



2022
APRICOT
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IXP Manager Tutorial

Bringing Your IX and First Members Live

APRICOT 2022

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ABOUT ME

Barry O'Donovan

- Management and Operations team at INEX
- Project manager and lead developer for IXP Manager
- Husband, dad, geek, sci fi, politics and business
- Internet infrastructure specialist - Island Bridge Networks
- Open source software and projects
- <https://www.barryodonovan.com/>



INEX

- Peering point for the island of Ireland, member owned association, not for profit, founded in 1996
- ~115 members (inc. >95% of eyeballs)
- 750 Gbps of IP data exchanged at peek
- Dual infrastructure, 7 PoPs, own dark fibre
- Opened INEX Cork in 2016
- IXP Manager / Salt / Napalm automation
- Home of IXP Manager

IXP Manager

- An INEX project
- Full-stack management system for IXPs
- FOSS - GPL v2 license
- Complete route server automation
- In use at nearly 200 IXPs worldwide
- Teaches and implements best practice
- MANRS Compliant



<https://www.ixpmanager.org/>

Automation

Automation at INEX - via IXP Manager

- Route servers at INEX automated from the beginning. (LAN1 IPv4 has ~0.5m lines)
- Route collectors
- AS112 routers
- Graphing (MRTG)
- sflow (discovery / static configuration of MAC addresses and updates automatically)
- Nagios (switches, member reachability and BGP sessions)
- Weathermaps / core bundles
- DNS ARPA entries
- IRRDB entries for members peering on route servers
- IX-F Member Export
- Peering matrices
- RIR Object updates
- Smokeping
- TACACS
- DB has been used for Apache Auth, mail systems, etc.

Automation

Automation at INEX - Switches

Using IXP Manager as the *source of truth*, we configure switches using:

- Arista - SaltStack + Napalm
- Cumulus - SaltStack

See: <https://www.ixpmanager.org/support/talks>

SaltStack takes its *pillar* information from IXP Manager APIs.

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Demonstration Platform

- IXP Manager as at public GitHub repo [inex/IXP-Manager](#)
- Basic .env configuration for database, mail, etc.
- Database via:

```
php artisan migrate
php artisan db:seed --force --class=IRRDBs
php artisan db:seed --force --class=Vendors
php artisan db:seed --force --class=ContactGroups
```

- Nothing else - bare bones install.



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Bringing Your IX Live with IXP Manager

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“dotenv” Configuration

- Standard means of IXP Manager configuration
- Sample: <https://github.com/inex/IXP-Manager/blob/master/.env.example>
- Let's look at our demo's .env file...
- And then let's see the local IXP Manager's webpage...

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Initial Member / Customer Creation

- Your own IXP needs a member entity in IXP Manager
 - Associates users, core ports, route collector, etc.
 - *You also need an entity for your route servers.*
- Done for you with the automated installer.
- Instructions provided for manual installation:
 - <https://docs.ixpmanager.org/install/manually/>
- We'll do it the manual way just to demonstrate it.

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Initial Member / Customer Creation

```
INSERT INTO company_registration_detail
  ( registeredName ) VALUES ( 'Sample IXP' );
SET @crdid = LAST_INSERT_ID();

INSERT INTO company_billing_detail
  ( billingContactName, invoiceMethod, billingFrequency )
  VALUES ( 'Barry in AP', 'EMAIL', 'NOBILLING' );
SET @cbdid = LAST_INSERT_ID();
```

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Initial Member / Customer Creation

```
INSERT INTO cust ( name, shortname, type, abbreviatedName, autsys, maxprefixes, peeringemail,
  nocphone, noc24hphone, nocemail, nochours, nocwww, peeringpolicy, corpwww, datejoin, `status`,
  activepeeringmatrix, isReseller, company_registered_detail_id, company_billing_details_id )
VALUES (
  'Sample IXP', 'sample', 3, 'S-IXP', '65500', 10, 'peering@example.com', '+123456789',
  '+123456789', 'noc@example.com', '24x7', '', 'mandatory', 'https://s-ixp.demo', NOW(),
  1, 1, 0, @crdid, @cbdid );
```

