

OpenStack Nova Network to Neutron Migration: Survey Results

OpenStack UX Team

- Ju Lim, Red Hat
- Melissa Meingast, HPE
- Piet Kruithof, HPE

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Background

The purpose of this study was to gather data to better understand the attributes of OpenStack users who remain on Nova Networking rather than migrating to Neutron, and their primary reasons for doing so.

- Initial interviews conducted with 5 OpenStack Cloud Operators which helped create a community survey, that was then distributed to a larger group of OpenStack users to ensure representation by the larger community to validate findings and gather additional feedback
 - Initial interviews (July - August 2015)
 - Survey (September - October 2015)
- Effort between HP, Red Hat, and the OpenStack Foundation

Executive Summary

- Nova Network use is decreasing
 - Currently 16% of OpenStack deployments ([OpenStack October 2015 User Survey](#))
- Still a fair number of users with simple, flat networking needs
- Overall both Nova Network and Neutron users are satisfied with their networking choice, though Neutron users felt their organizations' needs were better met vs. Nova Network users
- For simple, flat networking needs, Nova Network still meets a very high majority of Nova Network users' end-users' needs
- Neutron complexity and scalability perceived as biggest barriers to Neutron adoption by Nova Network users
- Scalability and HA are the biggest concerns by Neutron users

Recommendations

- Develop tools to facilitate migration to Neutron
 - Develop tooling to assist with Neutron migration (especially with ability to keep the same floating IPs and fixed IPs assigned without having to reassign them as part of the migration) while minimizing downtime and impact to instances (end-user impact)
 - Publish guide / best practices for migration
- Publish 1:1 comparison of features in Nova Networks and Neutron
 - Ideally targeted towards most common user's network configuration / use cases
- Expand documentation to cover other common plug-ins being used, e.g. Linux Bridge (for simple networking needs)
 - Current documentation focuses primarily on Open vSwitch today

Recommendations (contd.)

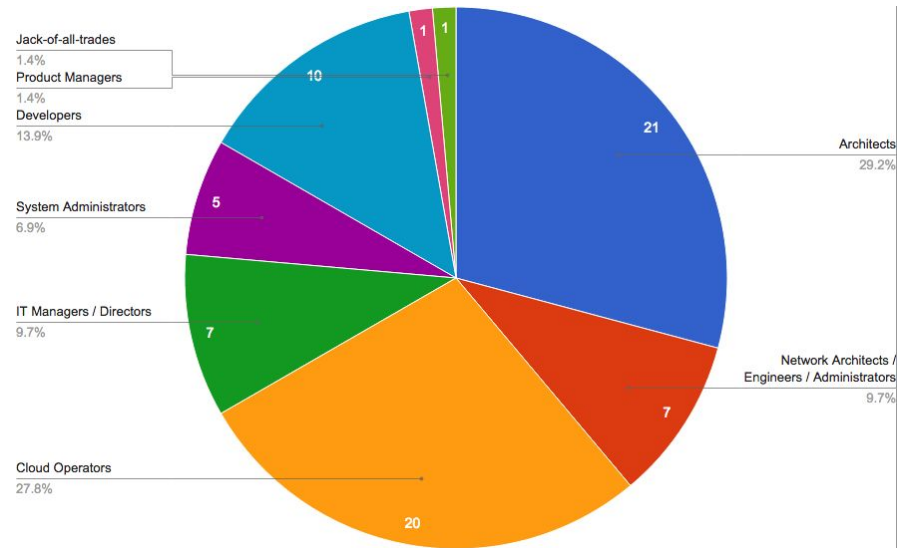
- Publish scalability guidelines and limitations for Neutron
 - “Neutron scalability and limitations not documented and perceived to be largely unknown except to Neutron Developers”
- Improve community involvement and engagement
 - Publish case studies and/or reference architectures based on proven customer’s production deployments
- Improve scalability of Neutron

Comparison of Nova Network vs. Neutron User's Perceptions



Approach

- Survey respondents recruited through a variety of channels -- LinkedIn, Email Distribution Lists and IRC
- 71 individuals completed the survey
- More were using Neutron than were running Nova Network
 - o 53 Neutron users (75%)
 - 51 run Neutron in their production environment
 - 2 run Neutron only in test, as they did not have OpenStack running in production
 - o 18 Nova users (25%)
 - 16 run Nova Networking in their production environments
 - 2 run Openstack only in test, and using Nova



Approach (contd.)

