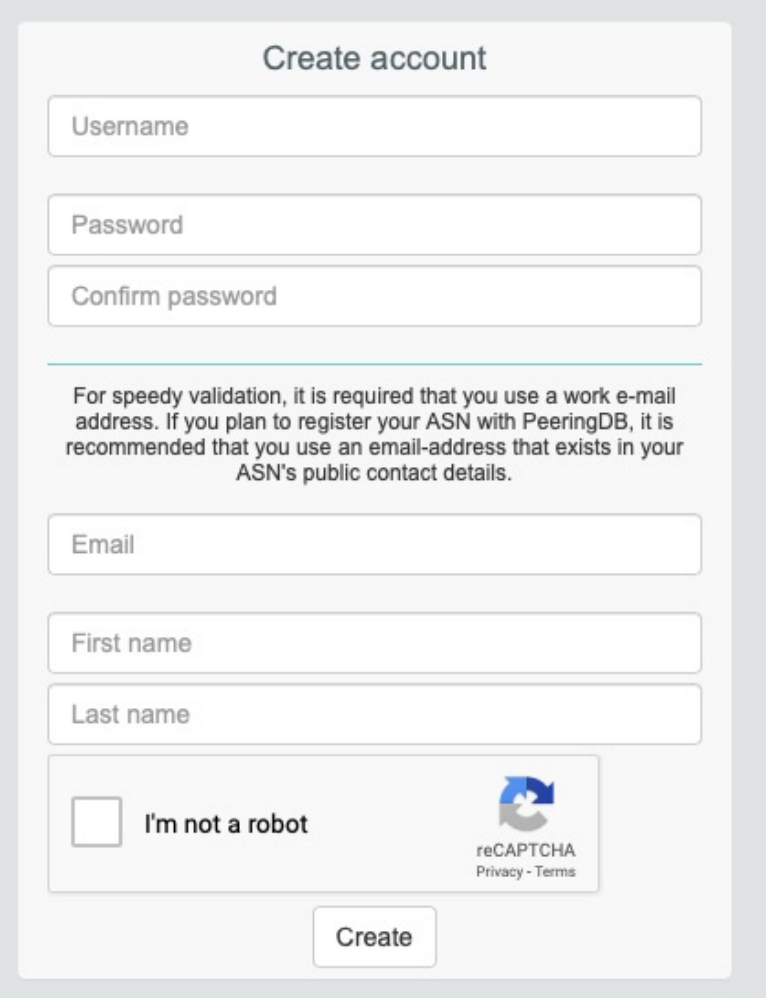
- Please always use the tutorial DB at https://tutorial.peeringdb.com

- 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
  - Managing Suggestions

Registering

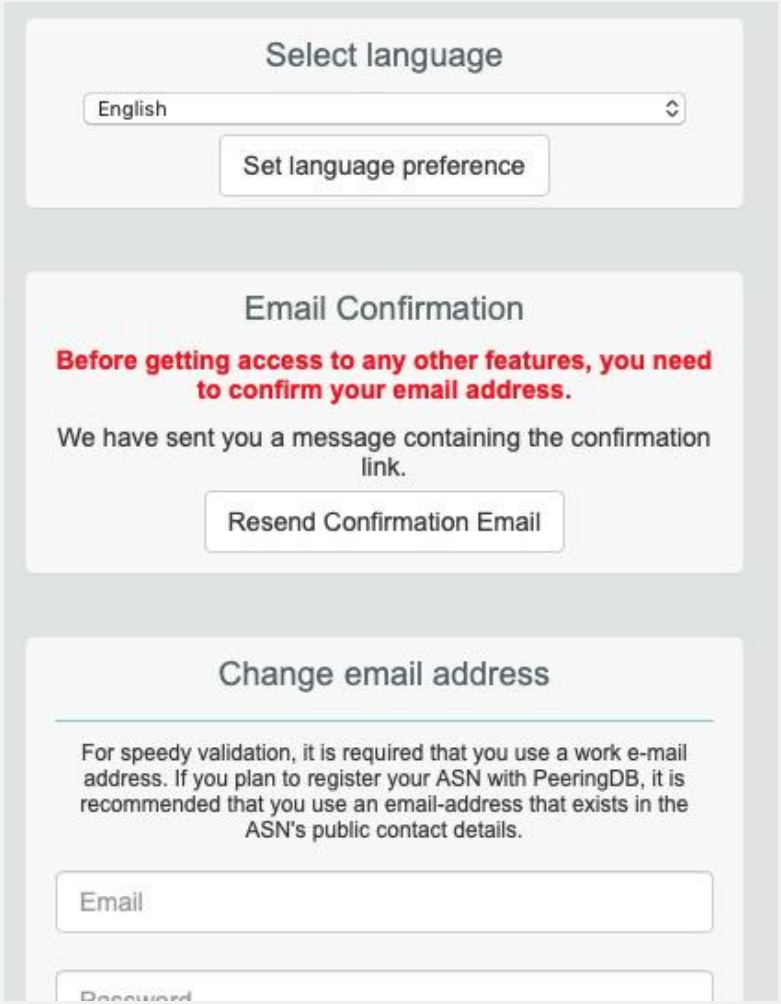


Registering



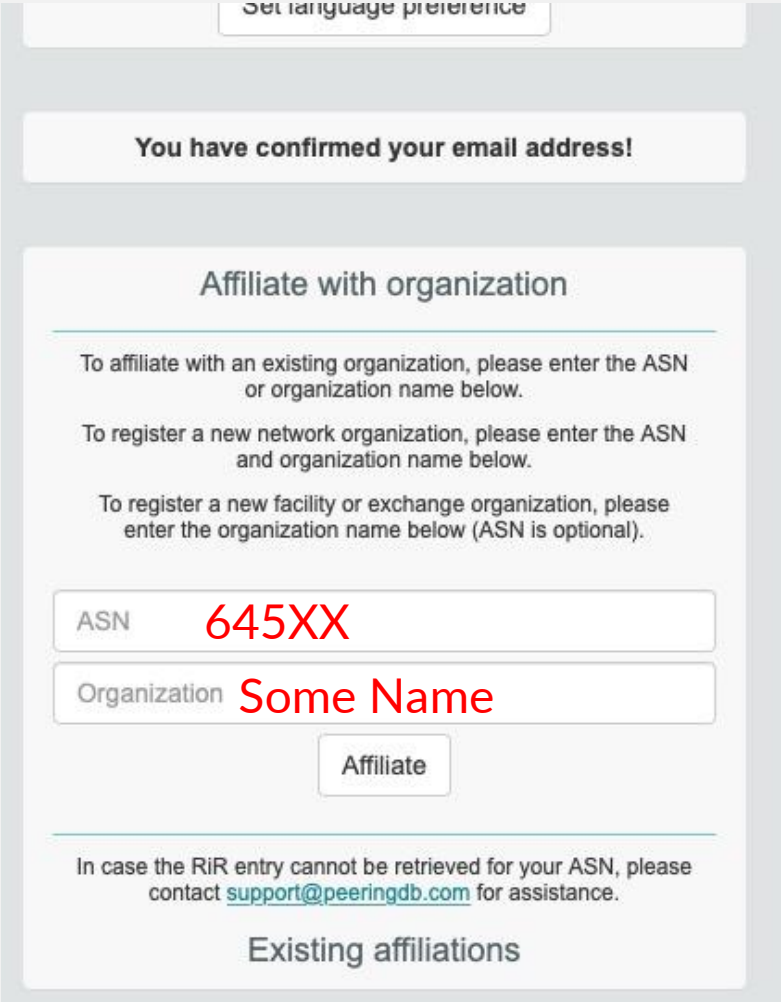
- Choose a username
- Password must be at least 10 characters long
- Use a **real** work **e-mail address**
  - Ideally the one you registered the ASN with
- And put in your first and last name
- You receive a confirmation email
- Click on the link in the email

Registering



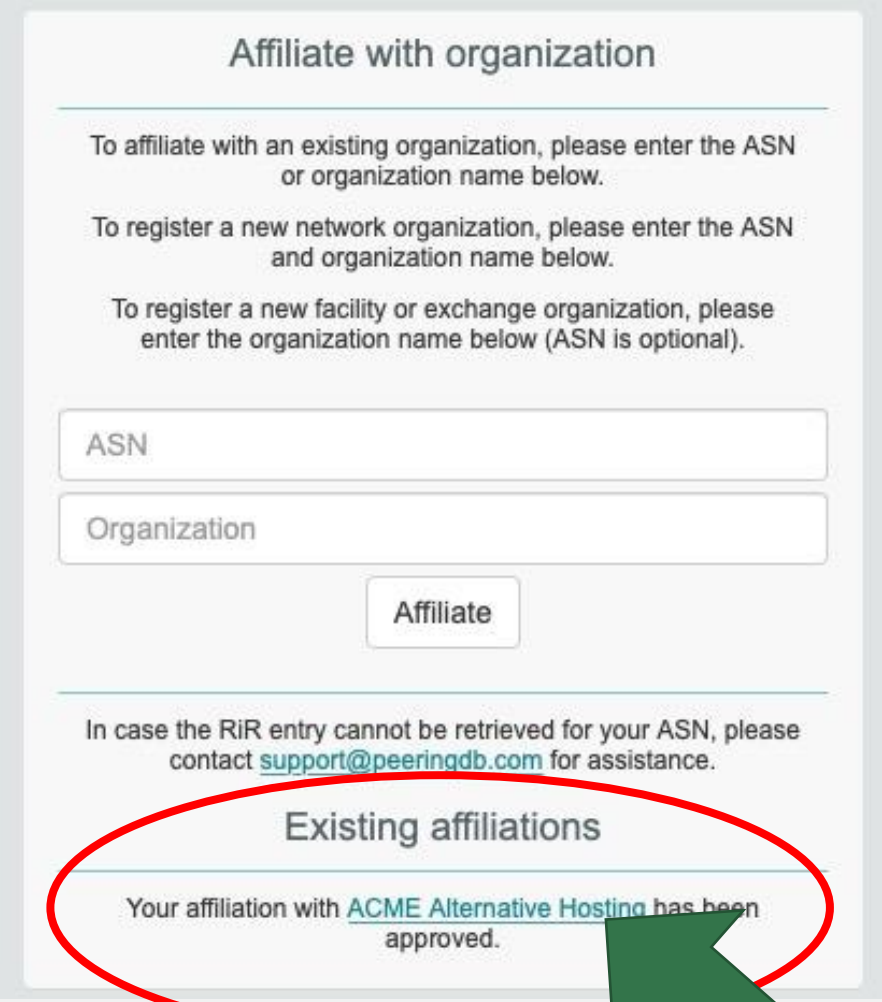
- You can choose a language
  - If your language is not available yet and you want to help – let us know!
  - Not all languages are fully translated
- To re-send the confirmation email, click the button
- Further options here:
  - Change email address
  - Change password
- You have to click the link 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

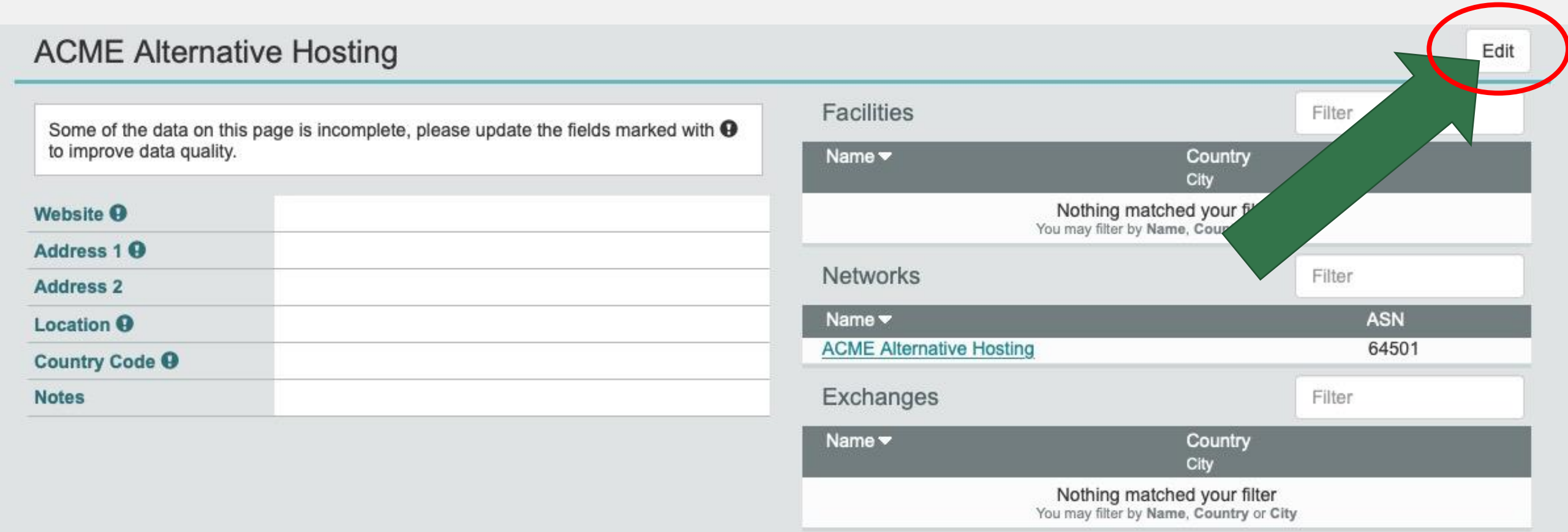
Registering



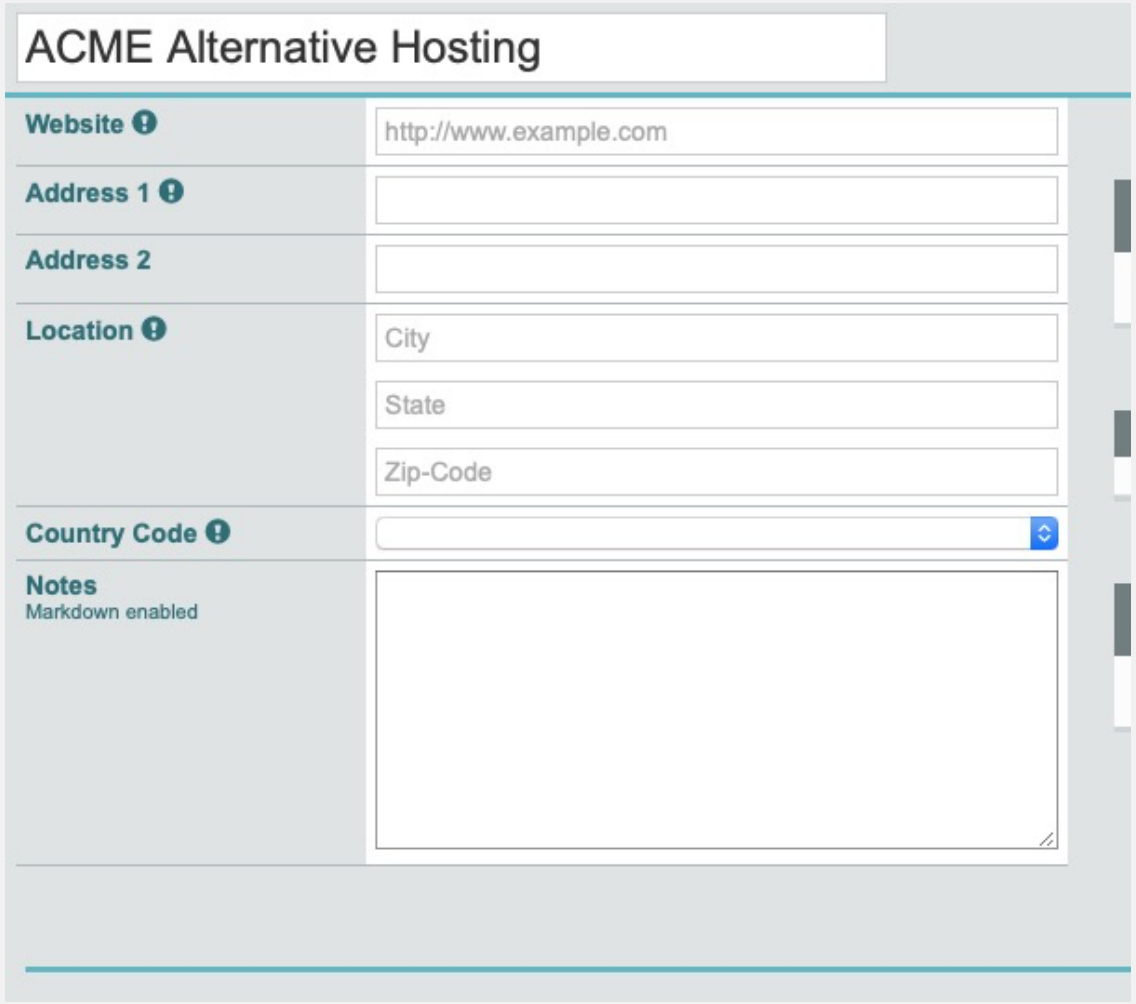
- Once approved, you can edit your organization
- Click on your organization to continue...

