NetDevOps Survey
State of network operations through automation

Damien Garros, Managing Director, Network To Code

NANOG 78, San Francisco, February 2019

@dgarros

@damgarros

Agenda

- Introduction

- State of Network Operations

- Transition to Network Automation

- Industry Trends

- NetDevOps Survey project

1

Introduction

NetDevOps Survey

The goal of this survey is to collect information to understand how network operators and engineers are using automation to operate their network today.

Vendor Neutral and Community Driven

Where is the data coming from?

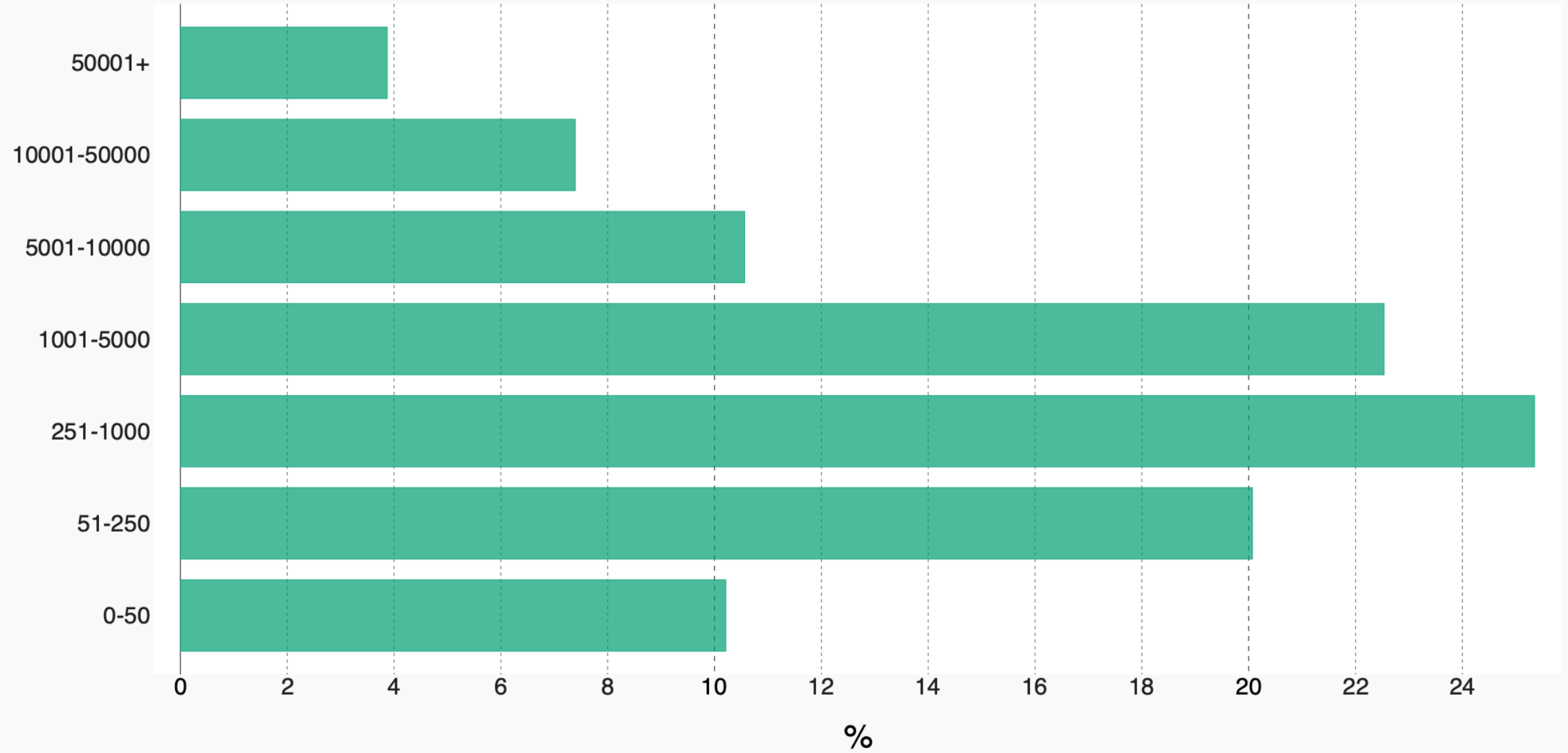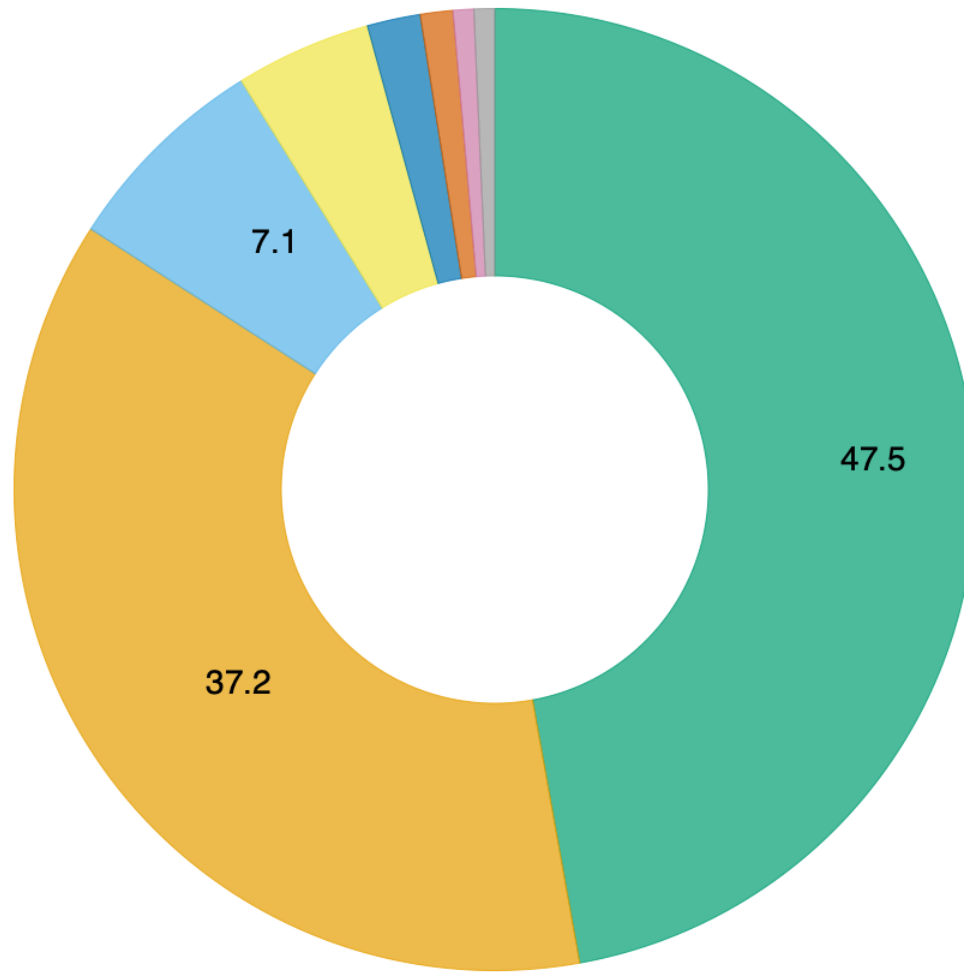| 1st Survey	2nd Survey
Q4 2016	Q4 2019
20 Contributors	10 Contributors
20 Questions	26 Questions
~300 Participants	~300 Participants