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Initial User Creation

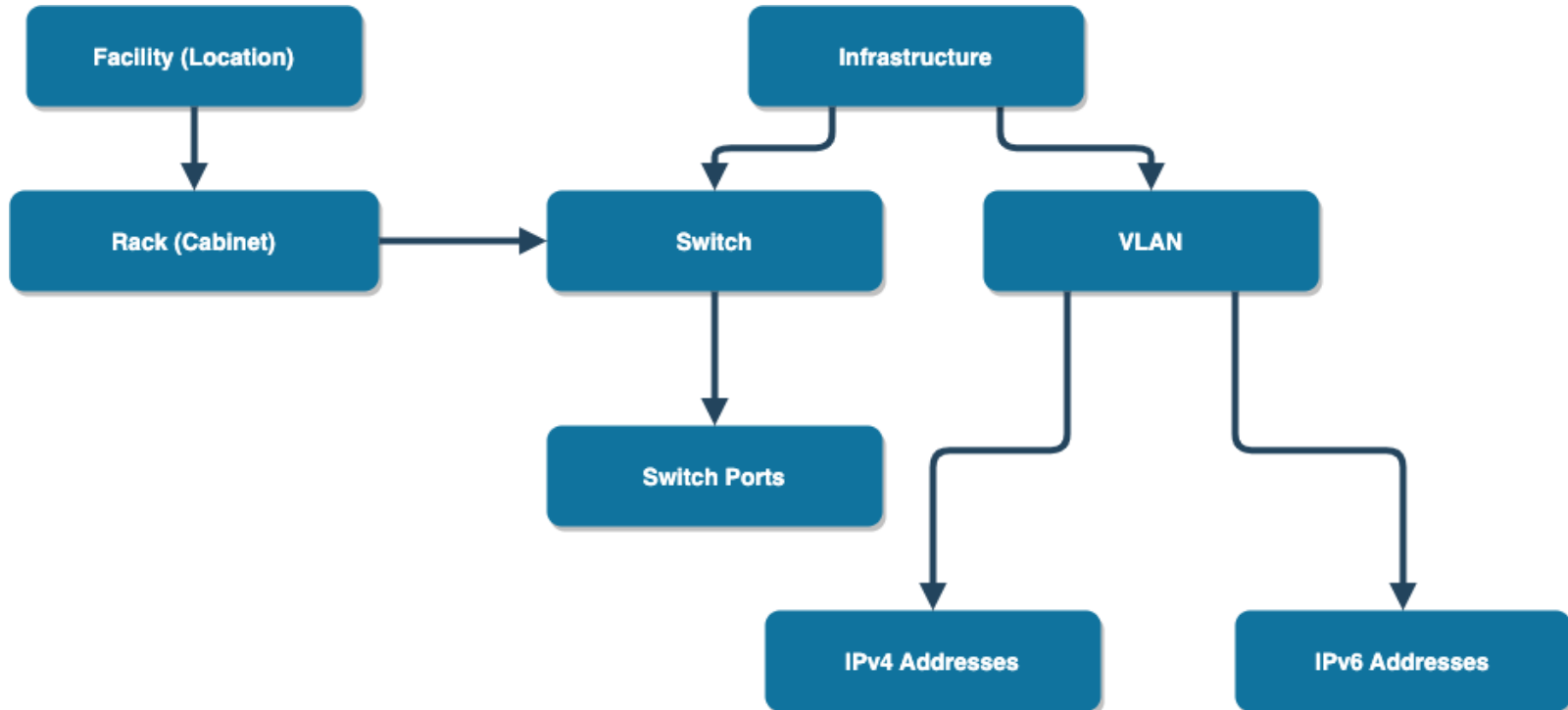
- Done for you with the automated installer.
- Other option is our new command line user management via Artisan

```
php artisan user:create
```

- And now we can log in...