Your Organization

- Enter information about your organization – click on edit

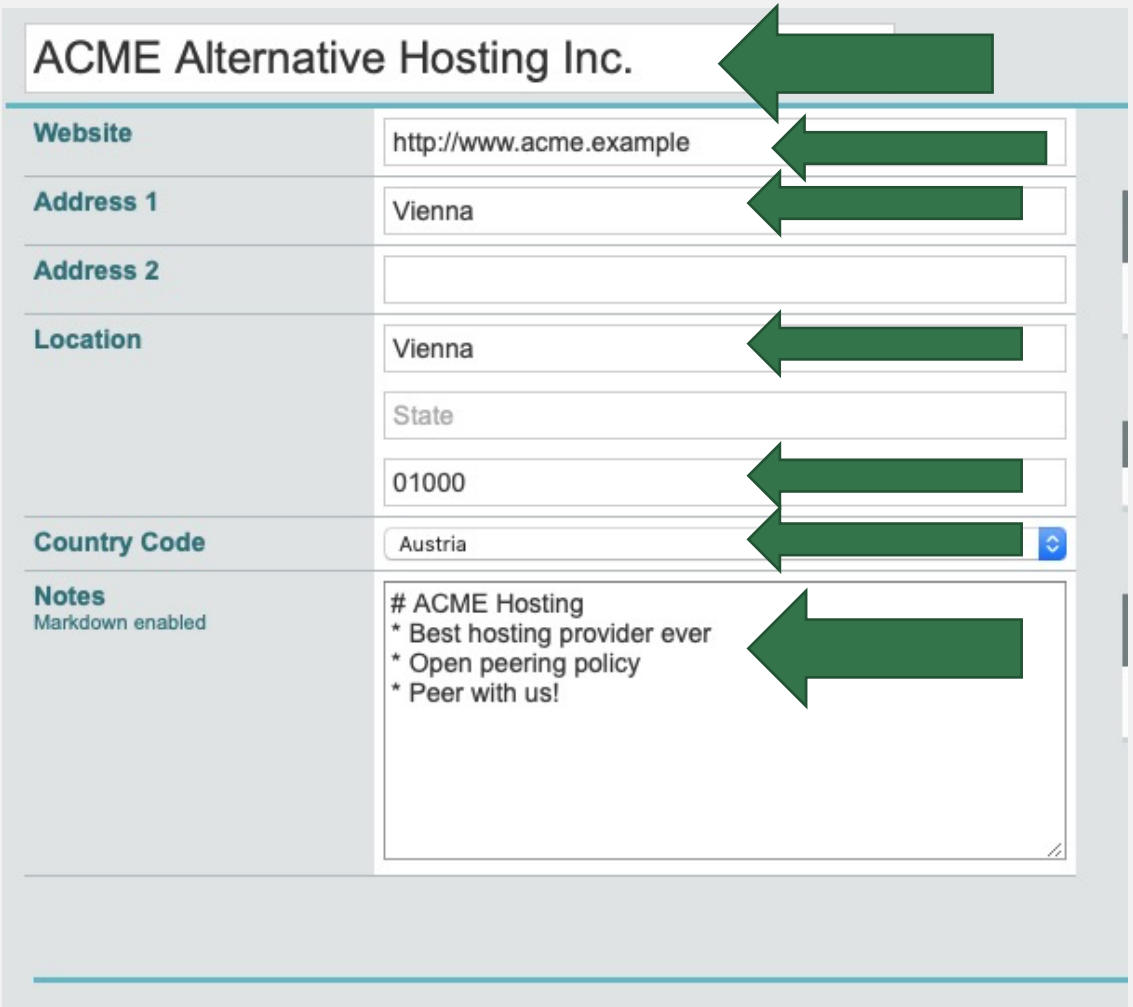


Your Organization



- 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)

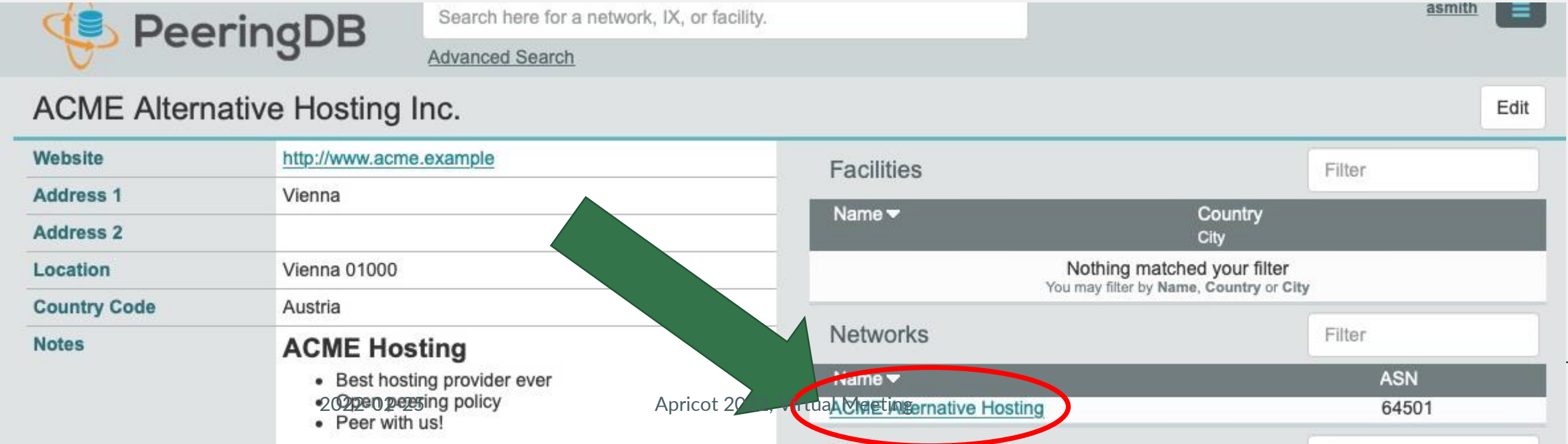
Your Organization



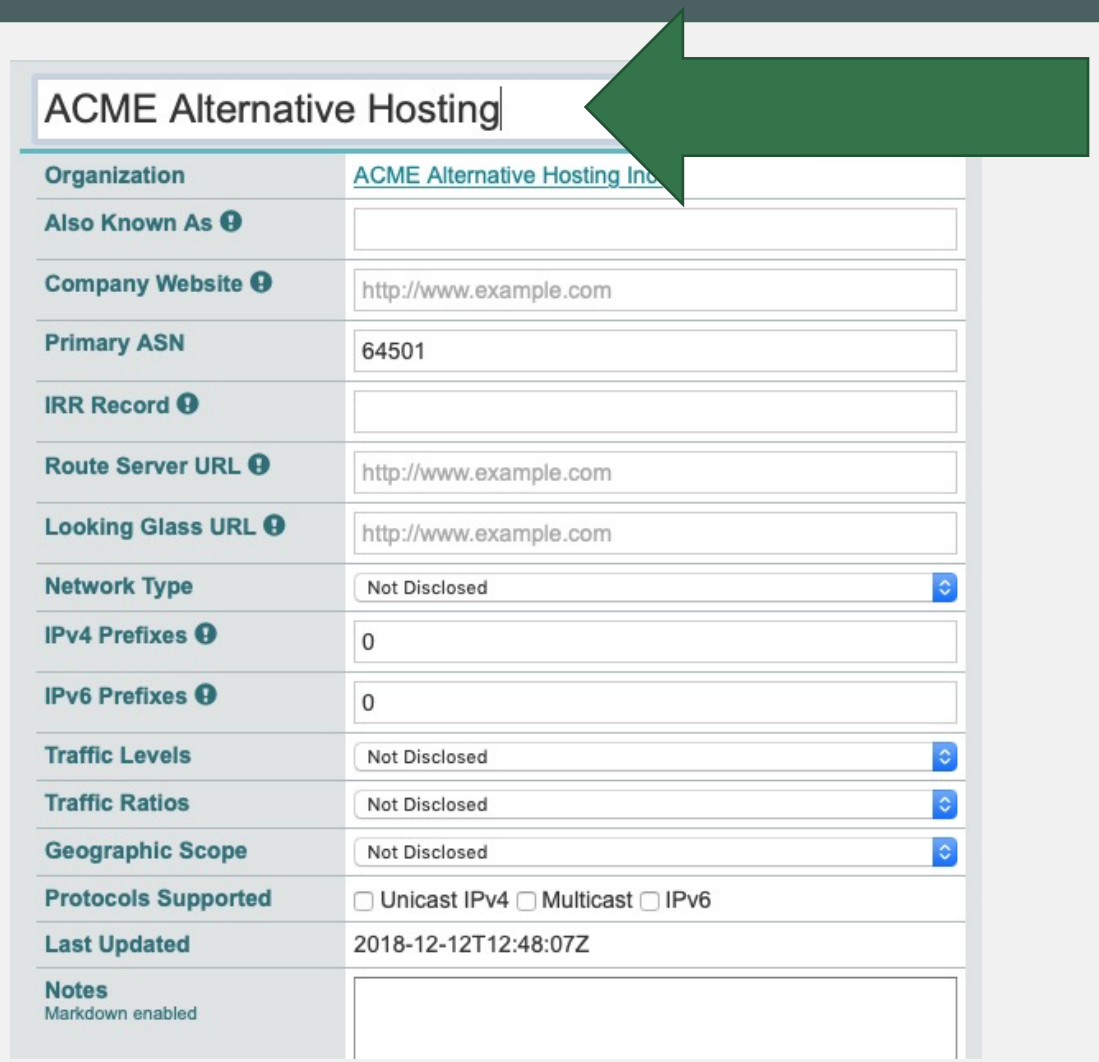
- You can also change your company name
- Enter some information and click “Save“

Network Information

- 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

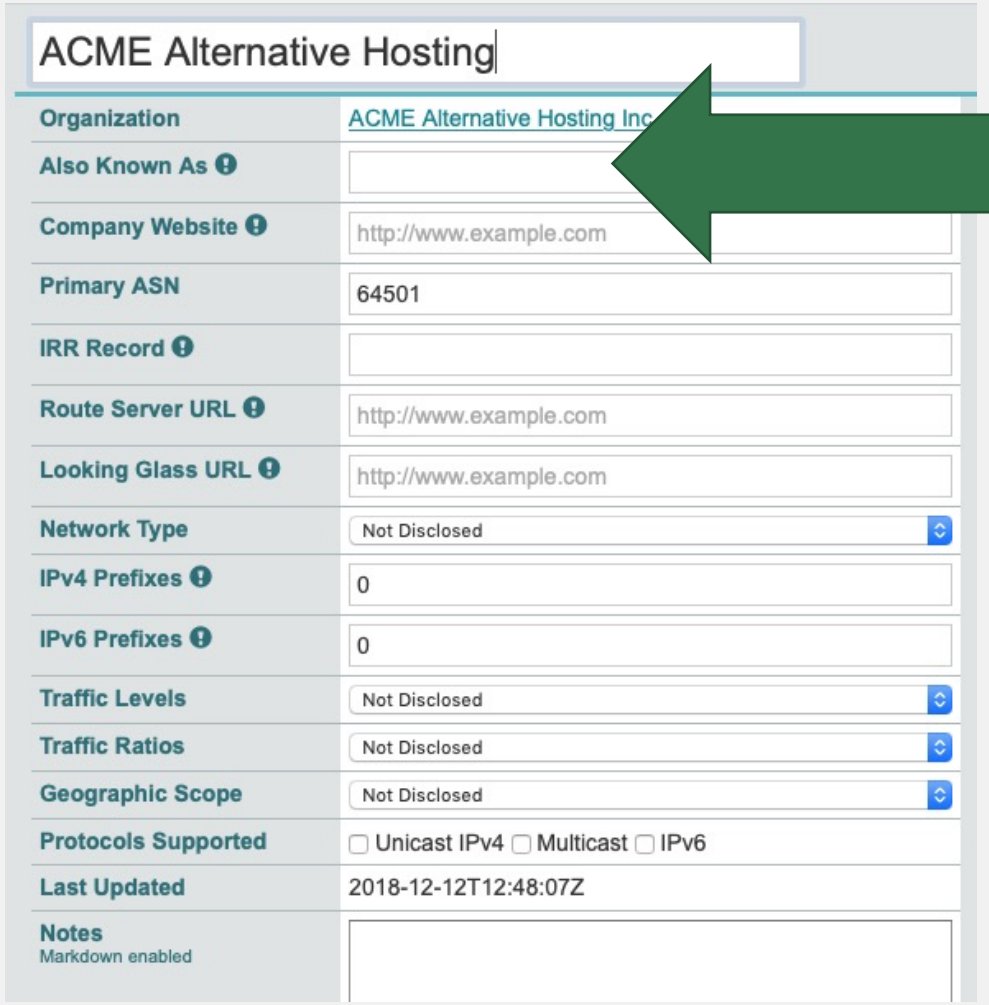


Network Information



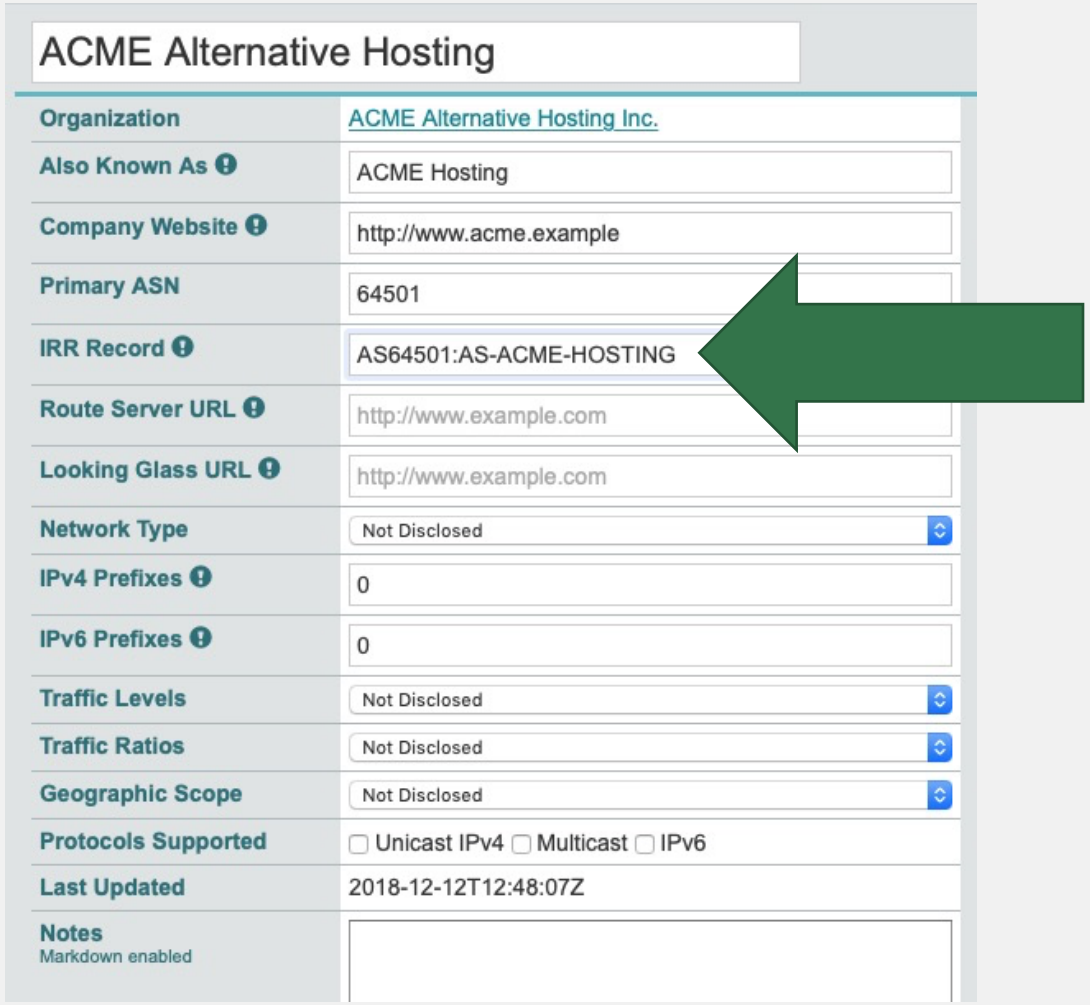
- Again, click on „Edit“ (top right)
- Here is a lot of information to enter
- Most is self-explanatory
- But some is not that obvious
  - Title here is your **network name**
  - Does not have to be the same as your company name
  - Some companies run more than one network/ASN
  - Or use a different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