NetDevOps Survey (2019)
How many network devices are you managing?
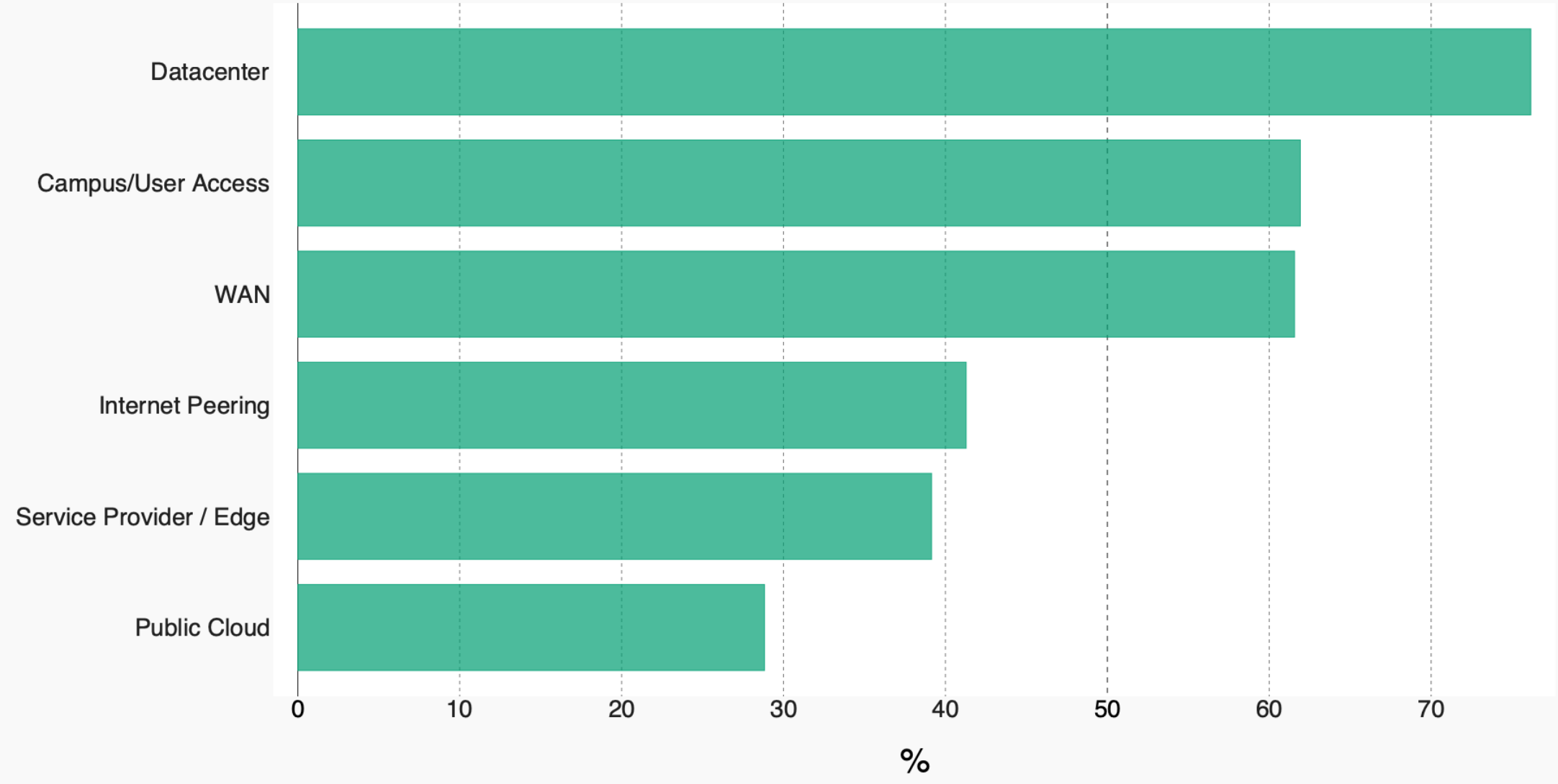
NetDevOps Survey (2019)
Where are you located?

Legend:
- North America
- Europe
- Asia
- Australia / Oc…
- South America
- Africa
- Middle East
- Everywhere