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Initial Steps - <https://docs.ixpmanager.org/install/next-steps/>



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Initial Steps - <https://docs.ixpmanager.org/install/next-steps/>

1. Create your infrastructure
 - Represents an IXP (INEX has *INEX LAN1*, *INEX LAN2*, *INEX Cork*)
 - Typically has a PeeringDB and an IXPDB entry
2. Add your facilities / points of presence
 - Where your switches are physically located
 - Integrates with PeeringDB for additional information
3. Add racks to your facilities / points of presence
 - Will be used later for patch panels and switches

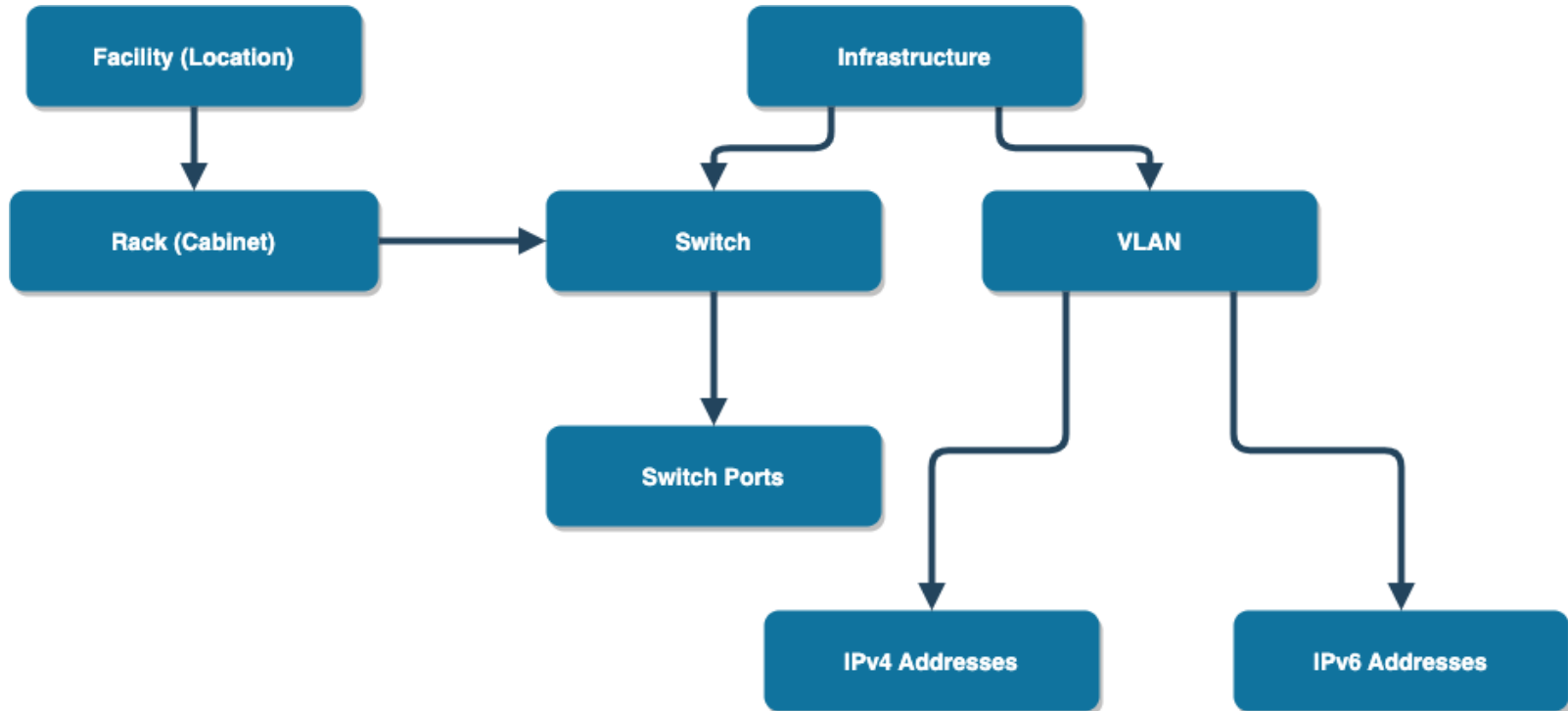
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Initial Steps - <https://docs.ixpmanager.org/install/next-steps/>