Network Information



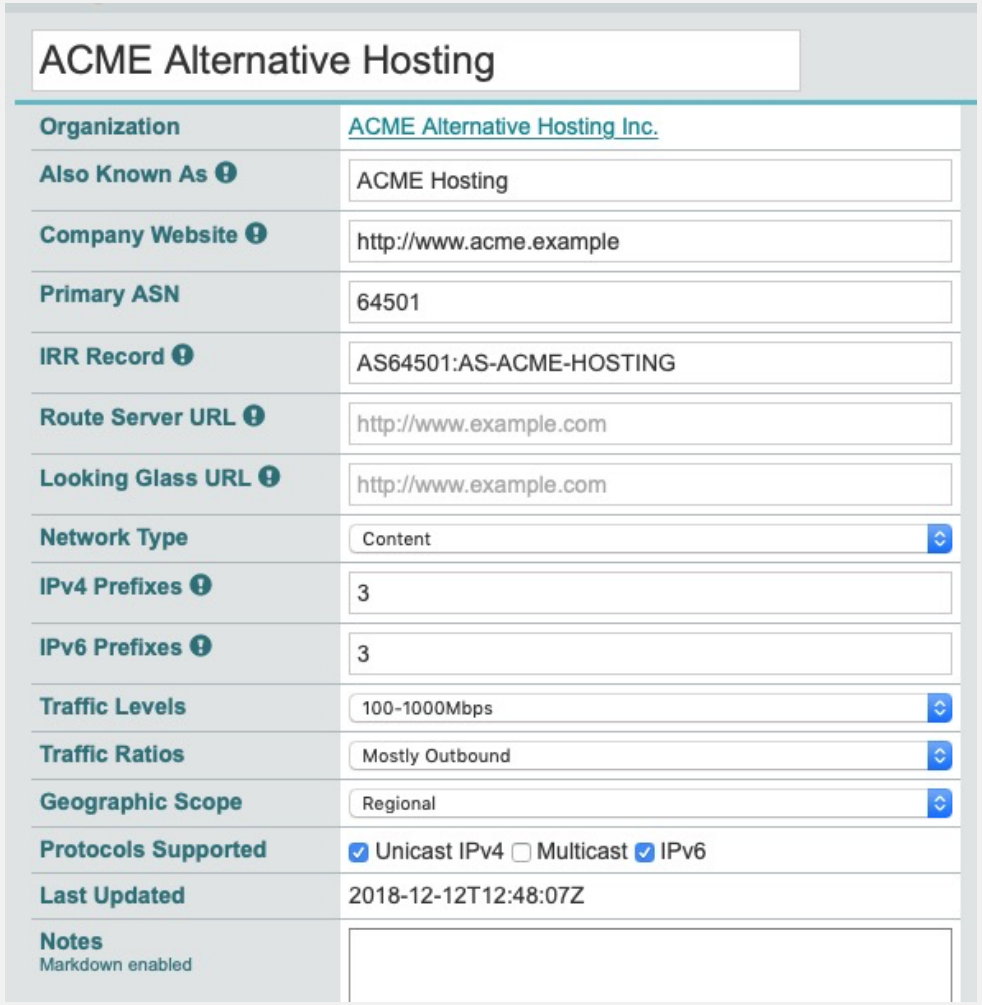
- Use this field for an alternative name
- Or an „old“ name if you changed names
- Or leave it empty
- Company website – remember this is PeeringDB
  - Put in the URL your peers should see
- AS number – your main one
  - If you have more, you can add them later

Network Information



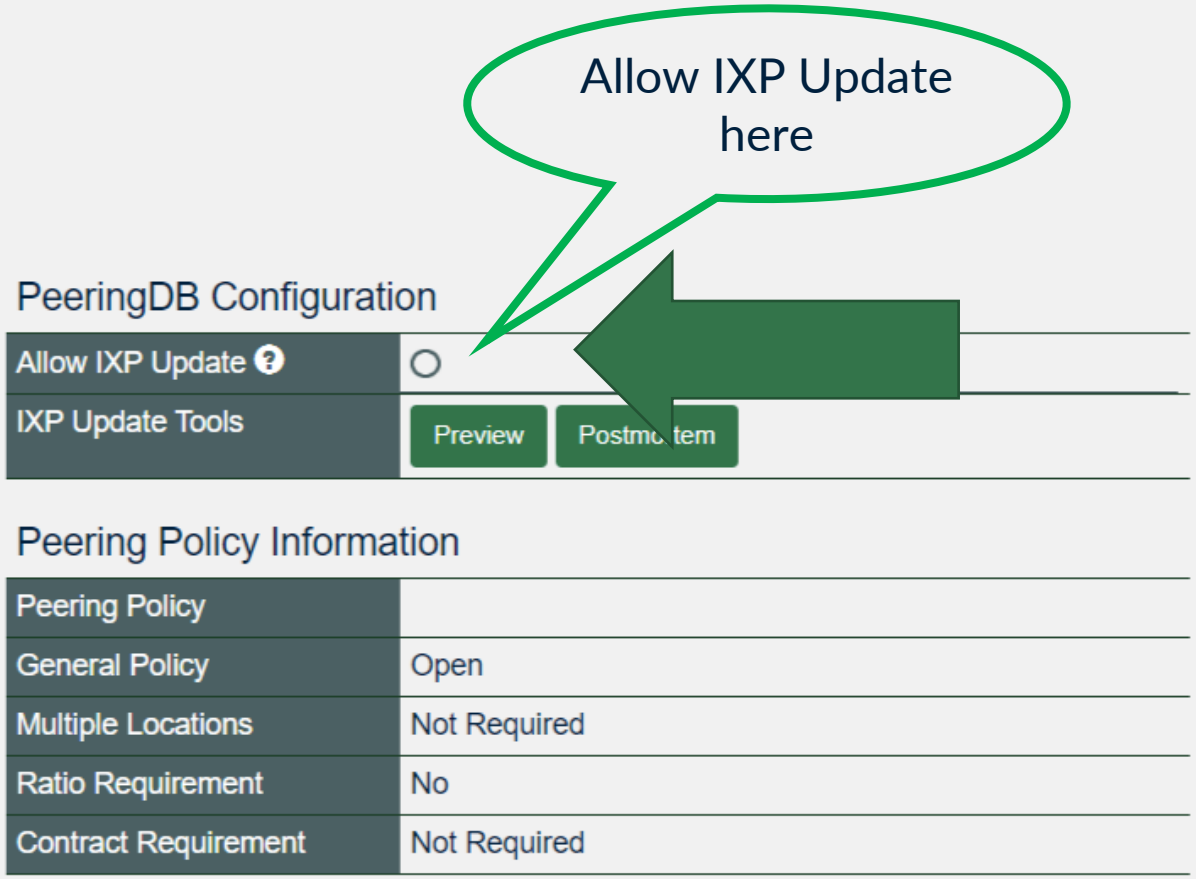
- IRR Record
  - Your AS-Macro (also called AS-Set)
  - Registered in an *IRR database*
  - Create an AS-Set if you don‘t have one
- Route Server URL
- Looking Glass URL

Network Information



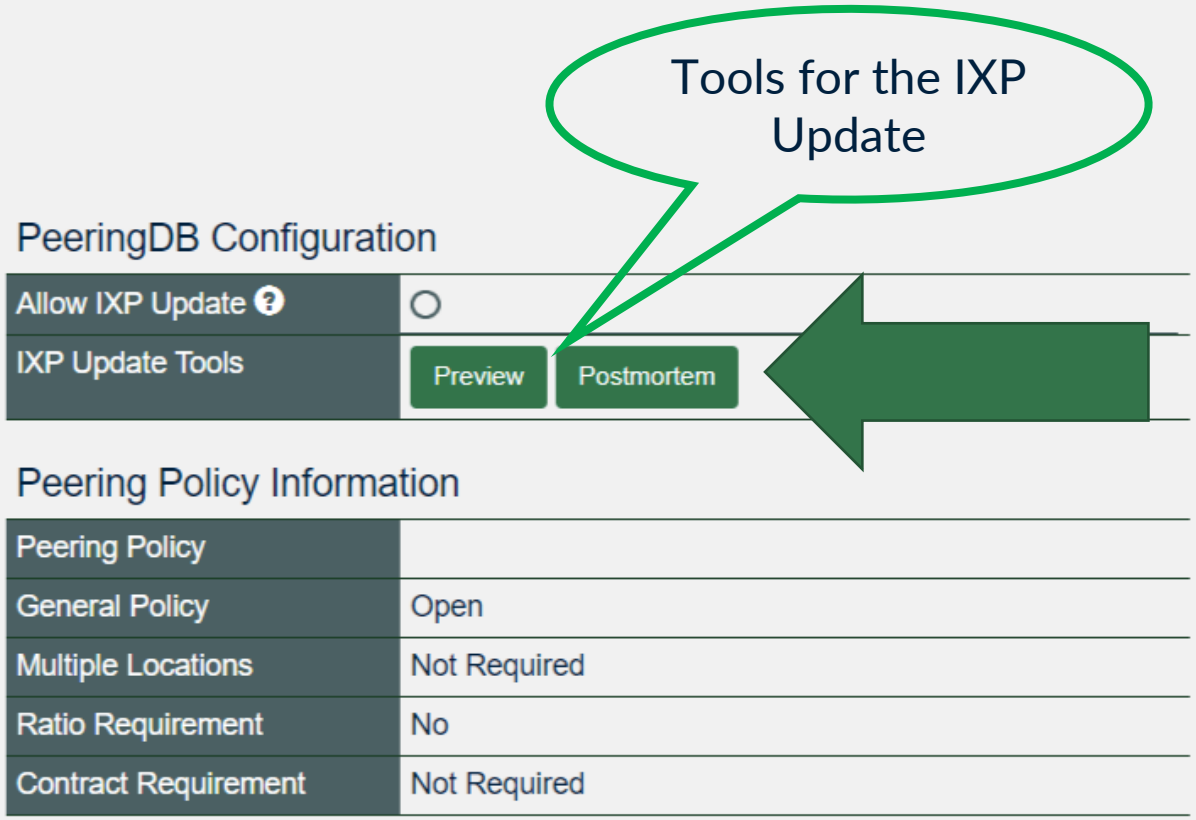
- Fill in the rest
  - Either according to your sheet
  - Or choose your real network
- In „Notes“ you can use Markdown
  - You can give your peers free text information
  - Like details about your peering policy or special services
  - More about your peering policy further down below

Peering Information



- Now we add information about Peering!
- Important: Allowing IXP Update helps maintaining DB accuracy
- So please allow if you trust your IXPs
  - You trust either all or none

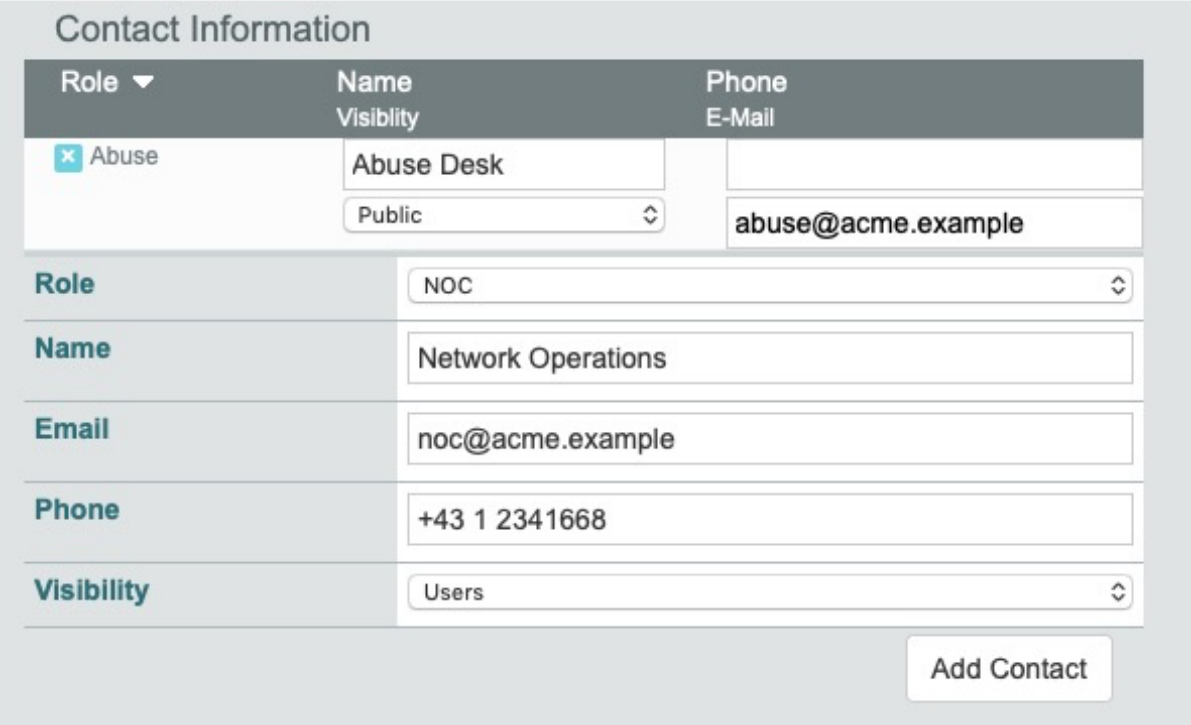
Peering Information



- **Preview** lets you see what will happen wit the next import
- **Postmortem** shows what happened at the last import

- Use the dropdowns to indicate your general peering policy
- In case of selective/restrictive you may provide a URL at „Peering Policy“

Contact Information

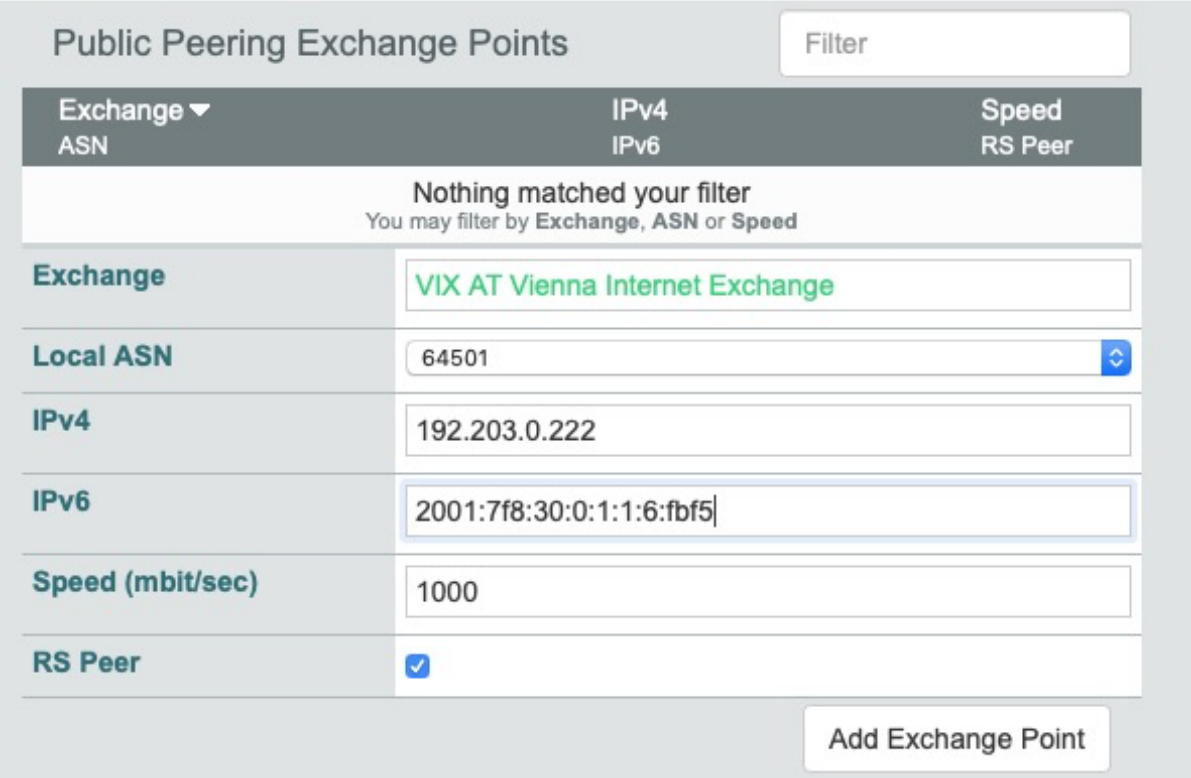


- To inform peers how to contact you
  - In a number of roles
- You can add as many as you need
  - „Add Contact“ to save a contact
  - Public or for authenticated Users
- You do not have to fill out all fields
- **Keep your contact info up to date**
- **A technical contact is mandatory if you add a connection to an IXP**

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

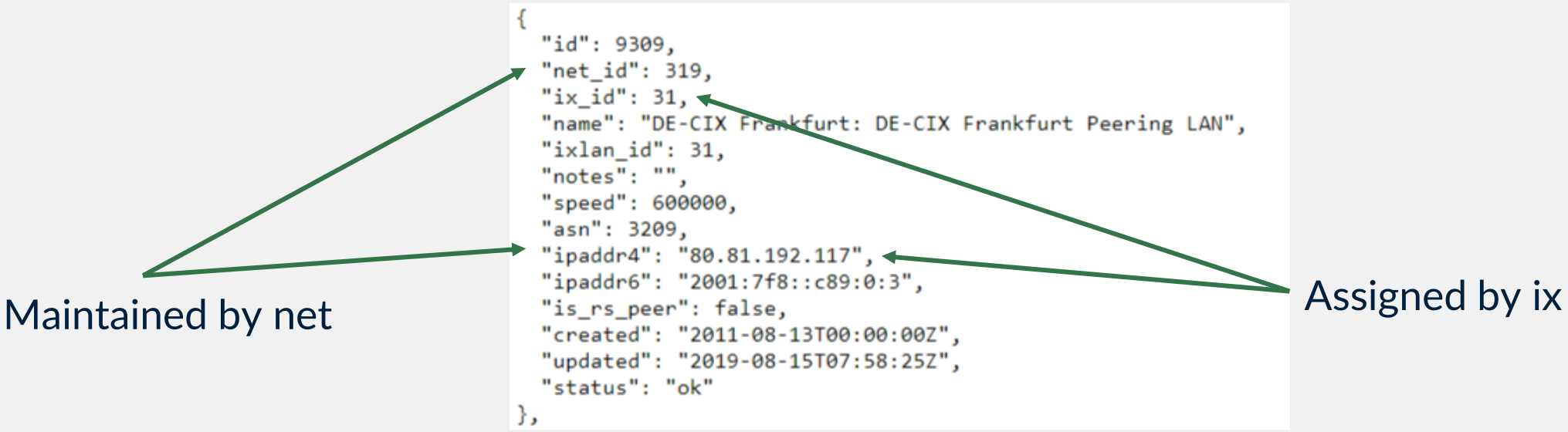
Add peering at an IXP



- 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“.