Values shown: 47.5, 37.2, 7.1
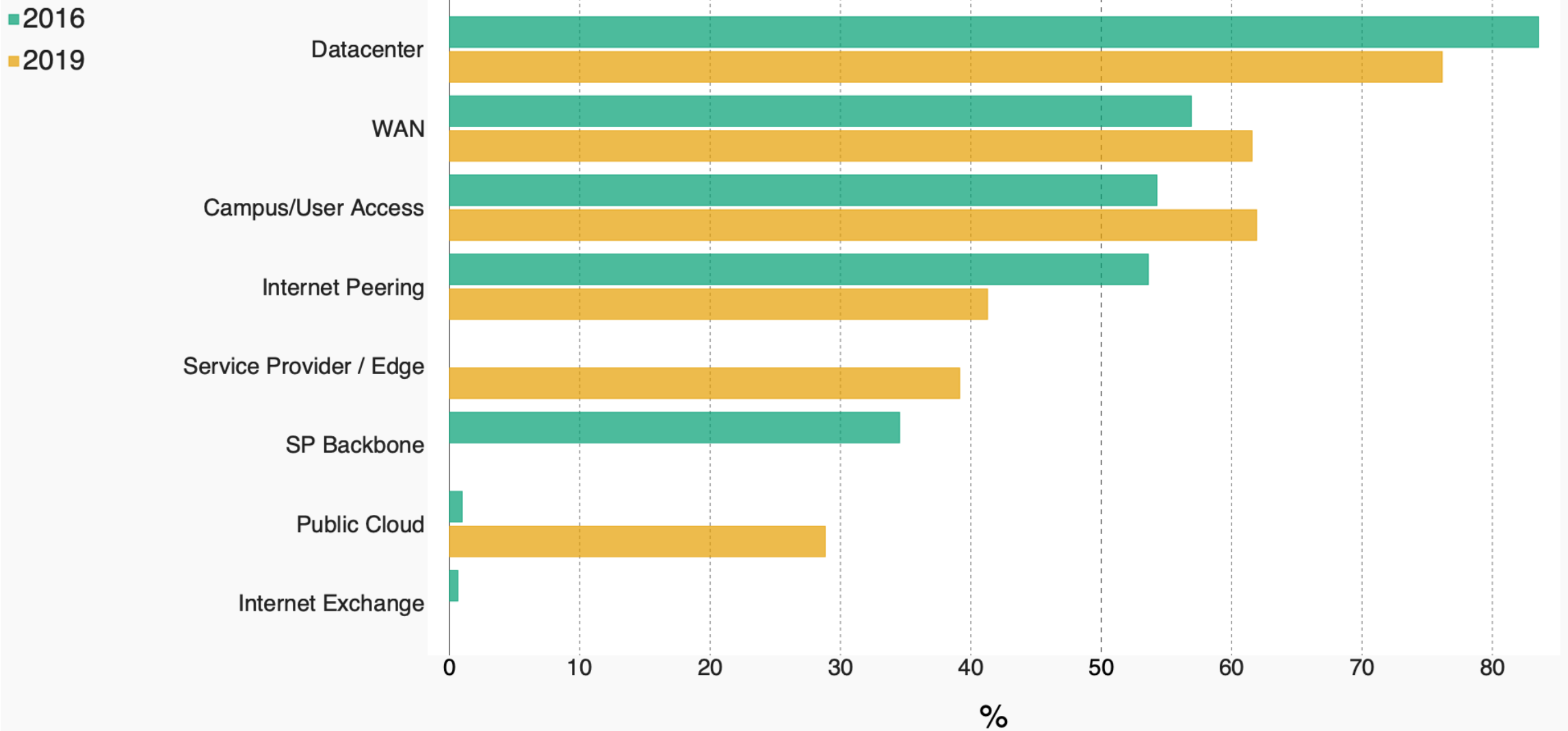
NetDevOps Survey (2019)
What types of environments are you managing?
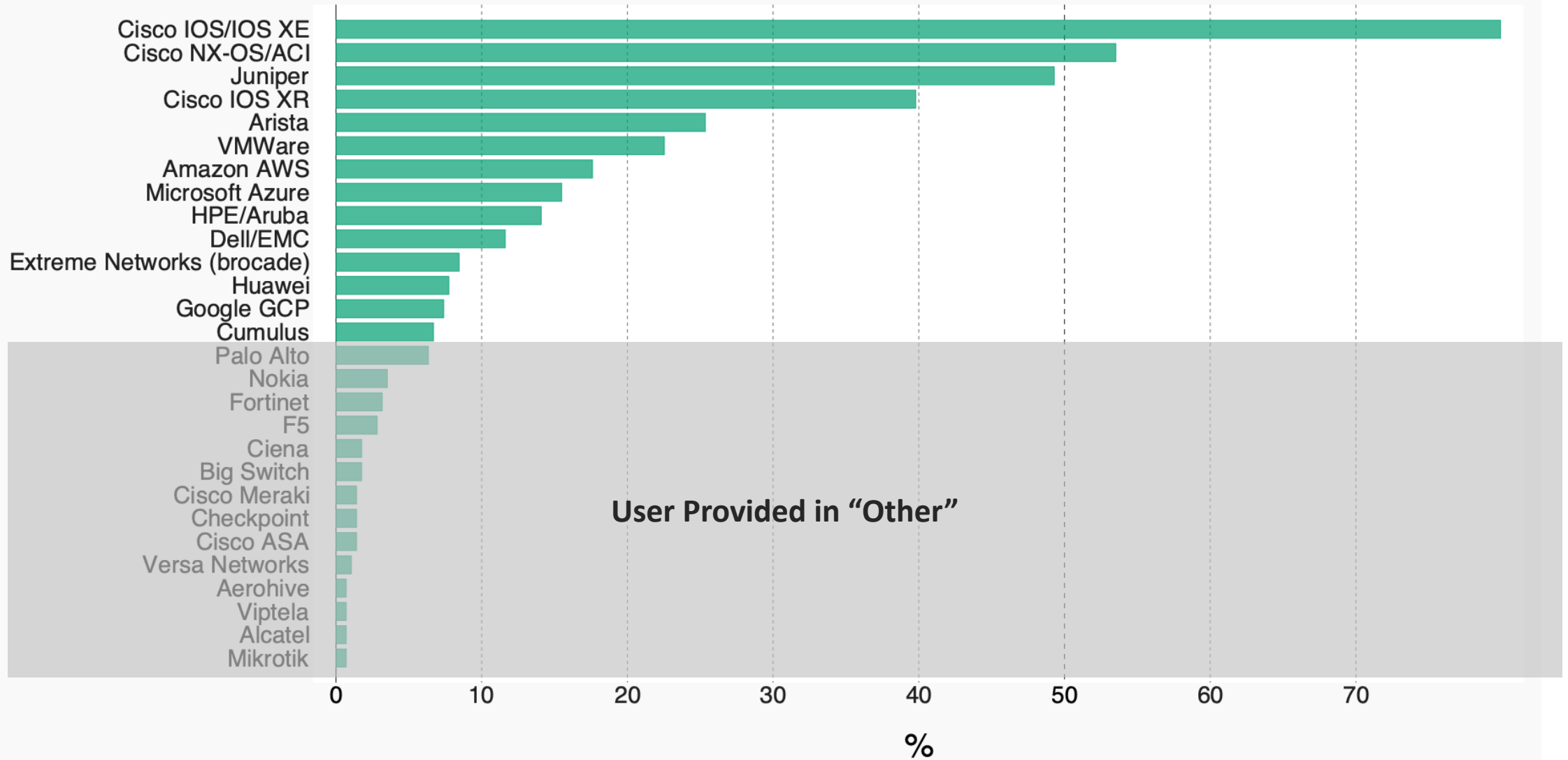### Stats: 3.09 avg, max 6

NetDevOps Survey
What types of environments are you managing?