- Size of survey participants' clouds varied

	Neutron Users	Nova Users
1-20 nodes	8	2
21-50 nodes	7	7
51-80 nodes	3	1
81-100 nodes	4	0
101-500 nodes	25	3
501+ nodes	6	4
Unknown	0	1

- A range of OpenStack versions were being run in production
- 19 were running a more current release in their test environments

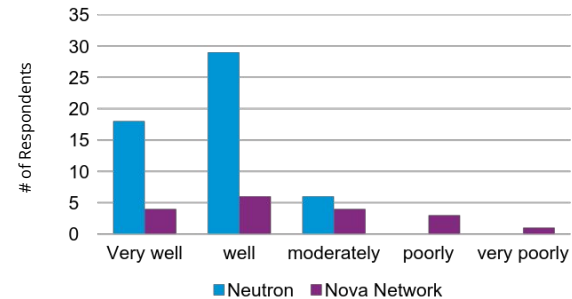
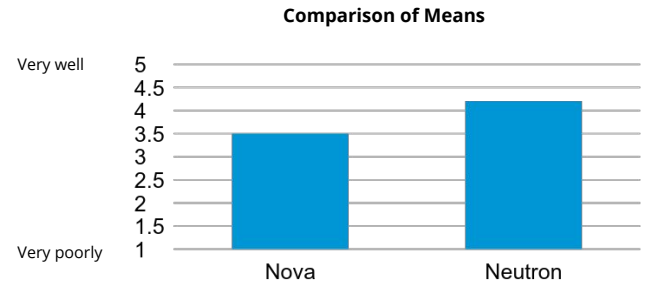
	Neutron Users	Nova Users
Kilo	22	6
Juno	17	2
Icehouse	11	7
Havana	0	2
Grizzly or earlier	1	0
Not in production	2	1

Meeting Customers' Needs

Neutron users reported greater satisfaction with their needs being met compared with Nova Network users

- Neutron users ($\bar{M} = 4.2$; $SD = 0.65$) reported being significantly more satisfied with their networking solution compared with Nova Network ($\bar{M} = 3.5$; $SD = 1.19$) users, at the $p = .05$ level ($t(21) = -2.3$; $p = 0.027$)
- Results were analyzed using an independent samples t-test assuming unequal variances

How well does (Nova or Neutron) meet your organization's needs?



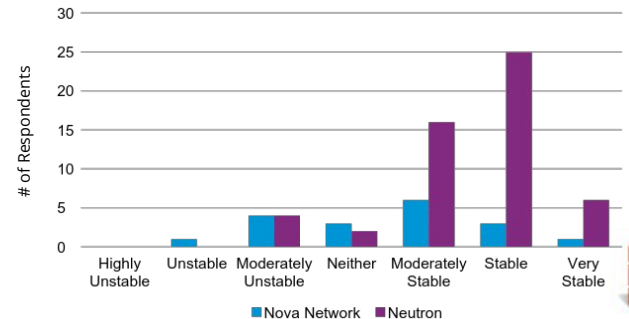
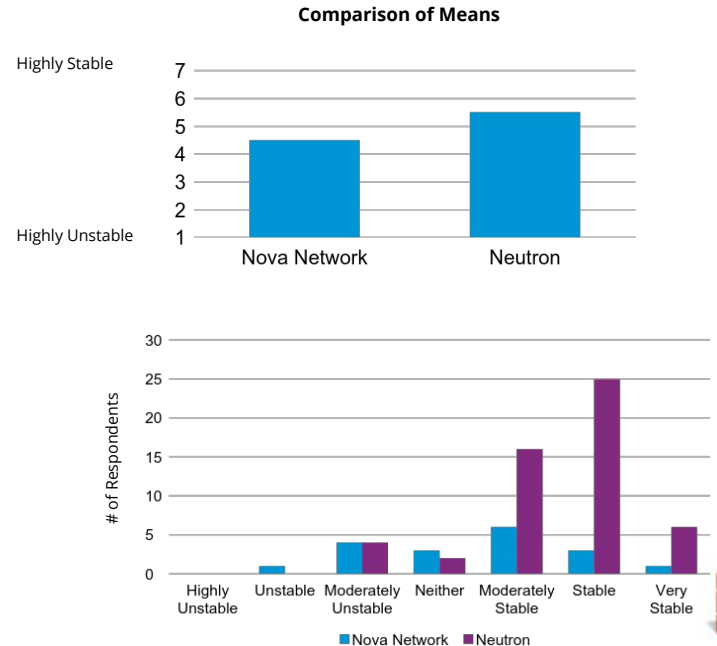
Neutron $N = 53$
Nova Network $N = 18$