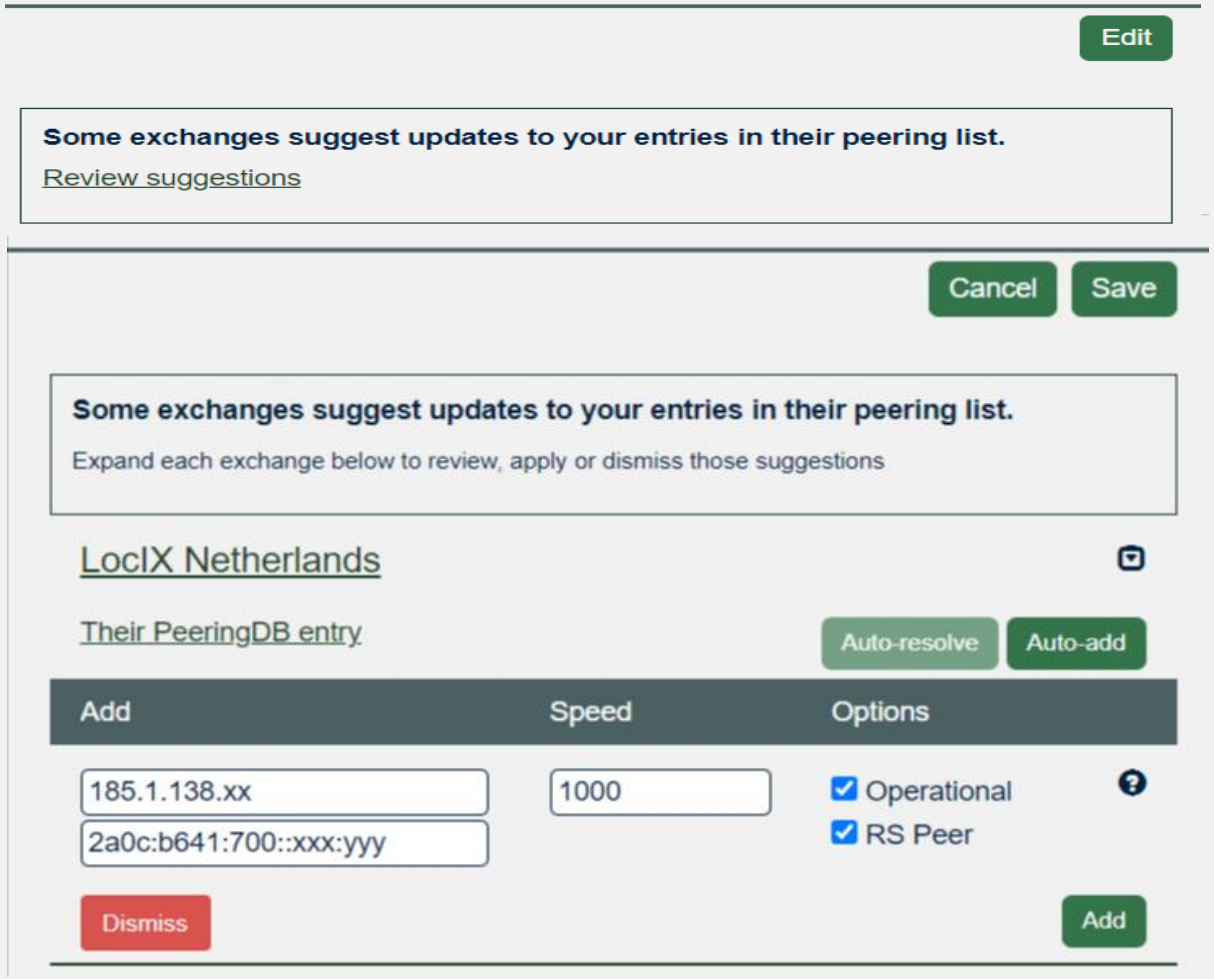
Data Ownership

- How to resolve conflicts when more than one party is involved?
  - Ex.: netixlan



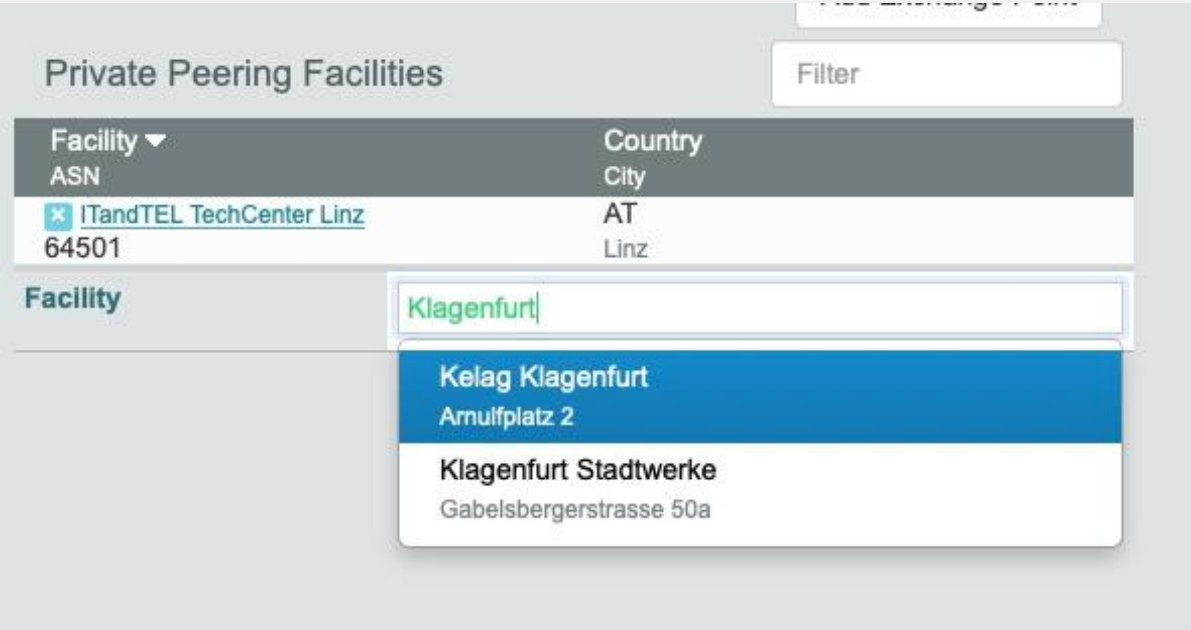
  - A Task Force (so-called DOTF) created a policy document
  - Recommendations incorporated in latest releases

Suggested Entries



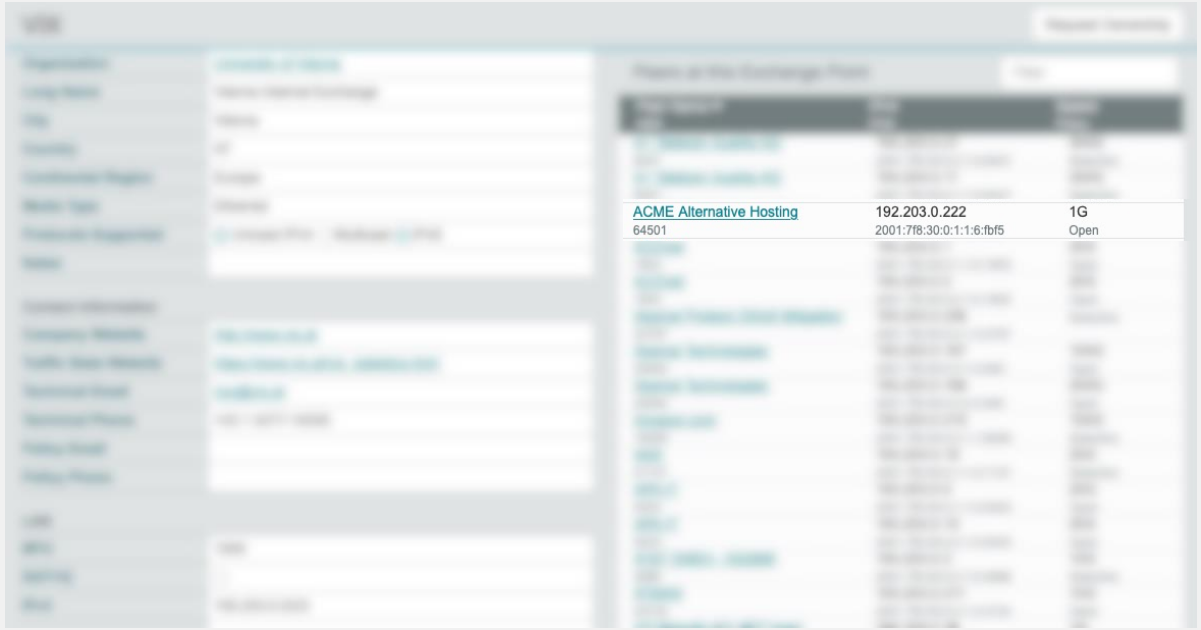
- Go to your network page
- Click on „Review suggestions“
- You see a list of IX with sugestions
- Select one
- You have a couple of choices
  - Auto-add: add entry as suggested
  - Auto-resolve: resolve as suggested
  - Dismiss: ignore suggestion

Presence at a datacenter



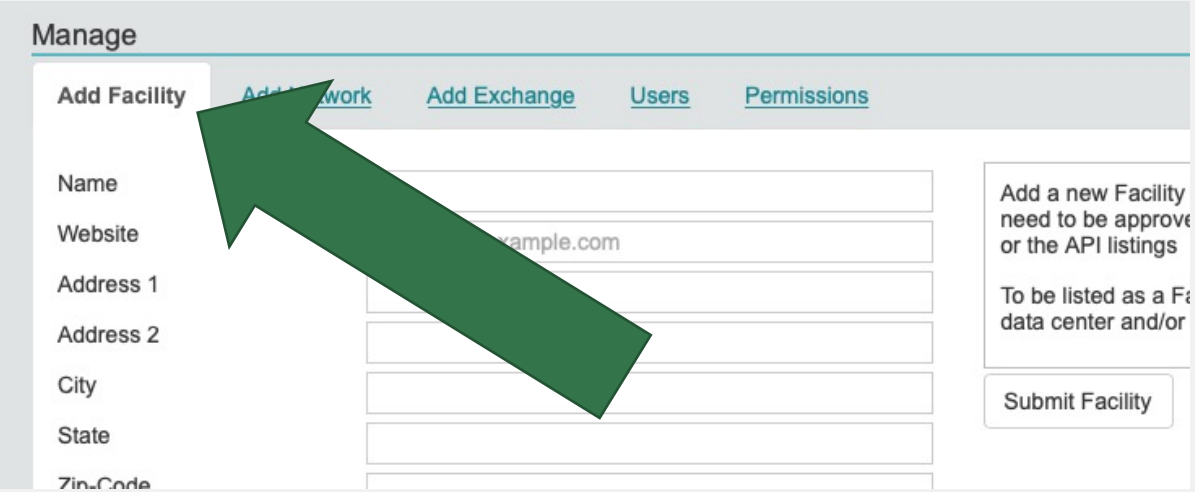
- Now again click on „edit“
- Scroll down and enter a city or datacenter name in „Facility“
- Select the facility you are in from the list and….
- …click on „Add Facility“
- When you have added all facilites click on „Save“

Check what you have entered



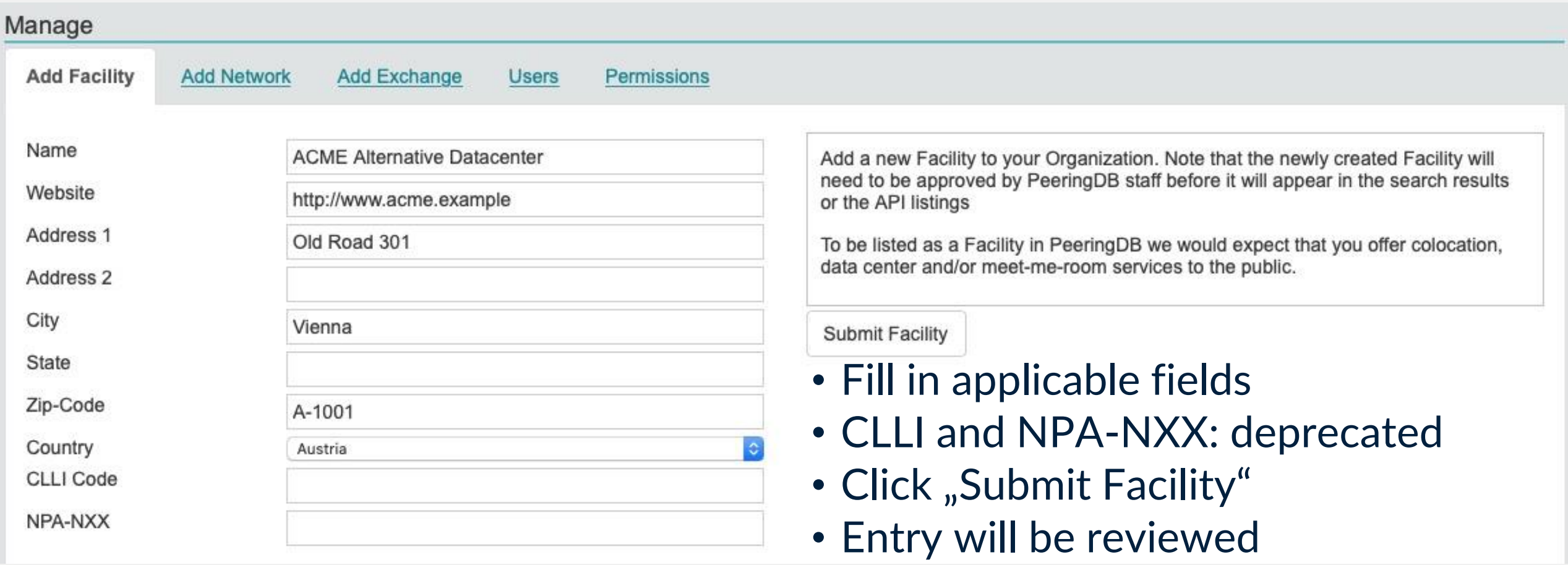
- Click on the name of the IXP you entered
- Find your entry in the list
- Do the same for the facilities you are in

Add your own facility



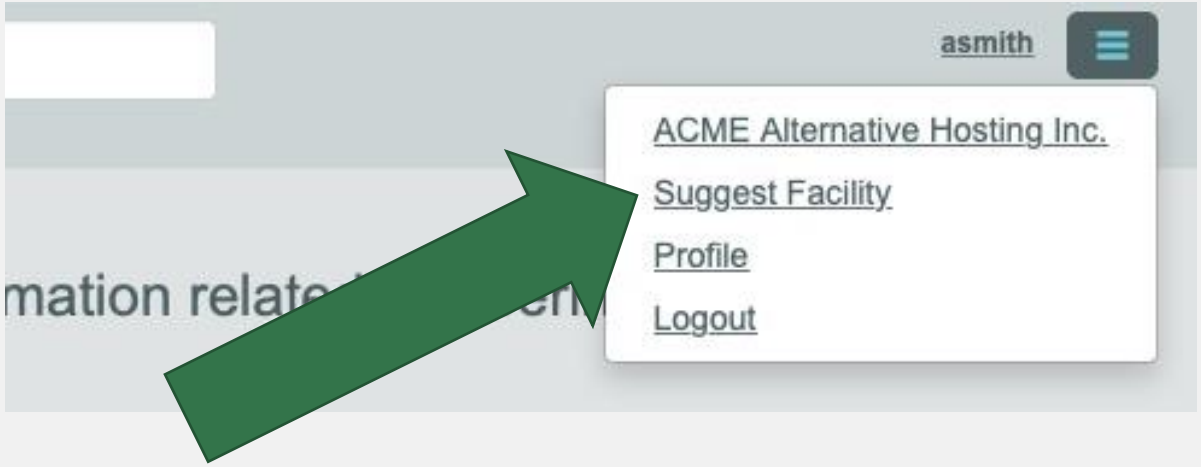
- If you run your **own** datacenter
- Why not add it to PeeringDB?
- Go to your organization page
- Scroll down to „Manage“
- Choose „Add Facility“