NetDevOps Survey (2019)
Which networking vendor devices are you managing?
Stats: 3.95 avg, max 11

2

## State of Network Operations through automation

What operations in your network are currently automated ?

– Config Generation
– Config Archiving
- Compliance Check
– Troubleshooting
– Anomaly Detection
– Software Upgrade
- Day 0 Provisioning/ZTP

– Config Deployment
– Data collection / reporting
– Pre/Post changes
– Topology Mapping
– Fault Remediation
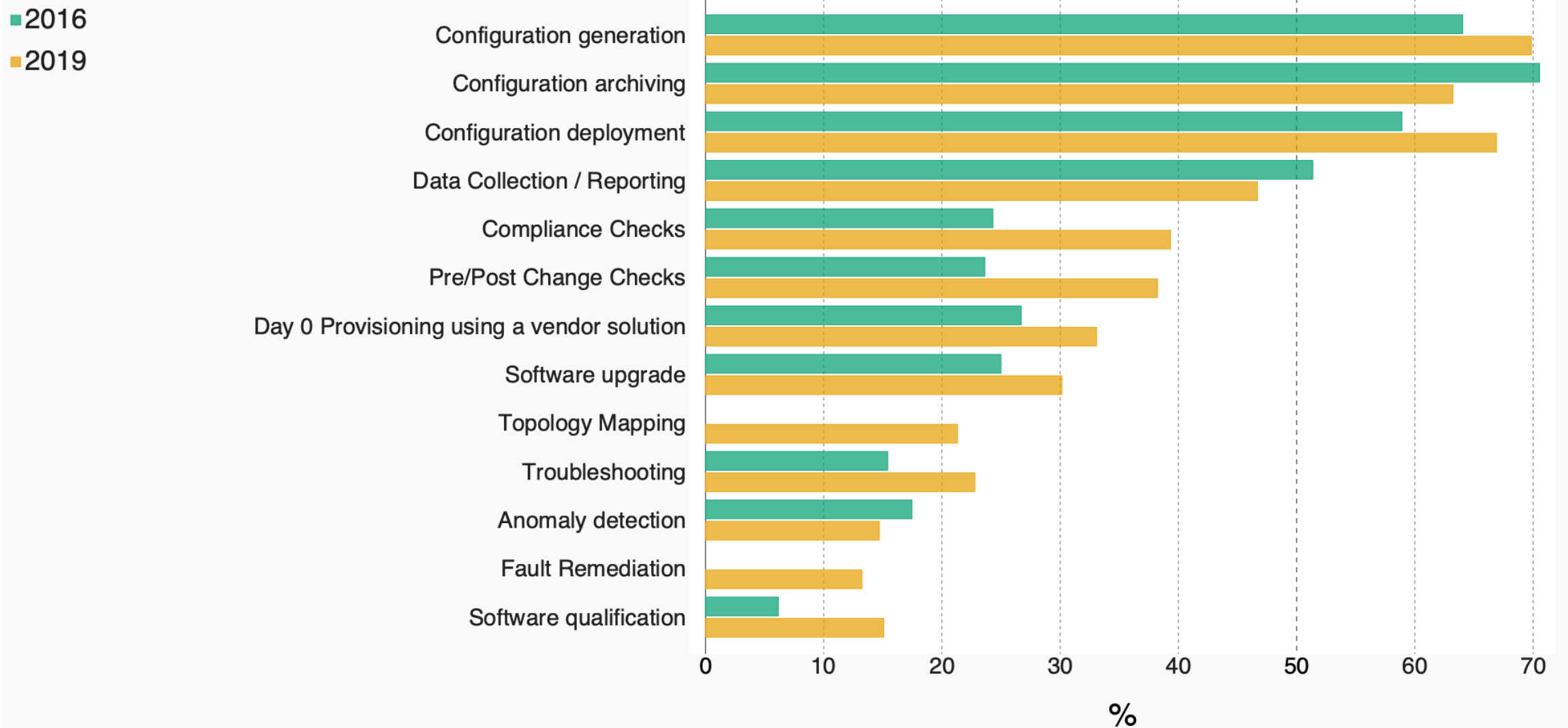– Software Qualification