Perceived Stability of Neutron

Individuals currently using Neutron perceived it a more stable solution than those still using Nova Network

- Neutron users ($\bar{M} = 5.5$; $SD = 1.0$) rated Neutron as significantly more stable compared with current Nova Network users ($\bar{M} = 4.5$; $SD = 1.3$) users, at the $p = .05$ level ($t(24) = -2.9$; $p = 0.007$)
- Results were analyzed using an independent samples t-test assuming unequal variances

Based on your current knowledge, how stable do you feel Neutron is?



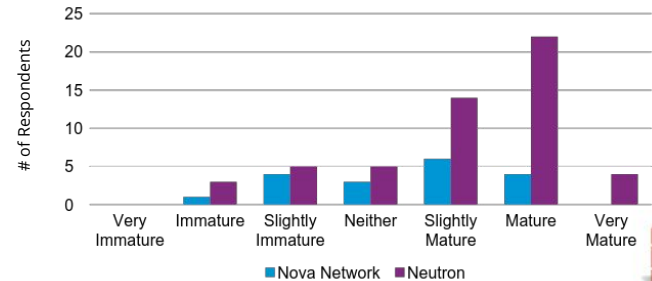
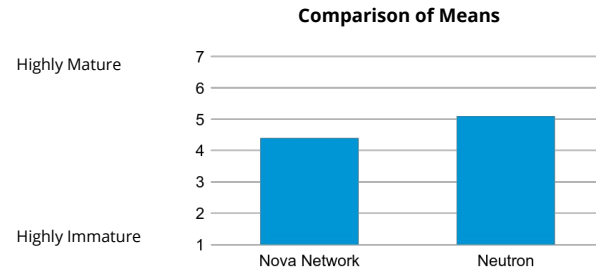
Neutron $N = 53$
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Perceived Maturity of Neutron

No difference in the perception of Neutron's maturity was detected between individuals currently using Neutron and those still using Nova Network

- The analysis failed to reveal a significant difference in Neutron users ($\underline{M} = 5.1$; $SD = 1.3$) and Nova Network users ($\underline{M} = 4.4$; $SD = 1.2$) users, at the $p = .05$ level ($t(31) = -1.9$; $p = .06$)
- Results were analyzed using an independent samples t-test assuming unequal variances

Based on your current knowledge, how mature do you feel Neutron is?



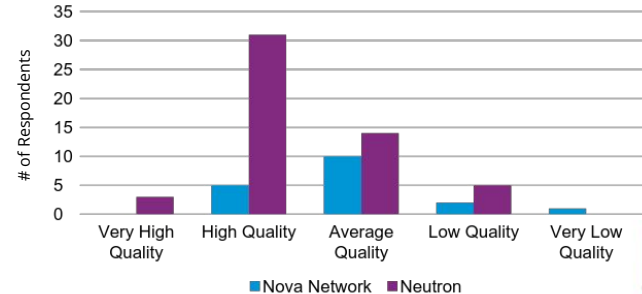
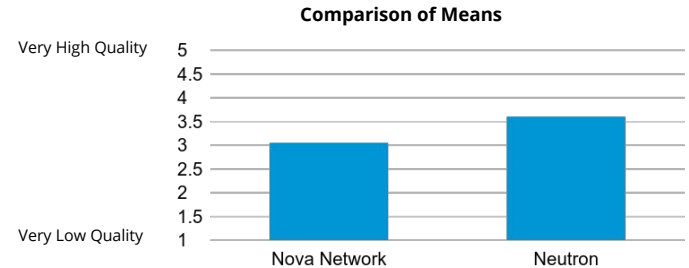
Neutron $N = 53$
Nova Network $N = 18$