Add your own facility



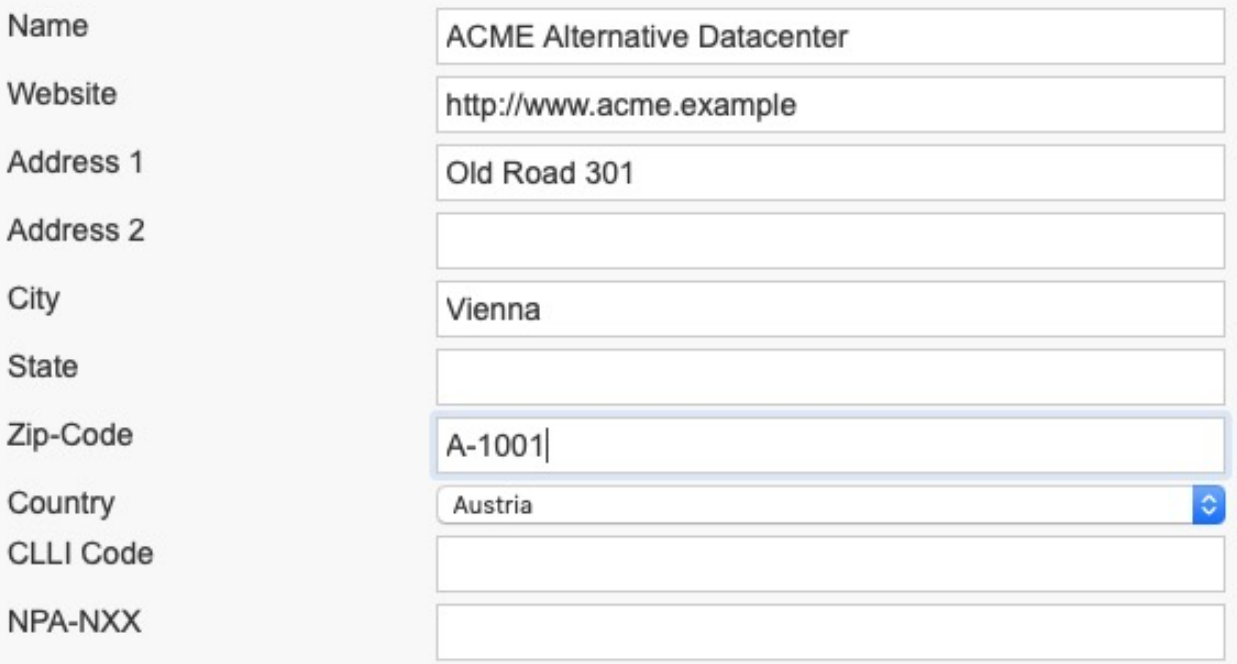
- Fill in applicable fields
- CLLI and NPA-NXX: deprecated
- Click „Submit Facility“
- Entry will be reviewed
- And added or declined

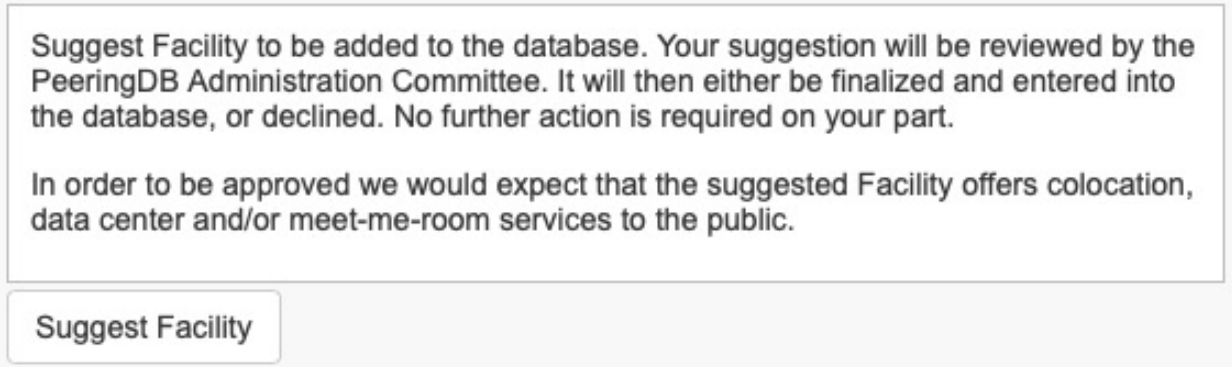
Suggesting a facility



- For facilities **you don‘t own**
- **But you are in or know about**
- Choose „Suggest Facility“
- Is reviewed by PeeringDB staff

Suggesting a facility



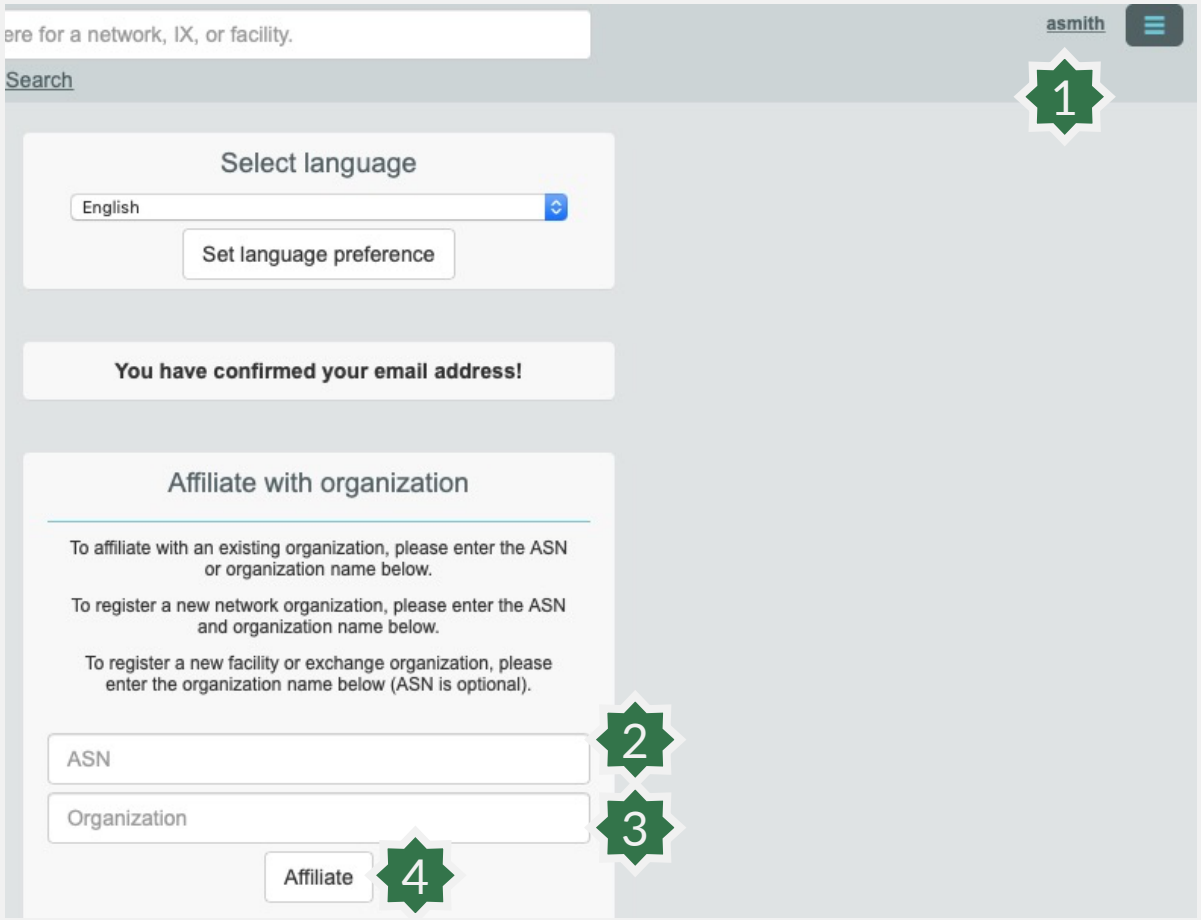


- Fill in applicable fields
- CLLI and NPA-NXX: deprecated
- Click „Suggest Facility“
- Entry will be reviewed
- And added or declined

Adding users

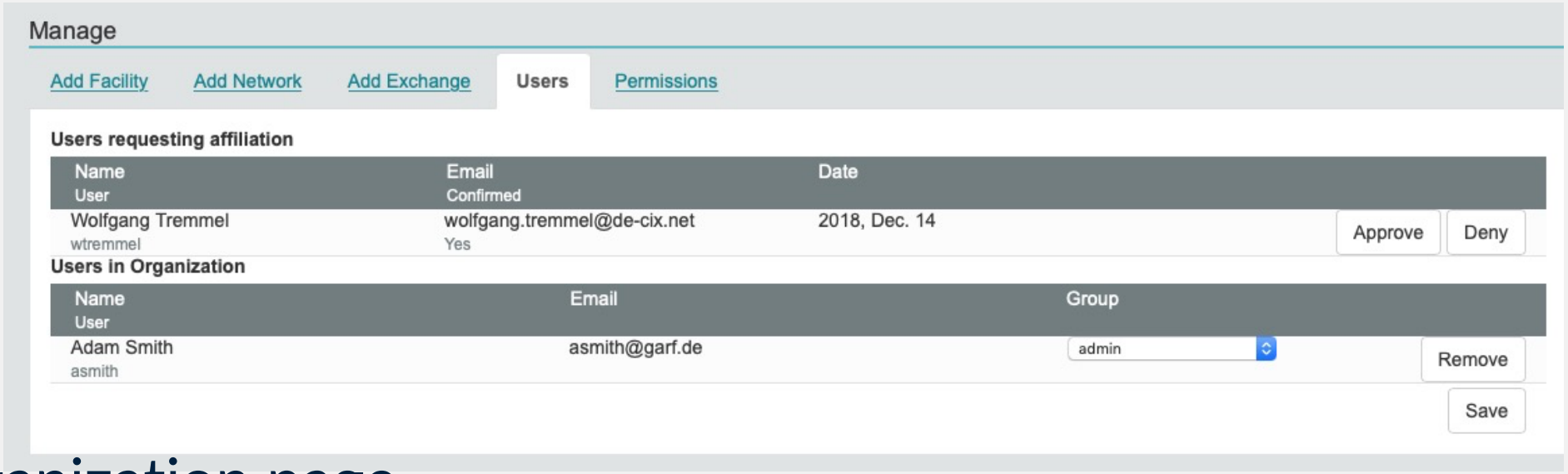
- You do not have to be the only person working with PeeringDB
- Other users from your organization may also register!
- Users can be „admin“ or „member“
  - The first user automatically will be an „admin“
- Administrators are allowed to edit all fields (of your organization)
- Members rights can be 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



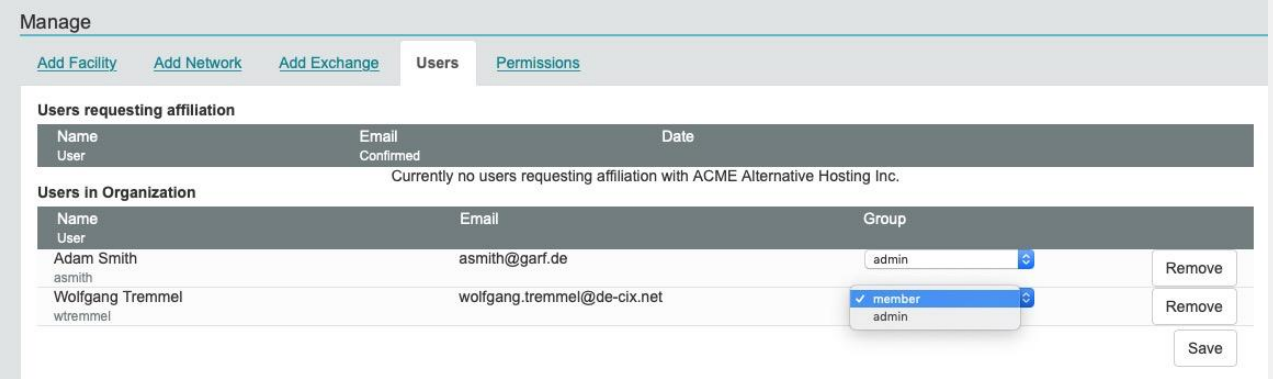
- Go to your profile page (1)
- Request affiliation
  - Either use the AS number (2)
  - Or name and select (3)
  - Click on „Affiliate“ (4)
- Admin of organization gets an email if there is one. Otherwise PeeringDB support is informed
- They check, and either approve or deny
- Let PeeringDB support know if you do not receive an answer timely

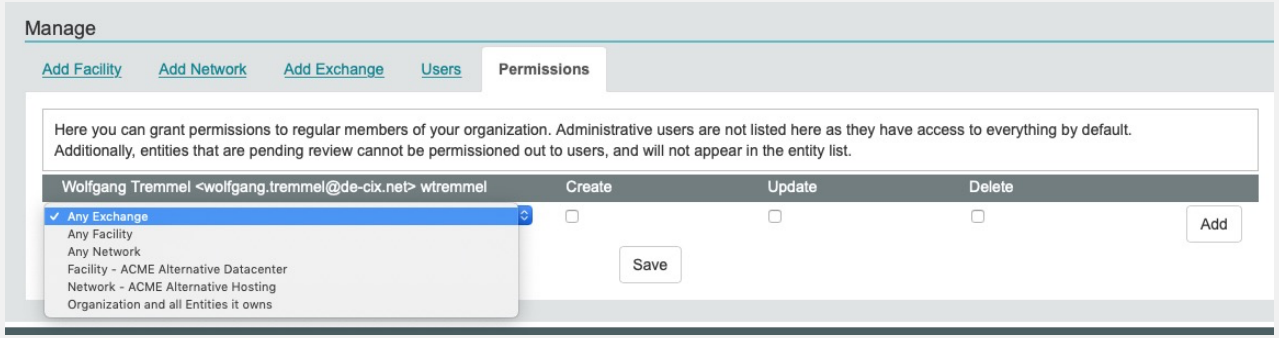
Approve affiliation requests



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

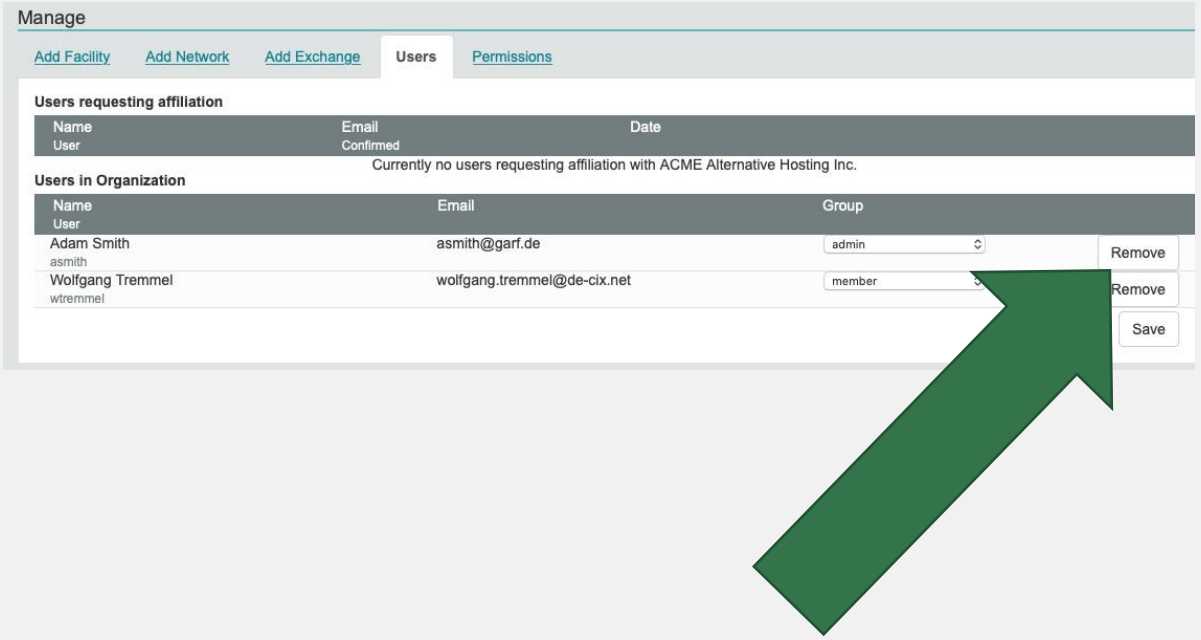
User administration





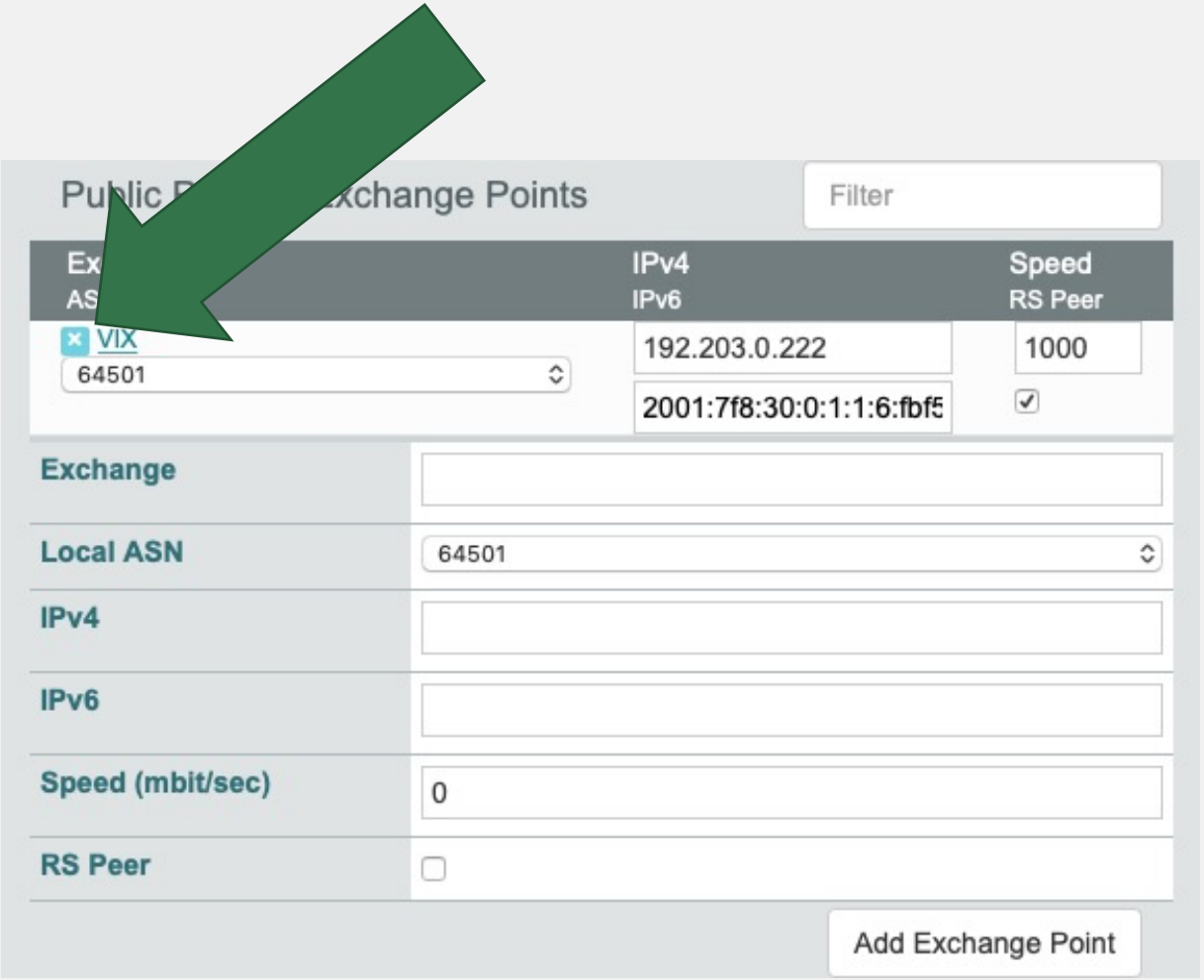
- Users can be admins or members
- Use the dropdown to change
- For members – you can add permissions
- Use the permissions tab to grant create, update and/or delete permission to any entity
- Do not forget to „save“ your changes

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
- The user is only deleted from your organization
- If you want to remove a user completely, email PeeringDB support

More removing...