NetDevOps Survey (2019)
What operations in your network are currently automated?
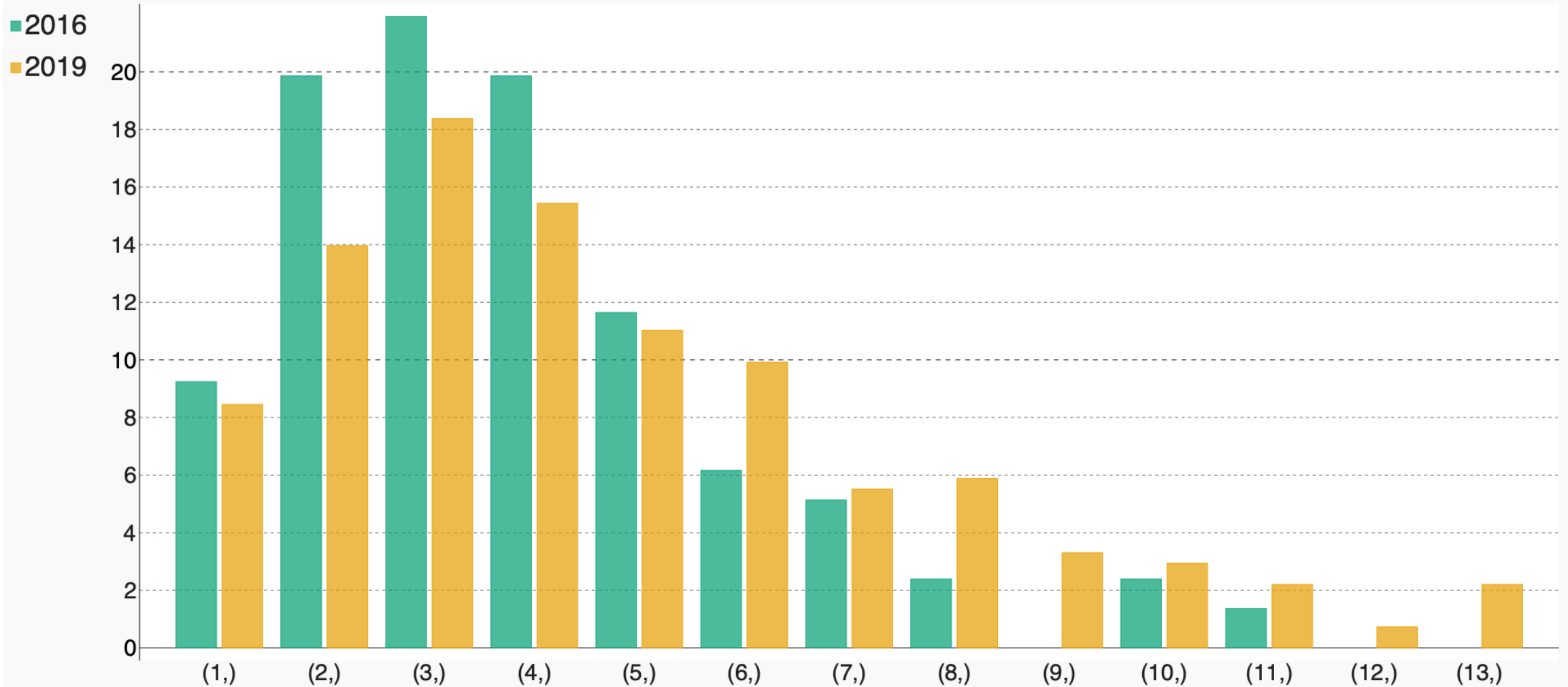Stats: 4.75 avg, max 13
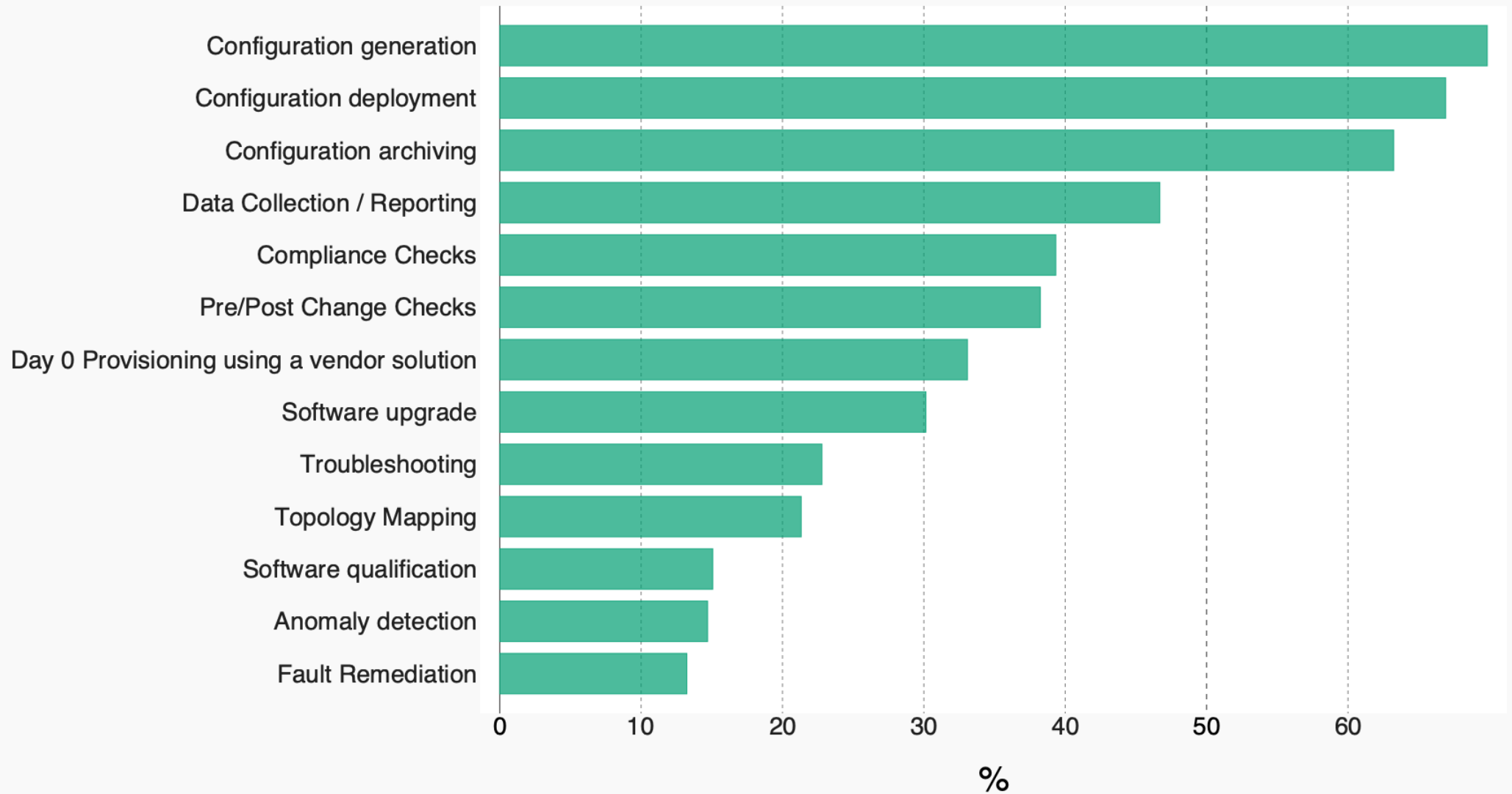
NetDevOps Survey
What operations in your network are currently automated?