Perceived Quality of Neutron

Individuals currently using Neutron perceived it a higher quality solution than those still using Nova Network

- Neutron users ($\underline{M} = 3.6$; $SD = 0.74$) rated Neutron as having a higher quality compared with current Nova Network users ($\underline{M} = 3.1$; $SD = 0.8$) users, at the $p = .05$ level ($t(28) = -2.6$; $p = 0.02$)
- Results were analyzed using an independent samples t-test assuming unequal variances

Based on your current knowledge, how would you rate Neutron's overall quality?



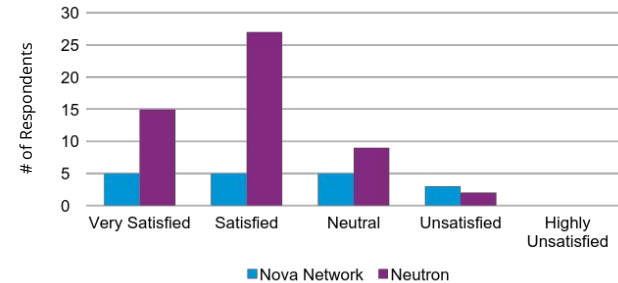
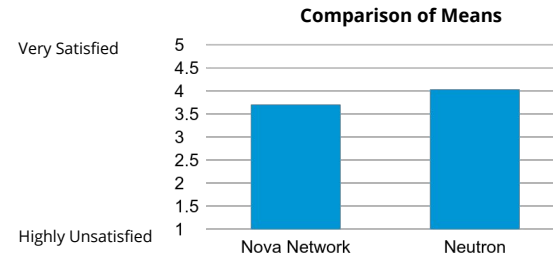
Neutron $N = 53$
Nova Network $N = 18$

Satisfaction with Networking Solution

Nova Network and Neutron users were equally satisfied with their current OpenStack networking solution

- The analysis failed to reveal a significant difference in Neutron users ($\underline{M} = 4.0$; $SD = .78$) and Nova Network users ($\underline{M} = 3.7$; $SD = 1.1$) users, at the $p = .05$ level ($t(23) = -1.3$; $p = 0.2$)
- Results were analyzed using an independent samples t-test assuming unequal variances

Overall, how satisfied are you with (Neutron/Nova Network)?



Neutron $N = 53$
Nova Network $N = 18$

Nova Network Users and Neutron Users: Feedback and Details



Top Reasons for Not Migrating to Neutron

What are the primary reasons that you have not migrated to Neutron?

Concern	# of Respondents	Percentage
Concerns with complexity of migrating to Neutron	13	72%
Concerns with manageability and troubleshooting in Neutron	11	61%
Insufficient time and/or resources to migrate to Neutron	10	56%
Our networking needs are being met by Nova Network	7	39%
The features that Neutron offers are not of interest or benefit to us	6	33%
Unsure which Neutron plug-in to deploy	6	33%
No plans to migrate to Neutron unless Nova Network is deprecated	5	28%
Concerns about stability	2	11%
Neutron does not scale as well as Nova	1	6%

Nova Network *N* = 18

Top Barriers for Not Migrating to Neutron

Have any of the following kept you from moving from Nova Network to Neutron?