4. Add your switches
 - SNMP required
 - Most common switches supported - see [opensolutions/OSS_SNMP](#) if not
5. Add your VLANs. Typically at least two per infrastructure / IXP:
 - Production peering LAN
 - Quarantine LAN for onboarding, diagnostics, etc.
 - Don't forget *VLAN -> Network Information*
6. Set up your IP addresses for the new VLAN(s).

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Initial Steps - <https://docs.ixpmanager.org/install/next-steps/>



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Initial Steps - <https://docs.ixpmanager.org/install/next-steps/>

7. Let us know you're using IXP Manager!

- <https://www.ixpmanager.org/community/world-map>
- We check the 'ping' api: <https://ixpm-apricot.test/api/v4/ping>

8. Register with IXPDB

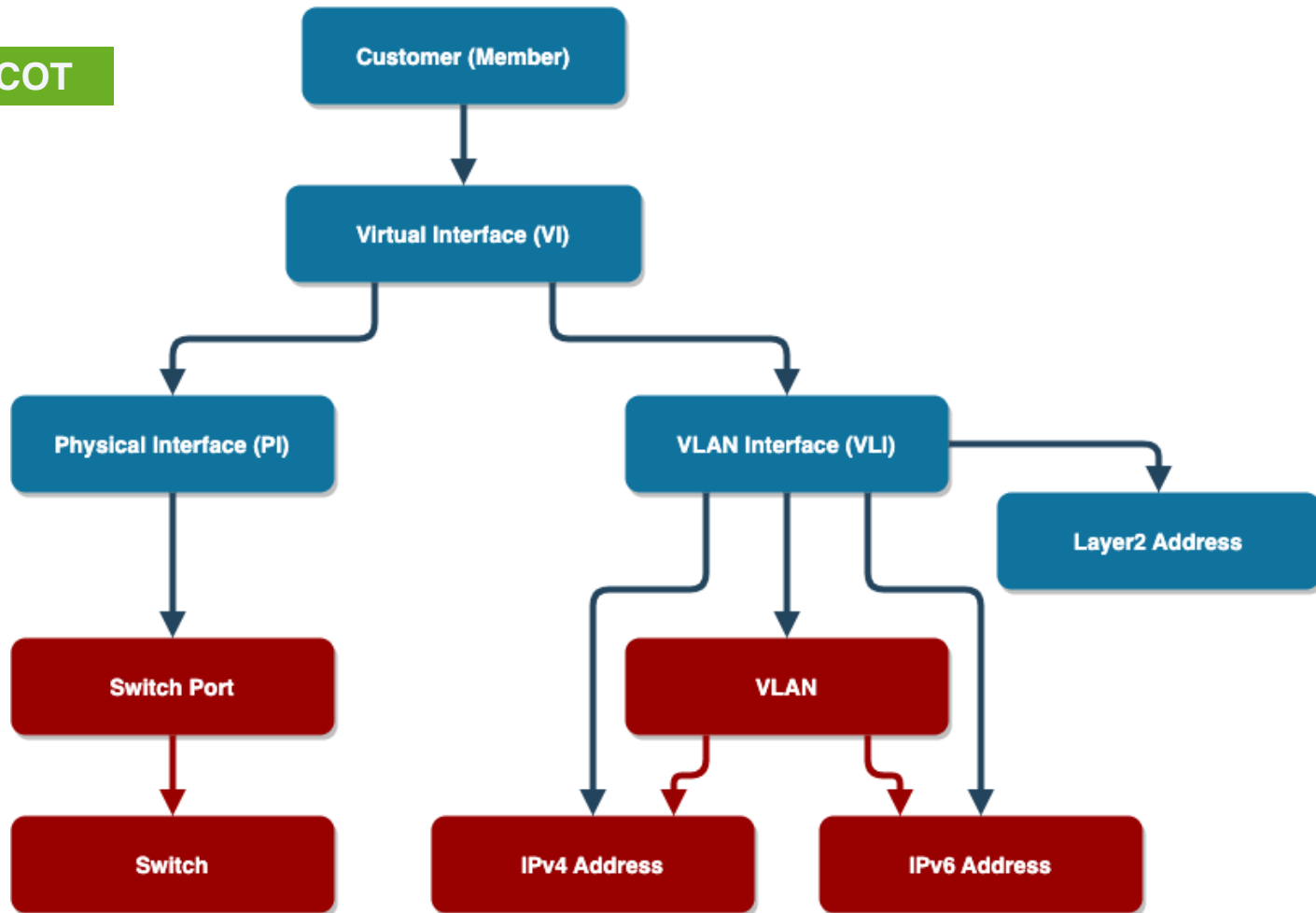
- See: <https://ixpdb.euro-ix.net/en/>
- *'If you want to list your IXP in the IXPDB, here's what to do:'*
- <https://ixpm-apricot.test/api/v4/member-export/ixf>