NetDevOps Survey
Number of responses per participant
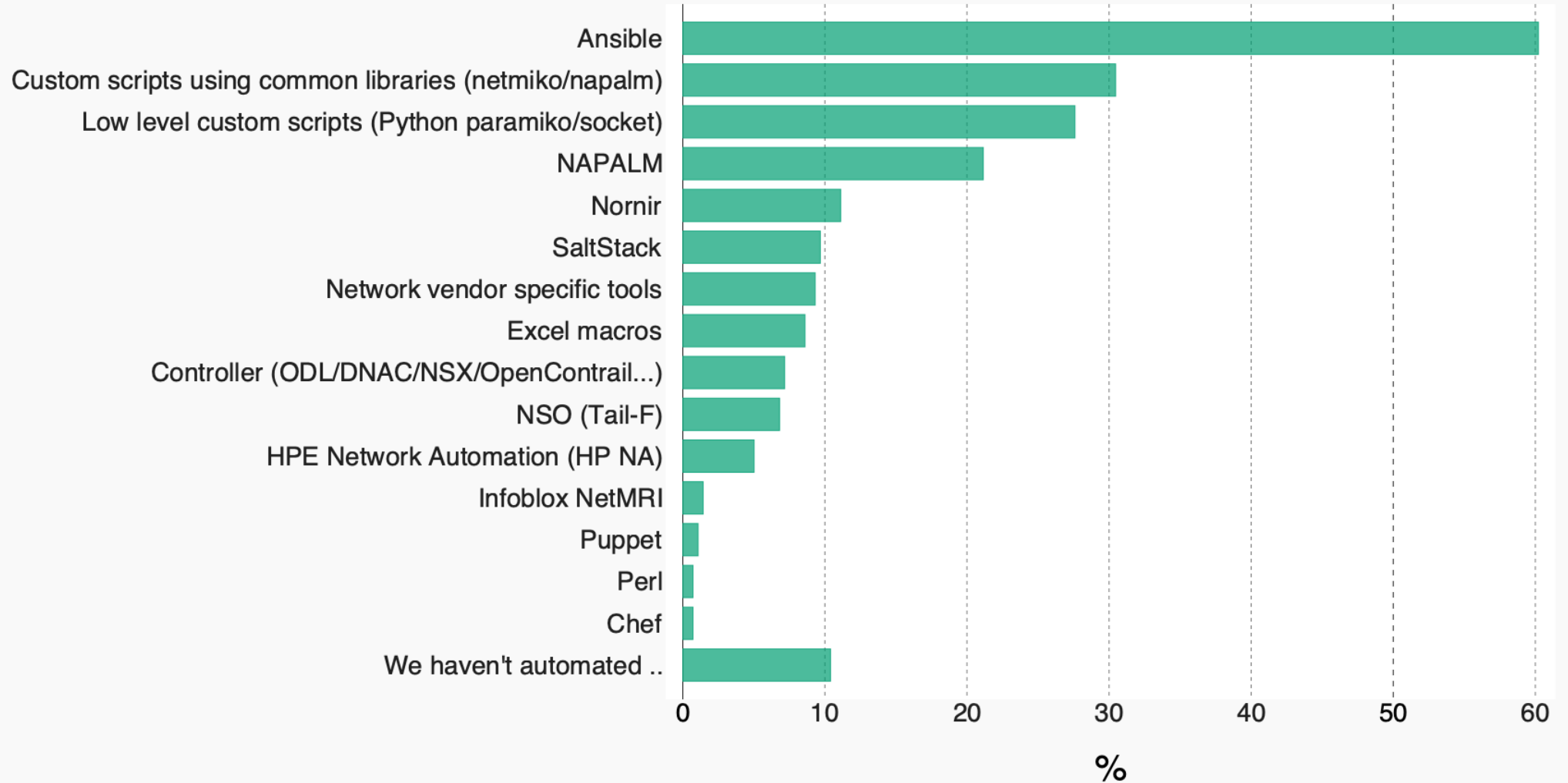What operations in your network are currently automated?

Configuration Management

What solution(s) are you using for the generation and/or the deployment of your configurations?