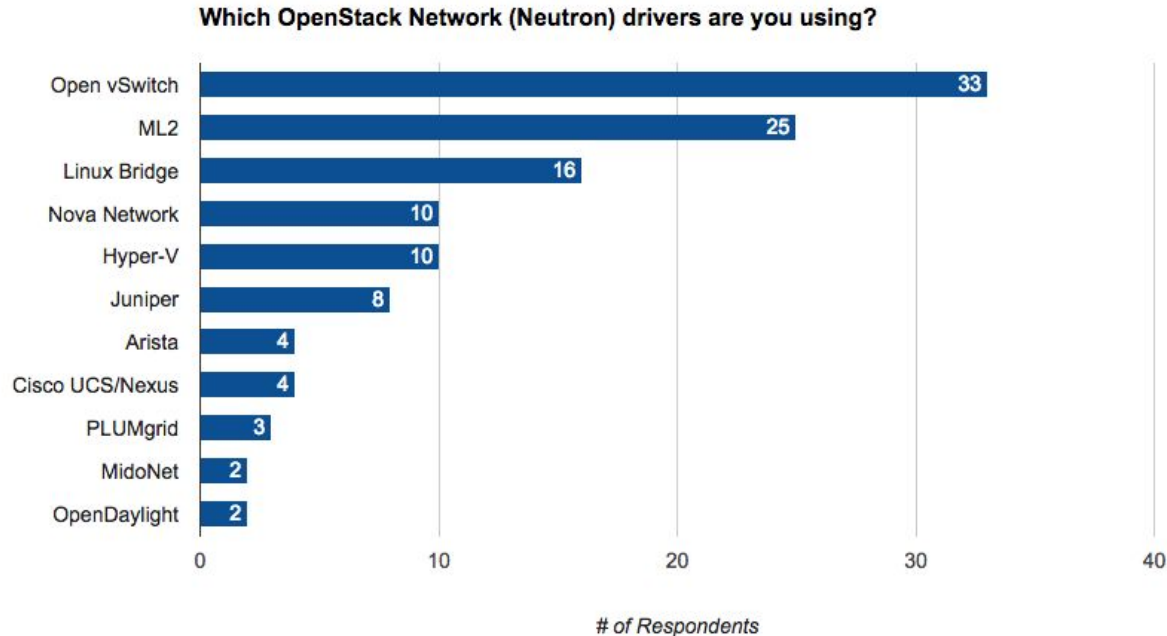
Concern	# of Respondents	Percentage
Neutron scalability	10	56%
Concerns around feature parity and scalability with Nova Network	9	50%
The need that end-users have to setup Neutron virtual networks and security groups as part of the Launch Instance workflow	8	44%
Limited high availability for L3 agents	7	39%
Distributed virtual routing (DVR) limitations for environments with limited IPv4 addresses	5	28%
Lack of ability to swap out plug-ins easily	4	22%
Limited scalability of security groups	4	22%
Uses up more IP addresses vs. Nova Network	3	17%
Inability to have Layer 2 domain scoped to a certain group of hosts, and be able to define that in Neutron	3	17%
Lack of partitioning mechanism for cells	2	11%
Limited high availability for LBaaS	2	11%
Inability to share networks by subset of projects	2	11%
Inability to map multiple floating IPs to an instance	2	11%
Inability to specify primary IP for a host	2	11%
Inability to share security groups for re-use between projects	1	6%
Concerns with regard to IPAM support	0	0%