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Adding Your First Members

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Documentation - <https://docs.ixpmanager.org/usage/customers/>

1. Add the new member via *Members* -> [+]
2. Provision a new port using the wizard
 - There are no (?) cases where you shouldn't always start with the wizard
3. Configure a layer2 address (MAC) for I2acls
4. Look at IX-F Member Export now
 - <https://ixpm-apricot.test/api/v4/member-export/ixf>

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Route Collector - <https://docs.ixpmanager.org/features/route-collectors/>

1. Define a new router in IXP Manager.
2. Examine the configuration.
3. Refresh IRRDB prefix lists as we added two new members.
 - `php artisan irrdb:update-prefix-db`
4. Re-examine the configuration.
5. Take a live look at INEX's IXP Manager?

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Route Server - <https://docs.ixpmanager.org/features/route-servers/>

1. Define a new *route server member* in IXP Manager
2. Add a new route server to the routers
3. Examine the configuration.
4. Look at a new feature to provide a UI for the complex task of tagging routes with BGP communities.
 - Also solves the issue of no large BGP community support on a member's device.
 - Demo: <https://ixpm-apricot.test/rs-filtering/3>

APRICOT**Route Server - New Feature - Prefix Filtering**

Description	Community
Prevent announcement of a prefix to a peer	rs-asn:0:peer-as
Announce a route to a certain peer	rs-asn:1:peer-as
Prevent announcement of a prefix to all peers	rs-asn:0:0
Announce a route to all peers	rs-asn:1:0

APRICOT**Route Server - New Feature - Prefix Filtering**

Description	Community
Prepend to peer AS once	rs-asn:101:peer-as
Prepend to peer AS twice	rs-asn:102:peer-as
Prepend to peer AS three times	rs-asn:103:peer-as



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Graphing

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Graphing - <https://docs.ixpmanager.org/grapher/introduction/>

- Too much material to cover in this tutorial - see other videos and docs
- Essentially three types:
 - MRTG (aggregate graphs, member ports, etc.)
 - Smokeping (latency measurements)
 - sflow / peer-to-peer
- Configuration for all generated via IXP Manager
 - `php artisan grapher:generate-configuration -B mrtg | less`



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Other Features

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See <https://docs.ixpmanager.org/install/next-steps/>

- Remember:
 - Docs: <https://docs.ixpmanager.org/>
 - In-application contextual help and links to documentation
 - Video Tutorials: <https://www.ixpmanager.org/support/tutorials>
 - Other Talks: <https://www.ixpmanager.org/support/talks>
 - The mailing list: <https://www.ixpmanager.org/support/mailling-lists>
 - Archives are public!
 - GitHub issues: <https://github.com/inex/IXP-Manager>

Thank You!

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