NetDevOps Survey (2019)
Configuration – If you are automating the generation and/or the deployment of your configurations what solution(s) are you using?
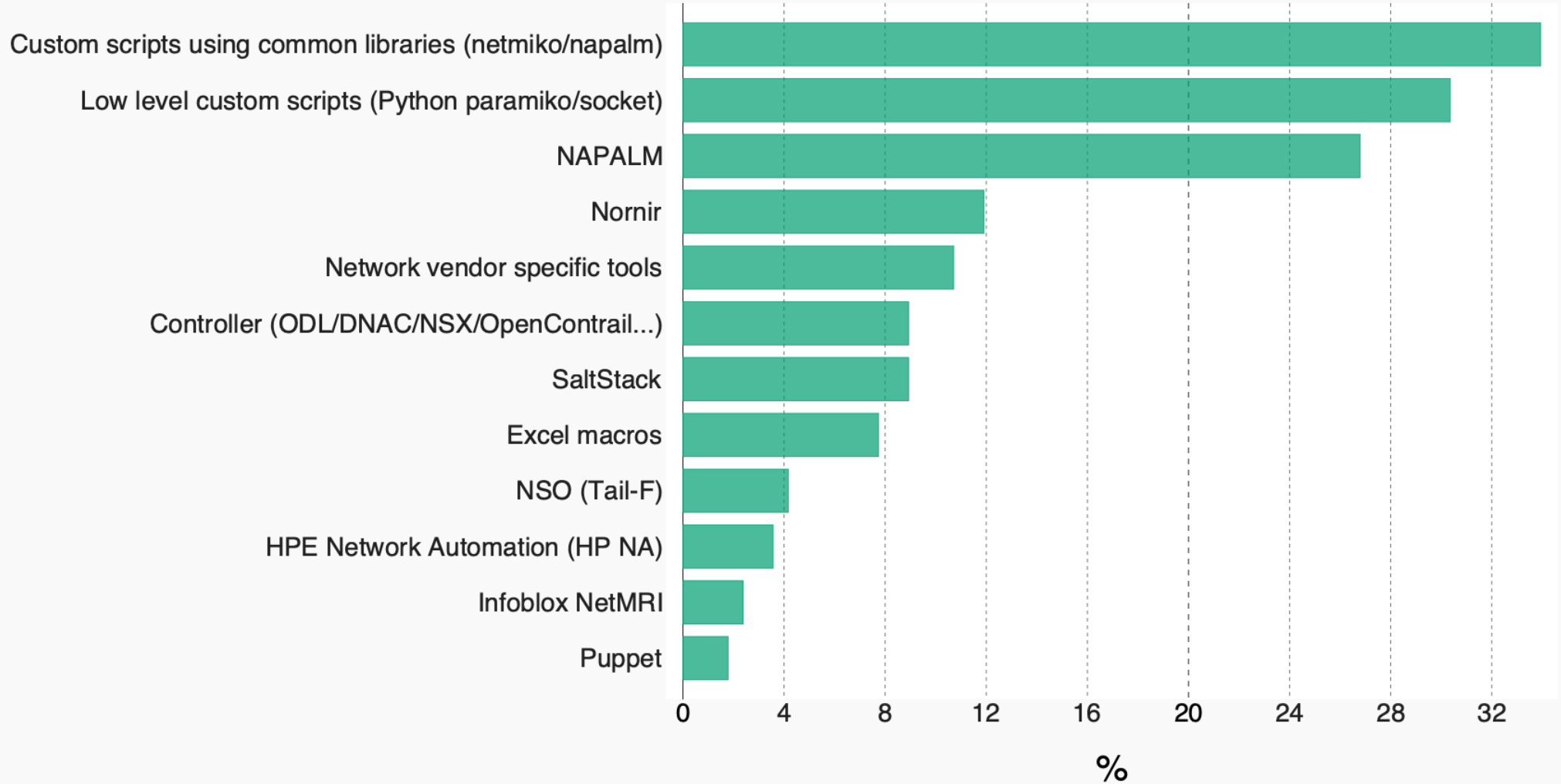### Stats: 2.13 avg, max 7
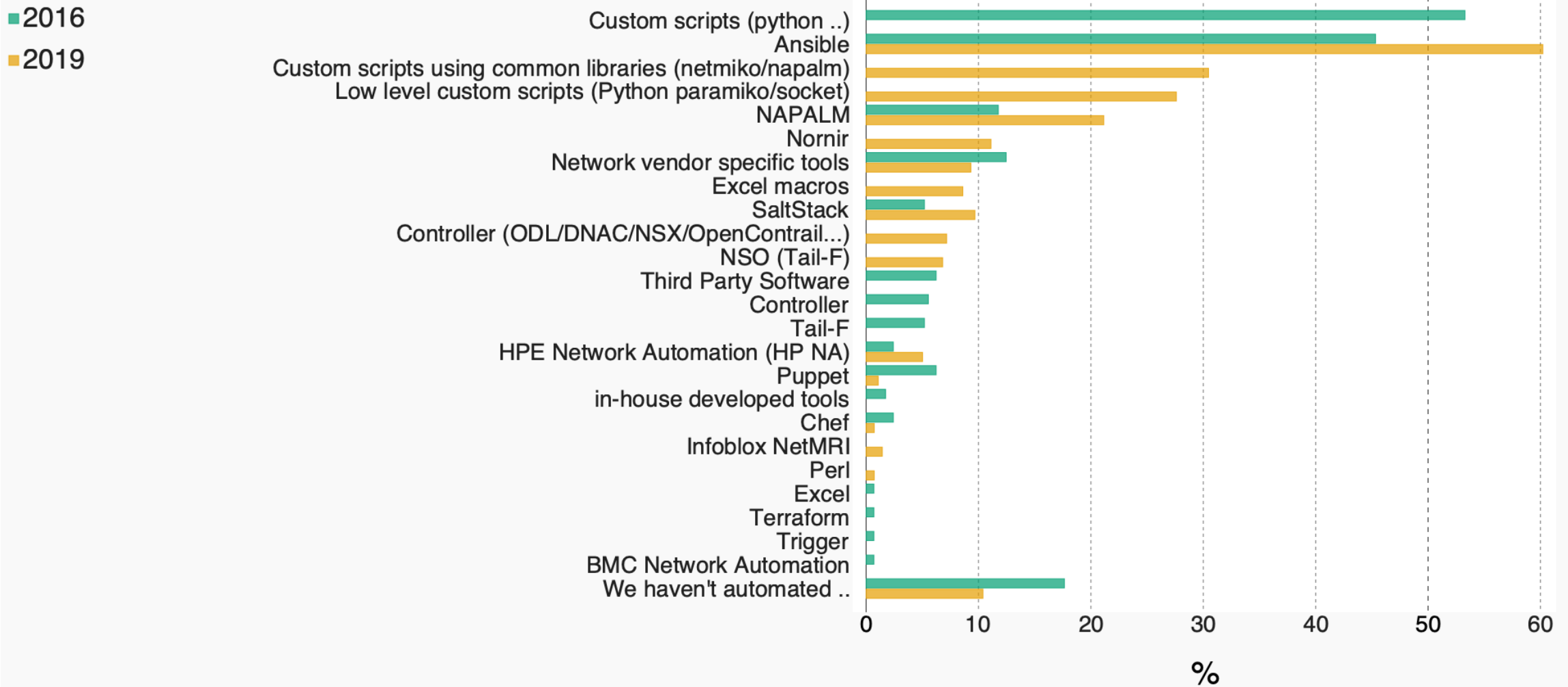
NetDevOps Survey (2019)
Configuration – If you are automating the generation and/or the deployment of your configurations what solution(s) are you using?
Sub Responses for all participants who selected 'Ansible'

NetDevOps Survey
Configuration – If you are automating the generation and/or the deployment of your configurations what solution(s) are you using?

Legend:
- 2016
- 2019

Categories (top to bottom):
- Custom scripts (python ..)
- Ansible
- Custom scripts using common libraries (netmiko/napalm)
- Low level custom scripts (Python paramiko/socket)
- NAPALM
- Nornir
- Network vendor specific tools
- Excel macros
- SaltStack
- Controller (ODL/DNAC/NSX/OpenContrail...)
- NSO (Tail-F)
- Third Party Software
- Controller
- Tail-F
- HPE Network Automation (HP NA)
- Puppet
- in-house developed tools
- Chef
- Infoblox NetMRI
- Perl
- Excel
- Terraform
- Trigger
- BMC Network Automation
- We haven't automated ..