Nova Network *N* = 18



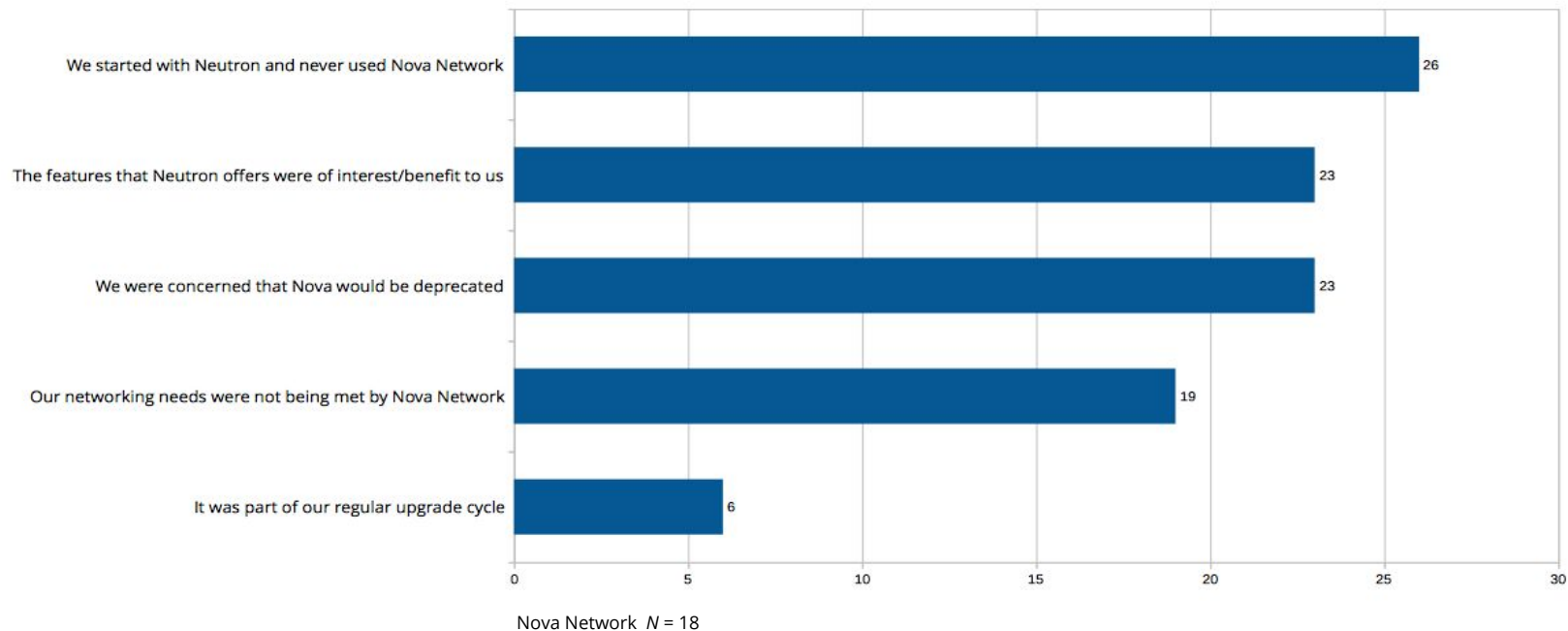
Neutron Users: Drivers Used

Open vSwitch is the most common choice for Neutron drivers for Neutron users



Nova Network to Neutron Migration Drivers

What caused you to migrate from Nova Network to Neutron?



Neutron Issues

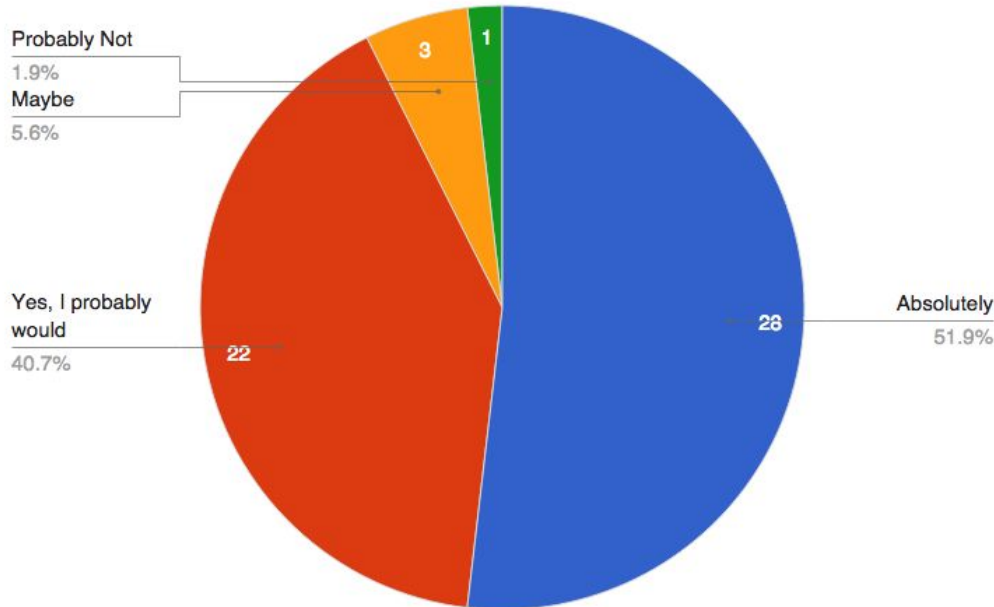
Have any of the following been issues for you since moving to Neutron?