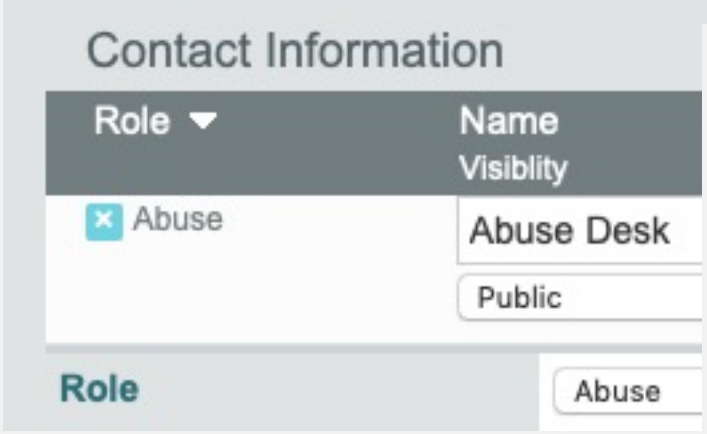


- If you leave an internet exchange:
  – please remove your peering IP addresses

- Go to your network page
- Click on „Edit“ (top right)
- Click on th 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“
- Remember that **you must have a technical** contact when **connected to an IXP**

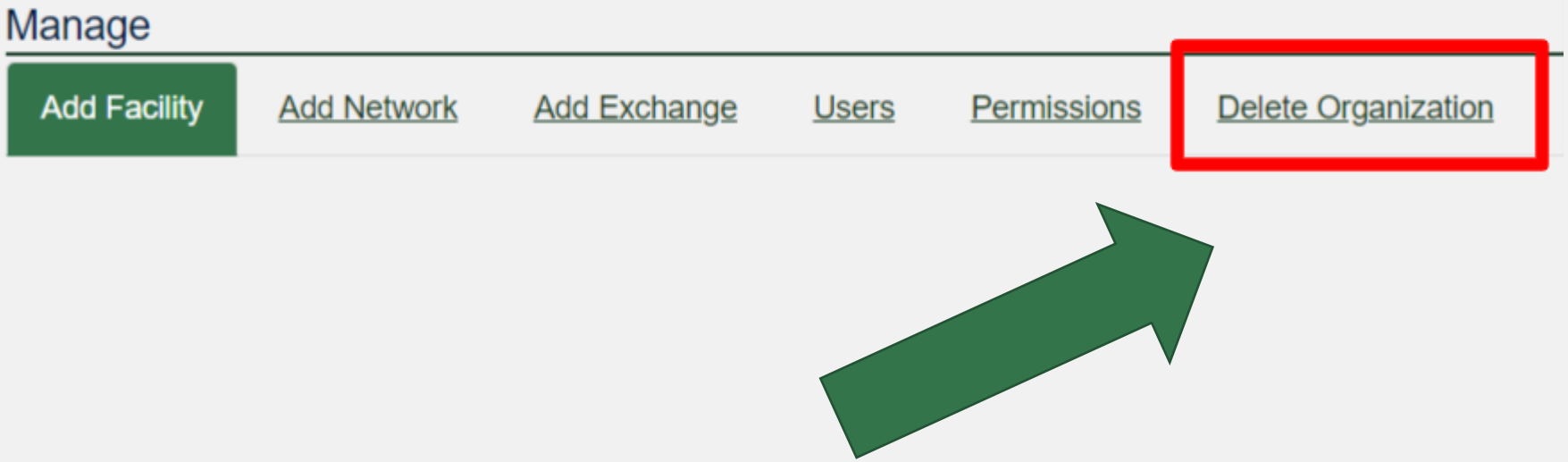


Removing – more information

- Objects are only *marked deleted, but stay in the DB*
  - *Facilities and IXes only can be removed if they don‘t have participants*
- ***You cannot simply re-add them***
- Please contact support@peeringdb.com if you need help

Removing your organization

- Iff you dissolve your organization
  - You first have to „empty“ your Ixes, Network and Facilities
- Please contact support@peeringdb.com if you need help



PeeringDB

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

jq

- 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
    - Can be used to pretty print JSON output
- See https://stedolan.github.io/jq/manual for an introduction
- Ex: curl -sG https://peeringdb.com/api/org --data-urlencode fields=id | jq -c '[.data[] | .id] | length'

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

```
{
  "firstName": "John",
  "lastName": "Smith",
  "isAlive": true,
  "age": 27,
  "address": {
    "streetAddress": "21 2nd Street",
    "city": "New York",
    "state": "NY",
    "postalCode": "10021-3100"
  },
  "phoneNumbers": [
    {
      "type": "home",
      "number": "212 555-1234"
    },
    {
      "type": "office",
      "number": "646 555-4567"
    },
    {
      "type": "mobile",
      "number": "123 456-7890"
    }
  ],
  "children": [],
  "spouse": 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 is an array

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

Authentication

- Authentication
  - basic HTTP authorization
  - API keys
- 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 to view/retrieve objects with visibility „Users“

Operations

- 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

- 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

Nested Data / Depth

- 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 exand 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


```
{
  "meta": {},
  "data": [
    {
      "id": 947,
      "org_id": 1187,
      "name": "DE-CIX Frankfurt Route Servers",
      "aka": "DE-CIX",
      "website": "https://fra.de-cix.net",
      "asn": 6695,
      "looking_glass": "https://lg.de-cix.net",
      "route_server": "https://www.de-cix.net/en/locations/germany/frankfurt/routeserver-gu
      "irr_as_set": "AS-DECIX",
      "info_type": "Route Server",
      "info_prefixes4": 240000,
      "info_prefixes6": 50000,
      "info_traffic": "1 Tbps+",
      "info_ratio": "Balanced",
```



```
{
  "meta": {},
  "data": [
    {
      "id": 947,
      "org_id": 1187,
      "org": {
        "id": 1187,
        "name": "DE-CIX Management GmbH",
        "website": "https://de-cix.net",
        "notes": "",
        "net_set": [
          947,
          5547,
          6978,
          6979,
          8383,
          8703,
          8919,
          8920,
          9840,
          9841,
          10018,
          13190,
          13251,
          19331,
          20739
        ],
        "fac_set": [],
        "ix_set": [
          31,
          74,
          248,
          804,
          1131,
          1149,
          1150,
          1214,
          1249,
          1277,
          2531
        ],
        "address1": "Lindleystr. 12",
```

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)

POST

- 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*

```
{
  "name": "Org-22106"
}
```

File 22106.json

- Example
  - curl -sn -X POST -H "Content-Type: application/json" -d @22106.json \
    https://tutorial.peeringdb.com/api/org

PUT

```
{
        "name": "Org-22106",
        "address1": "23 Mulholland Drive",
        "city": "Los Angeles",
        "country": "US"
}
```

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

DELETE

- 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
  - ixfac, 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 ixfac and netfac
- ix
  - Describes an Internet Exchange
  - More useful information are in derived records ixlan, ixpfx and netixlan
- net
  - Describes a network / ASN
  - More useful information are in netfac and netixlan
  - Root object for poc
- poc
  - Describes various role accounts (point of contact)
  - Currently only for net objects
- as_set
  - Array of all AS-SETs corresponding to networks/ASNs

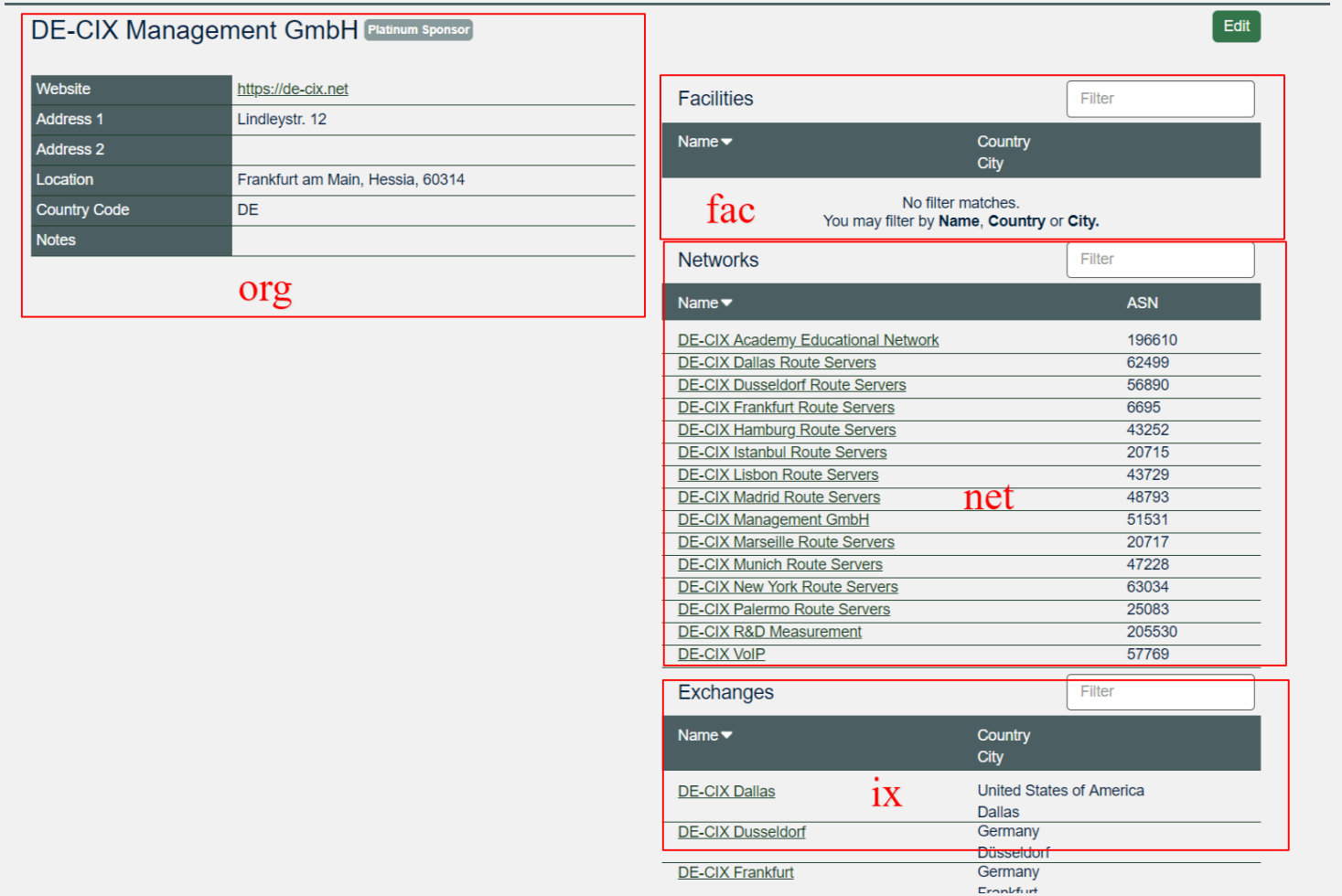
Derived Objects

- ixfac
  - Describes the availability of an IX in a facility
- ixlan
  - Describes the LAN of an IX
  - Will go away with PeeringDB 3.0. Hence, already tightly coupled to ix (i.e. same id)
- 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

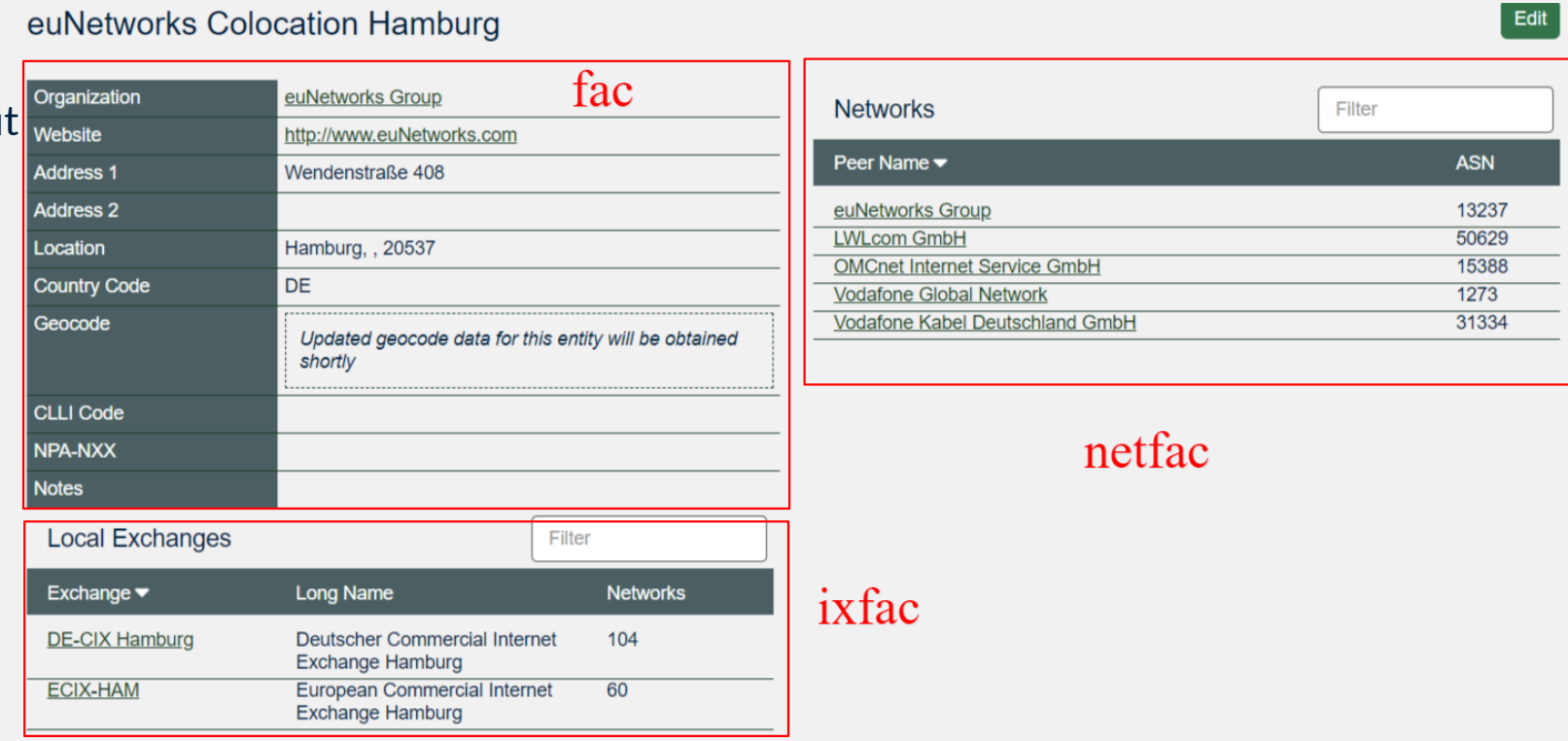
- Add pretty and depth for human friendly output
- https://peeringdb.com/api/org/1187
- https://peeringdb.com/api/fac?org_id=1187
- https://peeringdb.com/api/net?org_id=1187
- https://peeringdb.com/api/ix/org_id=1187



GUI to API // fac

- https://peeringdb.com/fac/752

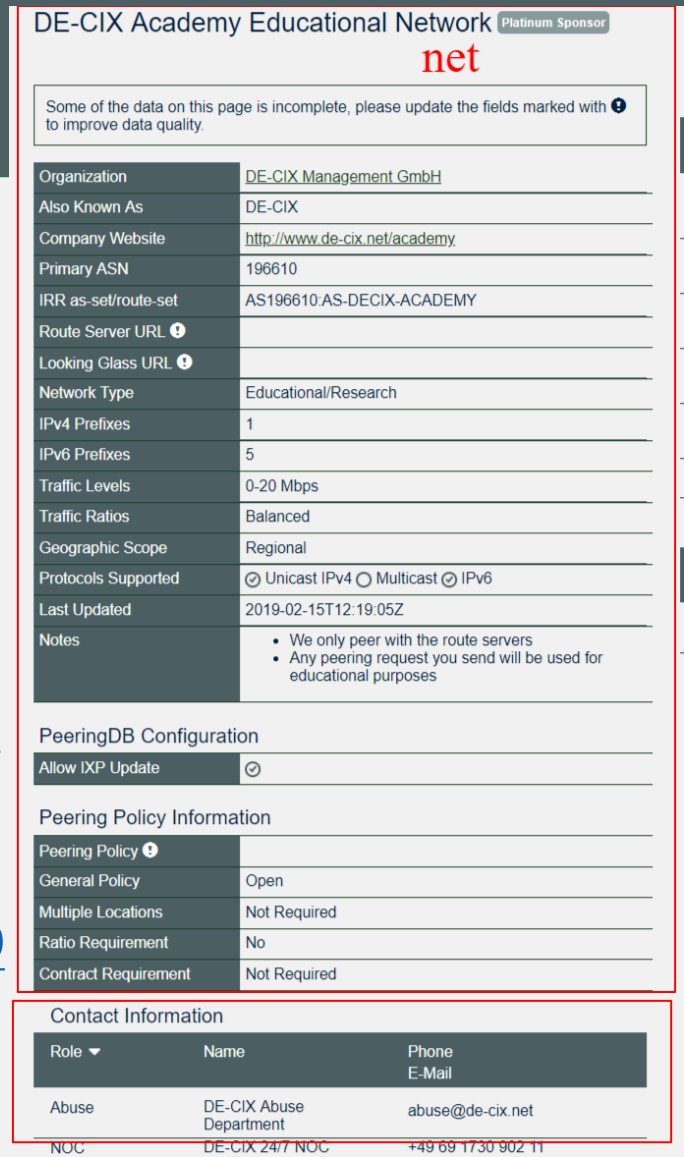
- Add pretty and depth for human friendly output
- https://peeringdb.com/api/fac/752
- https://peeringdb.com/api/ixfac?fac_id=752
- https://peeringdb.com/api/netfac?fac_id=752



GUI to API // net

- https://peeringdb.com/net/13251

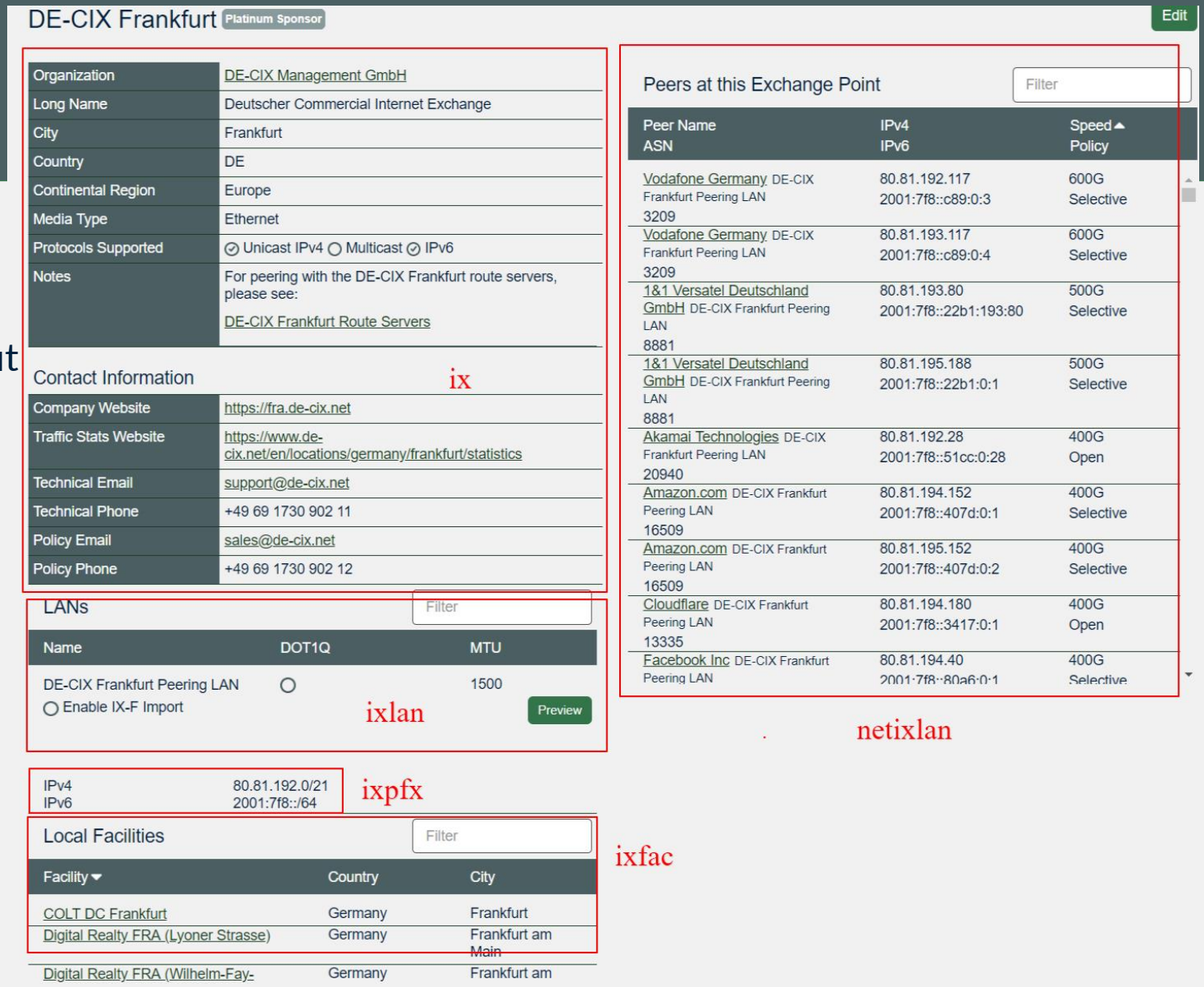
- Add pretty and depth for human friendly output
- https://peeringdb.com/api/net/13251
- https://peeringdb.com/api/poc?net_id=13251
- https://peeringdb.com/api/netixlan?net_id=31
- OR https://peeringdb.com/api/netixlan?asn=196610
- https://peeringdb.com/api/netfac?net_id=13251
- OR https://peeringdb.com/api/netfac?local_asn=196610



GUI to API // ix

- https://peeringdb.com/ix/31

- Add pretty and depth for human friendly output
- https://peeringdb.com/api/ix/31
- https://peeringdb.com/api/ixlan?ix_id=31
- https://peeringdb.com/api/ixpfx?ixlan_id=31
- https://peeringdb.com/api/ixfac?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_continent": "Europe",
    "media": "Ethernet",
    "notes": "For peering with the DE-CIX Frankfurt route servers, please see:\n\n[DE
    "proto_unicast": true,
    "proto_multicast": false,
    "proto_ipv6": true,
    "website": "https://fra.de-cix.net",
    "url_stats": "https://www.de-cix.net/en/locations/germany/frankfurt/statistics",
    "tech_email": "support@de-cix.net",
    "tech_phone": "+49 69 1730 902 11",
    "policy_email": "sales@de-cix.net",
    "policy_phone": "+49 69 1730 902 12",
    "net_count": 805,
    "created": "2010-07-29T00:00:00Z",
    "updated": "2018-06-19T11:53:46Z",
    "status": "ok"
  }
]
```



```
"data": [
  {
    "id": 1187,
    "name": "DE-CIX Management GmbH",
    "website": "https://de-cix.net",
    "notes": "",
    "address1": "Lindleystr. 12",
    "address2": "",
    "city": "Frankfurt am Main",
    "country": "DE",
    "state": "Hessia",
    "zipcode": "60314",
    "created": "2006-11-01T23:37:13Z",
    "updated": "2017-07-02T00:03:27Z",
    "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",
    "clli": "",
    "rencode": "",
    "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


```
"data": [
  {
    "id": 13251,
    "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_prefixes4": 1,
    "info_prefixes6": 5,
    "info_traffic": "0-20 Mbps",
    "info_ratio": "Balanced",
    "info_scope": "Regional",
    "info_unicast": true,
    "info_multicast": false,
    "info_ipv6": true,
    "notes": "* We only peer with the route servers\n* 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": "2017-04-20T19:44:59Z",
    "updated": "2019-02-15T12:19:05Z",
    "status": "ok"
  }
]
```

```
{
  "id": 25826,
  "net_id": 13251,
  "role": "Policy",
  "visible": "Users",
  "name": "Wolfgang Tremmel",
  "phone": "",
  "email": "academy@de-cix.net",
  "url": "",
  "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-NLG-PARTICIPANTS",
      "327740": "ORG-TA38-AFRINIC",
      "62": "AS-C1",
      "393280": "AS393280 in Level3",
      "72": "AS-SLB",
      "327754": "AS-RMS-Powertronics",
      "327693": "AfriNIC::AS-ECHOSP/RS-ECHOSP",
      "81": "AS-NCREN@ARIN"
```


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


```
{
  "meta": {},
  "data": [
    {
      "42": "AS-PCH"
    }
  ]
}
```


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

Derived records in detail // ixfac, ixlan and ixpfx


```
"data": [
  {
    "id": 41,
    "ix_id": 26,
    "fac_id": 63,
    "created": "2010-07-29T00:00:00Z",
    "updated": "2016-03-14T20:33:57Z",
    "status": "ok"
  }
]
```

```
{
  "id": 31,
  "ix_id": 31,
  "name": "DE-CIX Frankfurt Peering LAN",
  "descr": "",
  "mtu": 1500,
  "dot1q_support": false,
  "rs_asn": 0,
  "arp_sponge": null,
  "created": "2010-07-29T00:00:00Z",
  "updated": "2018-07-08T10:22:35Z",
  "status": "ok"
}
```

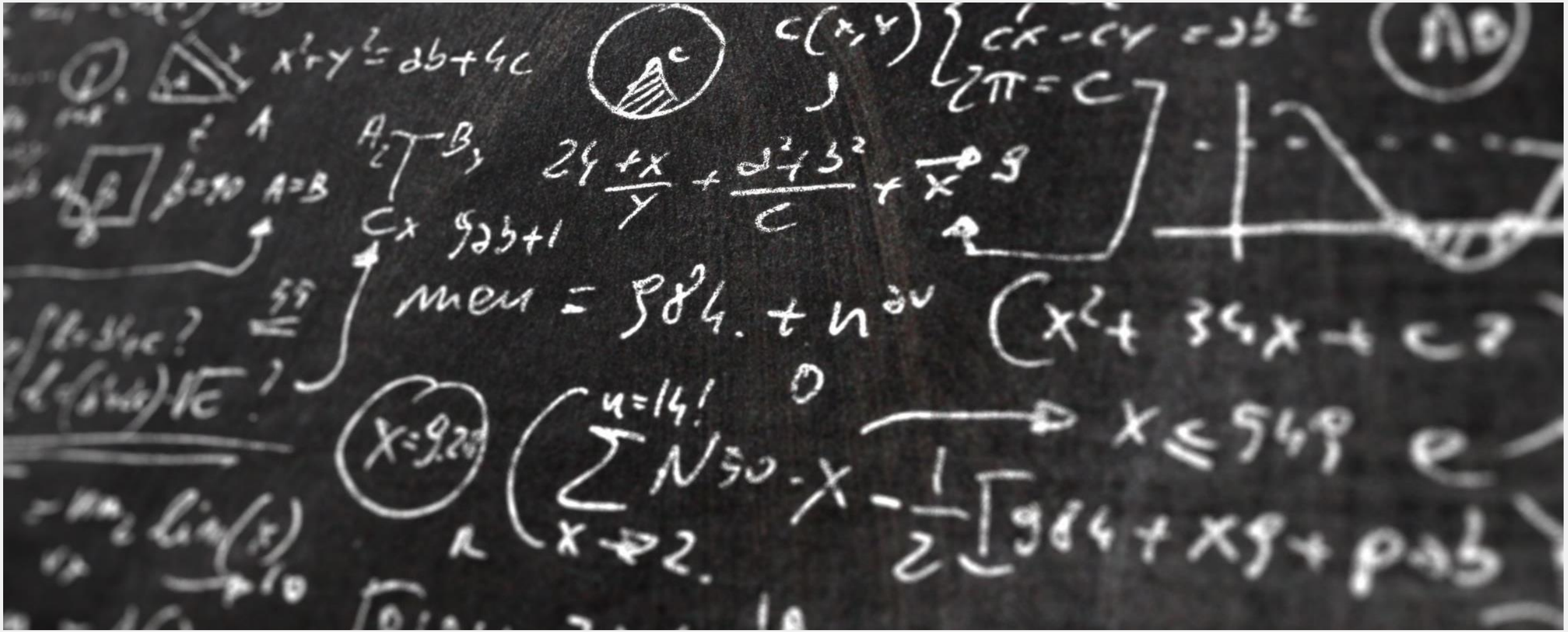
```
{
  "id": 312,
  "ixlan_id": 31,
  "protocol": "IPv6",
  "prefix": "2001:7f8::/64",
  "created": "2011-06-22T00:00:00Z",
  "updated": "2016-03-14T21:57:28Z",
  "status": "ok"
}
```

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"
},
```

Example: peer information at an IXP



Example: peer information at an IXP

```
(server0:global 5032 )curl -sG https://www.peeringdb.com/api/netixlan \
? --data-urlencode ix_id=31 | jq -r '.data[] | .asn, .ipaddr4, .ipaddr6' | \
? paste - - - | sort -n
42      80.81.194.42    2001:7f8::2a:0:1
112     80.81.195.77    2001:7f8::70:0:1
553     80.81.192.175   2001:7f8::229:0:1
553     80.81.194.106   2001:7f8::229:0:2
559     80.81.196.147   2001:7f8::22f:0:1
680     80.81.192.222   2001:7f8::2a8:0:1
680     80.81.193.222   2001:7f8::2a8:0:2
702     80.81.193.1     2001:7f8::2be:0:2
714     80.81.193.202   2001:7f8::2ca:0:1
714     80.81.193.223   2001:7f8::2ca:0:2
714     80.81.194.161   2001:7f8::2ca:0:3
714     80.81.194.171   2001:7f8::2ca:0:4
1239    80.81.192.121   2001:7f8::4d7:0:1
1241    80.81.192.90    2001:7f8::4d9:0:4
1241    80.81.193.231   2001:7f8::4d9:0:2
1241    80.81.194.129   2001:7f8::4d9:0:1
1241    80.81.195.130   2001:7f8::4d9:0:3
1248    80.81.194.17    2001:7f8::4e0:0:1
1257    80.81.196.81    2001:7f8::4e9:0:1
1267    80.81.192.215   2001:7f8::4f3:0:1
1267    80.81.193.215   2001:7f8::4f3:0:2
1273    80.81.192.33    2001:7f8::4f9:0:1
```

Example: peer information at an IXP

```
nipper@server0:~$ NETIDS=$(curl -sG https://www.peeringdb.com/api/netixlan \
--data-urlencode ix_id=31 --data-urlencode fields=net_id | jq -r '[.data[] | .net_id] | unique | @csv')
nipper@server0:~$
nipper@server0:~$ curl -sG https://www.peeringdb.com/api/net --data-urlencode id__in=$NETIDS --data-urlen
code fields=asn,irr_as_set | jq -r '.data[] | .asn, .irr_as_set' | paste - - | sort -n
42      RADB::AS-PCH
112     AS112
553     AS-BELWUE
559     RIPE::AS-SWITCH
680     AS-DFNTOWINISP
702
714     AS-APPLE
1239    AS1239:AS-CUSTOMERS
1241    AS-FORTHNET AS-FORTHNET-V6
1248    AS-HERE
1257    AS-TELE2
1267    AS-WINDTRE
1273    RIPE::AS1273:AS-CWW RIPE::AS1273:AS-CWW-V6
```

Example: peer information at an IXP

```
nipper@server0:~$ NETIDS=$(curl -sG https://www.peeringdb.com/api/netixlan \
--data-urlencode ix_id=31 --data-urlencode fields=net_id | jq -r '[.data[] | .net_id] | unique | @csv')
nipper@server0:~$
nipper@server0:~$ curl -snG https://www.peeringdb.com/api/poc --data-urlencode net_id__in=$NETIDS --data-
urlencode role="Policy" --data-urlencode fields=email,net_id --data-urlencode visible="Public" | jq -r '.
data[] | .net_id, .email' | paste - - | sort -n
14      peering@gtt.net
115     peering.de@telefonica.com
118     robert.wurzer@bt.com
179     peering@is.co.za
186     engineering@quickline.net
217     peering@bsonetwork.com
236     peeringTM@tm.com.my
341     peering@verizon.com
475     ip@oteglobe.gr
620     esther.fernandez@telxius.com
620     noelia.silva@telxius.com
678     peering@network.leaseweb.com
694     peering@microsoft.com
709     peering@globalconnect.net
```

64501 A

Peering DB Training Sheet

Your AS number: 64501
Your company name: ACME Alternative Hosting

ACME Alternative Hosting is an Austrian hosting provider with a presence in Vienna, Linz and Klagenfurt. Your traffic profile is mainly outgoing, usually about 200Mbps. You announce via BGP in IPv4 one /24, one /22 and one /18. On IPv6 you announce a /32 and two /48s. As a hosting provider, you have an open peering policy; you are very eager to handle your traffic via peering instead of your three upstream providers.