Issue	# of Respondents	Percentage
Neutron scalability	25	47%
Limited high availability for L3 agents	22	42%
Inability to share networks by subset of projects	18	34%
Inability to have Layer 2 domain scoped to a certain group of hosts, and be able to define that in Neutron	16	30%
Limited scalability of security groups	16	30%
Limited high availability for LBaaS	15	28%
Lack of partitioning mechanism for cells	14	26%
Concerns with regard to IPAM support	12	23%
Inability to share security groups between projects	10	19%
The requirement that end-users setup virtual networks and security groups as part of Launch Instance workflow	10	19%
Lack of ability to swap out plug-ins easily	9	17%
Distributed virtual routing (DVR) limitations for environments with limited IPv4 addresses	9	17%
Inability to specify primary IP for a host	9	17%
Inability to map multiple floating IPs to an instance	7	13%
Uses up more IP addresses vs. Nova Network	4	8%
Concerns around feature parity and scalability with Nova Network	3	6%

Neutron Adoption

Knowing what you know today, would you still migrate to Neutron, if you had it to do over again?

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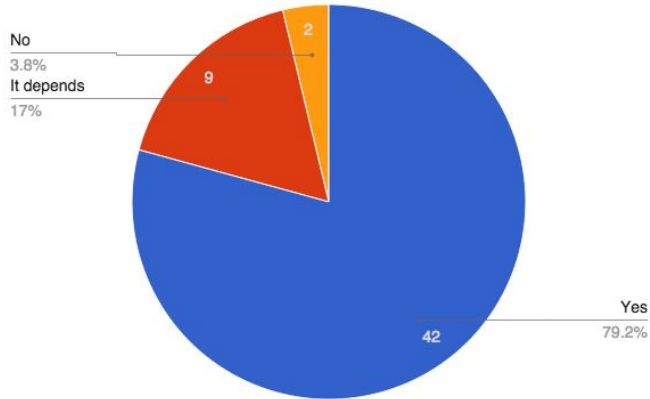


- A significant number of Neutron users (93%) would still migrate to Neutron today if they had to do it again
- A very small percentage of existing Neutron users are doubtful whether they would migrate to Neutron today

Would You Recommend Neutron?

If a peer in your industry was considering migrating from Nova to Neutron, would you recommend that they do so?

If a peer in your industry was considering migrating from Nova to Neutron, would you recommend that they do so?



20% of Neutron users hesitant on recommending Neutron

Explanations for "it depends":

- *Plug-ability provides the option of L2 and L3 overlays. This allows you to pick the best option for your requirements.*
 - *If all one needs is just to "give networking" to instances then there's no point in paying the price of switching to Neutron.*
 - *It depends on deployment size, and use cases -- many use cases are still solved by simple, flat networking.*
 - *It depended on the features they used and what features they were looking to get out of Neutron.*
 - *I don't know all the specific of why people are still using nova-network. Unless I understand his needs, I wouldn't make a recommendation.*
- *It seems like over-time nova-network is not going away and in the past 1+ years has gained some features so, if nova-networking will do everything they want out of the box - it would be hard to recommend the additional complexity of neutron to them.*
 - *Wholeheartedly, I'd recommend starting with Neutron and never building a new cloud with nova-network. I have never tested migrating from one to the other though, and hear that may be difficult, so I'd be more reluctant to actually recommend that.*
 - *It depends upon their needs and skill level to support it.*

Q&A

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More Info? User Research Requests?

- OpenStack UX Wiki: <https://wiki.openstack.org/wiki/UX>
- Mailing List: openstack-dev@lists.openstack.org with the (email) subject using the tag **[UX]**
- IRC: #openstack-ux
- Bi-weekly Friday meetings @ 1500 UTC
 - <https://wiki.openstack.org/wiki/Meetings/UX>





Thank You!