You take abuse handling seriously; your abuse department is reachable 24/7 at abuse@acme.example for everybody. Your NOC is only reachable for peers and customers at noc@acme.example and via phone at +43 1 2341668

You are connected with 1G to the Vienna Internet Exchange at Interxion Vienna with IPv4 192.203.0.222 and IPv6 2001:7f8:30:0:1:1:6:fbf5. You are at the only data centre in Linz; in Klagenfurt, you are at Stadtwerke.

Please put the above Information into PeeringDB.

64502 B

Peering DB Training Sheet

Your AS number: 64502
Your company name: Belgian Box

Belgian Box is a Belgian DSL provider with a presence in Brussels. Your traffic profile is mainly incoming, usually about 500Mbps. You announce via BGP in IPv4 one /19 and one /21. On IPv6, you announce a /32.
You have an open peering policy; you are very eager to handle your traffic via peering instead of your two upstream providers.

You have a contact for abuse at abuse@box.example for everybody. Your NOC is only reachable for peers and customers at noc@box.example (you do not have a phone contact for your NOC), and you also have an address for press enquiries at publicrelations@box.example.

You are connected with 2G to BNIX at Interxion Brussels with IPv4 194.53.172.254 and IPv6 2001:7f8:26::a500:fbf6:1.

Please put the above Information into PeeringDB.

64503 C

Peering DB Training Sheet

Your AS number: 64503
Your company name: Charles Townsend Consultants

CTC is a Czech consulting agency with a presence in Prague and Brno. Your traffic profile is balanced in and out, usually about 100Mbps, mainly shop systems for your customers. You announce via BGP in IPv4 one /24 and one /23. On IPv6, you announce three /48s.
You have a selective peering policy; you want to peer with eyeball networks but not with content providers.

You have a contact for abuse at abuse@ctc.example for your peers. Your NOC is only reachable for peers and customers at noc@ctc.example (you do not have a phone contact for your NOC). You also have a sales contact at info@ctc.example.

You are connected with 1G to NIX.CZ at GTS Telehouse with IPv4 91.210.16.254 and IPv6 2001:7f8:14::fbf7:1. In Brno you are present at DC Kounicova.

Please put the above Information into PeeringDB.

64504 D

Peering DB Training Sheet

Your AS number: 64504
Your company name: Data Shifters

Data Shifters is a Danish backbone operator in Copenhagen and Aarhus. Your traffic profile is balanced in and out, usually about 100Gbps. You announce via BGP in IPv4 three /16s and 20 /24s. On IPv6, you announce one /32 and ten /48s. You also provide transit to 8 other ASes, and your AS Macro is AS64504:AS-DS.
As a backbone provider, you have a restrictive peering policy, require a traffic level of at least 1Gbps balanced traffic for peering.

You have a contact for abuse at abuse@ds.example for your peers. Your NOC is only reachable for peers and customers at noc@ds.example (you do not have a phone contact for your NOC). You also have a sales contact at info@ds.example.

You are connected to DIX with 100G at Interxion with IPv4 192.38.7.253 and IPv6 2001:7f8:1f::fbf8:0:2. In Aarhus, you are present at Global Connect.

Please put the above Information into PeeringDB.

64505 E

Peering DB Training Sheet

Your AS number: 64505
Your company name: Electric Dreams

Electric Dreams is an Estonian web agency with a presence in Tallinn. Your traffic profile is mainly out, usually about 10Gbps. You announce via BGP in IPv4 one /24 and one /18. On IPv6, you announce three /48s.
You have an open peering policy; you are very eager to handle your traffic via peering instead of your two upstream providers.

You have a public contact for abuse at abuse@ed.example and sales at sales@ed.example. Your NOC is only reachable for peers and customers at noc@ed.example (you do not have a phone contact for your NOC).

You are connected to DIX with 100G at Interxion with IPv4 192.38.7.254 and IPv6 2001:7f8:1f::fbf8:0:1. In Aarhus, you are present at Global Connect.

Please put the above Information into PeeringDB.

64506 F

Peering DB Training Sheet

Your AS number: 64506
Your company name: Forever Young

Forever Young is a French DSL provider in Paris and Marseille. Your traffic profile is mainly incoming, usually about 5Gbps. You announce via BGP in IPv4 one /16 and one /17. On IPv6, you announce one /32. You have a restrictive peering policy; you peer with content providers and CDNs but not with other eyeball providers.

You have a contact for abuse at abuse@forever.example for your peers only and press enquiries at press@forever.example. Your NOC is only reachable for peers and customers at noc@forever.example (you do not have a phone contact for your NOC).

You are connected to DE-CIX Marseille with 10G at Interxion with IPv4 185.1.47.254 and IPv6 2001:7f8:36::fbfa:0:1. In Paris, you are present at Interxion Paris 6.

Please put the above Information into PeeringDB.

64507 G

Peering DB Training Sheet

Your AS number: 64507
Your company name: Golf Partners

Golf Partners is a German nationwide DSL provider in Frankfurt and Hamburg. Your traffic profile is mainly incoming, usually about 25Gbps. You announce via BGP in IPv4 one /12 and one /17. On IPv6, you announce one /32 and three /48s.
As a DSL provider, you have a very restrictive peering policy, and you peer only with content providers and CDNs.

You have a contact for abuse at abuse@golf.example for your peers only. Your NOC is only reachable for peers and customers at noc@golf.example and via phone at +49 1631737743

You are connected to DE-CIX Frankfurt with 40G at Interxion FRA1-15 with IPv4 80.81.197.253 and IPv6 2001:7f8::fbfb:0:2. In Hamburg, you are present at Global Connect HAM1.

Please put the above Information into PeeringDB.

64508 H

Peering DB Training Sheet

Your AS number: 64508
Your company name: Hosting Inc.

Hosting Inc. is a Hungarian hosting provider with a presence in Budapest. Your traffic profile is mainly outgoing, usually about 400Mbps. You announce via BGP in IPv4 one /21 and one /22. On IPv6, you announce two /48s.
As a hosting provider, you have an open peering policy. You are very eager to handle your traffic via peering instead of your two upstream providers.

You have a contact for abuse at abuse@golf.example for your peers only. Your NOC is only reachable for peers and customers at noc@golf.example and via phone at +49 1631737743

You are connected to DE-CIX Frankfurt with 40G at Interxion FRA4 with IPv4 80.81.197.254 and IPv6 2001:7f8::fbfb:0:1. In Hamburg, you are present at Global Connect HAM1.

Please put the above Information into PeeringDB.

64509

Peering DB Training Sheet

Your AS number: 64509
Your company name: Island Computing

Island Computing is an Italian nationwide backbone provider in Milan and Rome. Your traffic profile is balanced, usually about 4Gbps. You announce via BGP in IPv4 one /14 and eight /24s. On IPv6, you announce two /48s and one /32.
As a nationwide backbone provider, you peer with anyone not from Italy.

You have a contact for abuse at abuse@island.example for your peers only. Your NOC is only reachable for peers and customers at noc@island.example, and your sales team is happy to sell paid peering for Italian providers at sales@island.example.

You are connected to Milan Internet Exchange with 10G at Caldera21 with IPv4 217.29.66.249 and IPv6 2001:7f8:b:100:1d1:a5d6:4509:254. In Rome, you are at Interxion ROM1.

Please put the above Information into PeeringDB.

64510

L

Peering DB Training Sheet

Your AS number: 64510
Your company name: LuxRoute Inc.

LuxRoute Inc. is a Luxembourg web hosting provider with a presence in Luxembourg and Frankfurt. Your traffic profile is heavily outgoing, usually about 500Mbps. You announce via BGP in IPv4 one /21 and two /24s. On IPv6, you announce two /48s.
You have an open peering policy and are eager to win new peers.

You have a public contact for abuse at abuse@luxroute.example. Your NOC is only reachable for peers and customers at noc@luxroute.example.

You are connected to LU-CIX with 1G at Luxconnect DC2 with IPv4 188.93.171.254 and IPv6 2001:7f8:4c::fbfe:1. In Frankfurt, you are at Interxion FRA1-15.

Please put the above Information into PeeringDB.

64511 N

Peering DB Training Sheet

Your AS number: 64511
Your company name: Netherlands Best

Netherlands Best is a Dutch business provider with a presence in Amsterdam and The Hague. Your traffic profile is balanced, usually about 1Gbps. You announce via BGP in IPv4 5 /24s and one /21. On IPv6, you announce one /32 and two /48s.
You have an open peering policy but require your peers to have 24h abuse and NOC reachability.

You have a public 24h contact for abuse at abuse@thebest.example. Your NOC is also reachable 24/7 for peers and customers at noc@thebest.example.

You are connected to AMS-IX with 1G at Global Switch Amsterdam with IPv4 80.249.208.249 and IPv6 2001:7f8:1::fbff:1. In The Hague, you are at Data Facilities.

Please put the above Information into PeeringDB.

Peering DB Training Sheet

Your AS number: 64512
Your company name: Porto Hosting

Porto Hosting is a Portuguese hosting provider in Lisbon and Porto. Your traffic profile is mainly outgoing, usually about 3Gbps. You announce via BGP in IPv4 one /24 and one /22. On IPv6, you announce one /32.
You have an open peering policy but require your peers to have 24h abuse and NOC reachability.

You have a public contact for abuse at abuse@portohosting.example. Your NOC is reachable during business hours for peers and customers at noc@portohosting.example.

You are connected to GigaPIX with 1G at FCCN Lisbon SE03 with IPv4 193.136.250.254 and IPv6 2001:7f8:a::254. In Porto, you are at FCCN Oporto.

Please put the above Information into PeeringDB.

64513 R

Peering DB Training Sheet

Your AS number: 64513
Your company name: Russia Web Presences

Russia Web Presences is a Russian web hoster in Moscow and St. Petersburg. Your traffic profile is outgoing, usually about 2.5Gbps. You announce via BGP in IPv4 five /24s and one /21. On IPv6, you announce one /32.
You have an open peering policy but do not peer with other Russian providers.

You have a public contact for abuse at abuse@russiaweb.example.
Your NOC is reachable during business hours for peers and customers at noc@russiaweb.example.

You are connected to MSK-IX Moscow with 10G at Moscow M10 with IPv4 195.208.209.254 and IPv6 2001:7f8:20:101::209:254. In St. Petersburg, you are at Borovaya 57.

Please put the above Information into PeeringDB.

64514 S

Peering DB Training Sheet

Your AS number: 64514
Your company name: Sevilla Select ISP

Sevilla Select ISP is a Spanish residential DSL provider in Sevilla and Madrid. Your traffic profile is mainly incoming, usually about 12Gbps. You announce via BGP in IPv4 one /19 and two /24s. On IPv6, you announce one /32 and two /48s.
You have an open peering policy but do not peer other eyeball networks.

You have a public contact for abuse at abuse@select.example and sales at sales@select.example. Your NOC is only reachable for peers and customers at noc@select.example (you do not have a phone contact for your NOC).

You are connected to DE-CIX Madrid with 10G at Interxion MAD1 with IPv4 185.1.68.254 and IPv6 2001:7f8:a0::fc02:0:1. In Sevilla you are at Equinix SA1.

Please put the above Information into PeeringDB.

64515 T

Peering DB Training Sheet

Your AS number: 64515
Your company name: Istanbul Business Connect

Istanbul Business Connect is a Turkish business provider with a presence in Istanbul. Your traffic profile is more or less balanced, usually about 3Gbps. You announce via BGP in IPv4 one /24 and two /22s. On IPv6, you announce one /32 and one /48s.
You have an open peering policy but require that your peers have a 24/7 abuse desk and NOC.

You have a public contact for abuse at abuse@ibc.example and sales at sales@ibc.example. Your NOC is only reachable for peers and customers at noc@ibc.example (you do not have a phone contact for your NOC).

You are connected to DE-CIX Istanbul with 10G at MedNautilus with IPv4 185.1.48.254 and IPv6 2001:7f8:3f::fc03:0:1

Please put the above Information into PeeringDB.

64516 U

Peering DB Training Sheet

Your AS number: 64516
Your company name: Dubai BizConnect

Dubai BizConnect is a United Arab Emirates business provider with a presence in Dubai. Your traffic profile is more or less balanced, usually about 2.5Gbps. You announce via BGP in IPv4 one /16 and two /24s. On IPv6, you announce one /32 and three /48s.
You only peer with providers who are not from your region.

You have a public contact for abuse at abuse@dbc.example. Your NOC is reachable for everybody at noc@dbc.example (you do not have a phone contact for your NOC).

You are connected to UAE-IX with 10G at Datamena with IPv4 185.1.8.254 and IPv6 2001:7f8:73::fc04:0:1. You also have a presence at Equinix Dubai DX1.

Please put the above Information into PeeringDB.

64517 V

Peering DB Training Sheet

Your AS number: 64517
Your company name: Sofia Web

Sofia Web is a Bulgarian web hoster with a presence in Sofia. Your traffic profile is heavy outgoing, usually about 15Gbps. You announce via BGP in IPv4 two /16s and four /24s. On IPv6, you announce one /32 and eight /48s.
You have an open peering policy.

You have a public contact for abuse at abuse@sofiaweb.example.
Your NOC is only reachable for customers at noc@sofiaweb.example (you do not have a phone contact for your NOC).

You are connected to BIX with 20G at Evolink SO1 with IPv4 193.169.199.252 and IPv6 2001:7f8:58::fc05:0:252. You also have a presence at Equinix SO1.

Please put the above Information into PeeringDB.

64518 W

Peering DB Training Sheet

Your AS number: 64518
Your company name: Pint Size Hosting

Pint Size Hosting is a British colocation provider in London and Manchester. Your traffic profile is mainly outgoing, usually about 25Gbps. You announce via BGP in IPv4 one /21 and six /24s. On IPv6, you announce one /32 and three /48s.
You have an open peering policy.

You have a public contact for abuse at abuse@pint.example. Your NOC is reachable for customers and peers at noc@pint.example (you do not have a phone contact for your NOC).

You are connected to Lonap with 20G at Telehouse East with IPv4 5.57.80.251 and IPv6 2001:7f8:17::fc06:1. You also have a presence in Manchester at M247 Ball Green.

Please put the above Information into PeeringDB.

64519 X

Peering DB Training Sheet

Your AS number: 64519
Your company name: Stockholm Online

Stockholm Online is a Swedish DSL provider in Stockholm and Gothenburg. Your traffic profile is mainly incoming, usually about 12Gbps. You announce via BGP in IPv4 one /16 and two /24s. On IPv6, you announce one /32 and two /48s.
You have an open peering policy.

You have a public contact for abuse at abuse@s-online.example. Your NOC is reachable for customers only at noc@s-online.example (you do not have a phone contact for your NOC).

You are connected to Netnod Stockholm with 10G at Interxion STO2 with IPv4 194.68.123.253 and IPv6 2001:7f8:d:ff::249. You also have a presence in Gothenburg at SHG5.

Please put the above Information into PeeringDB.

64520 Y

Peering DB Training Sheet

Your AS number: 64520
Your company name: Gruezi Data Hosting

Gruezi Data Hosting is a Swiss Webhosting provider in Zurich and Geneva. Your traffic profile is heavily outgoing, usually about 45Gbps. You announce via BGP in IPv4 two /16s and one /24. On IPv6, you announce one /32 and one /48s.
You have an open peering policy.

You have a public contact for abuse at abuse@gruezi.example. Your NOC is reachable for everybody only at noc@gruezi.example (you do not have a phone contact for your NOC).

You are connected to SwissIX Zurich with 100G at Interxion Zurich with IPv4 91.206.52.239 and IPv6 2001:7f8:24:ff::fe. You also have a presence in Geneva at CERN.

Please put the above Information into PeeringDB.

API Exercises

Please use http://16.163.138.205:9001 - http://16.163.138.205:9020 if you don't have a Unix shell at hand.

Heads up:

- ***always provide '-H "accept: application/json" -H "Content-Type: application/json"' to curl when POSTing or PUTing!***
- ***create your directory first and cd***
- ***Webshells are only available during Tutorials and are shut down afte***

Create an object and re-read

- use data from Track 2 Training Sheets, or use ASN > 64520
- What is the output from the ***create (POST)*** call?
- What is the output from the ***get (GET)*** call?

Modify an object and reread

- What is the output from the ***modify (PUT)*** call?

Delete an object

- What is the output from the ***delete (DELETE)*** call?

Specific exercises

- How many ***org*** objects are in PeeringDB?
- How many networks (***net***) does Google LLC (org_id=574) have?
- How many Internet exchanges (hint: use ***netixlan***) does ASN 15169 peer?
- What is the total peering capacity (hint: use ***speed*** of ***netixlan*** object) of ASN 15169?
- How many European Internet exchanges does ASN 15169 peer?
- Compile a list (asn, ipv4, ipv6) (hint: use ***netixlan*** object) of participants at IX.br (PTT.br) São Paulo
- *Propose actions to be done*