X-axis: % (0, 10, 20, 30, 40, 50, 60)
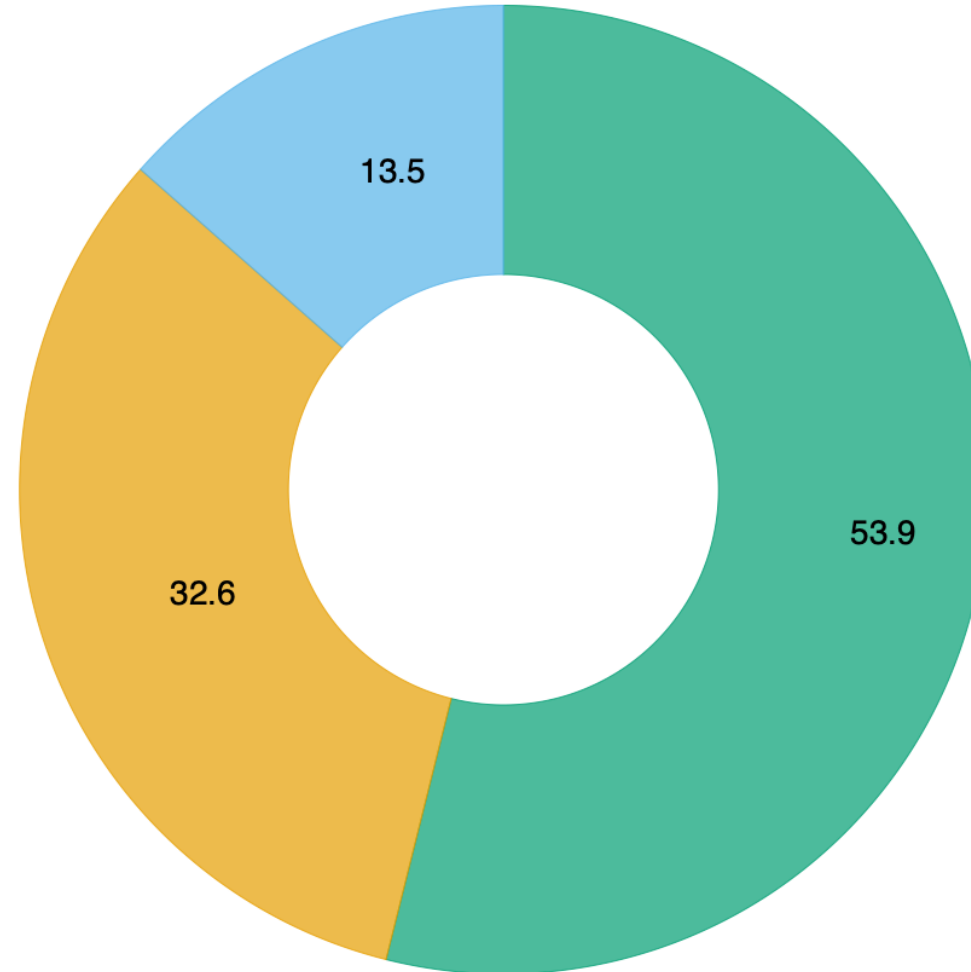
Configuration Management

Do you allow configurations to be manually changed via CLI?

Have you automated the decision to deploy a new configuration?

NetDevOps Survey (2019)
Have you automated the decision to deploy a new configuration?
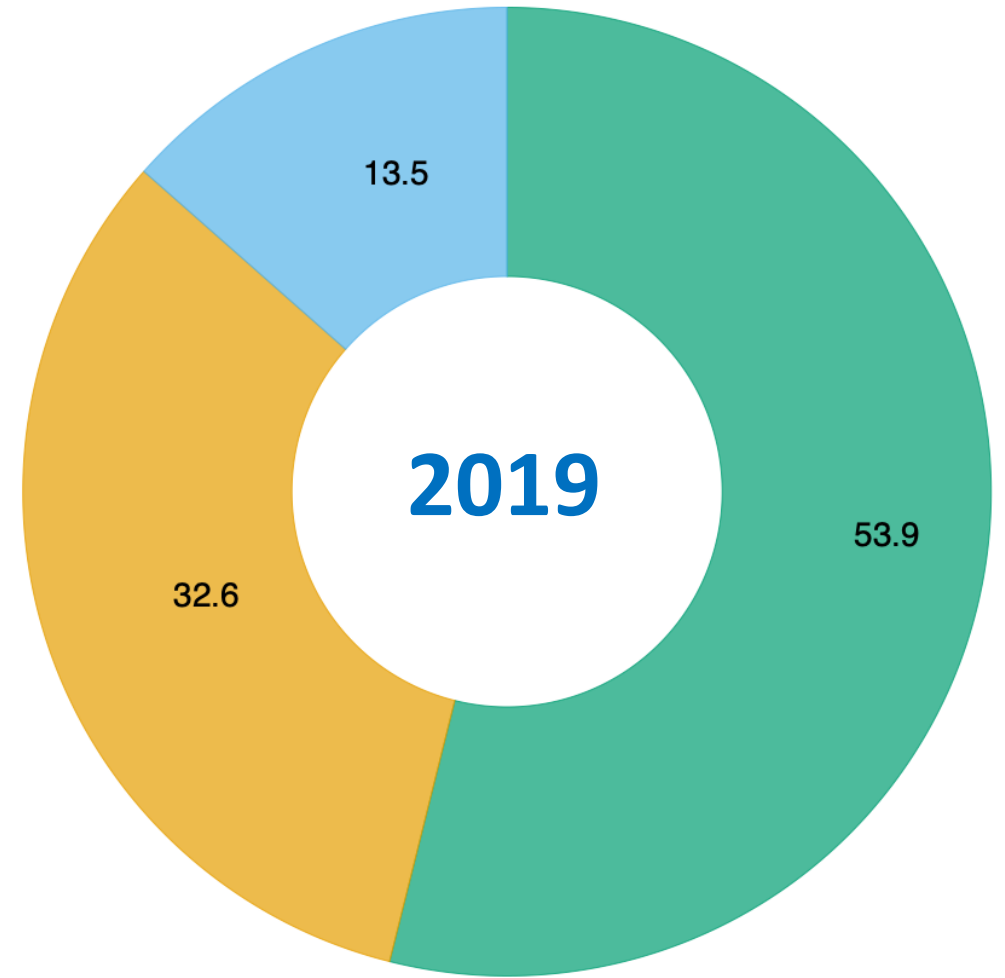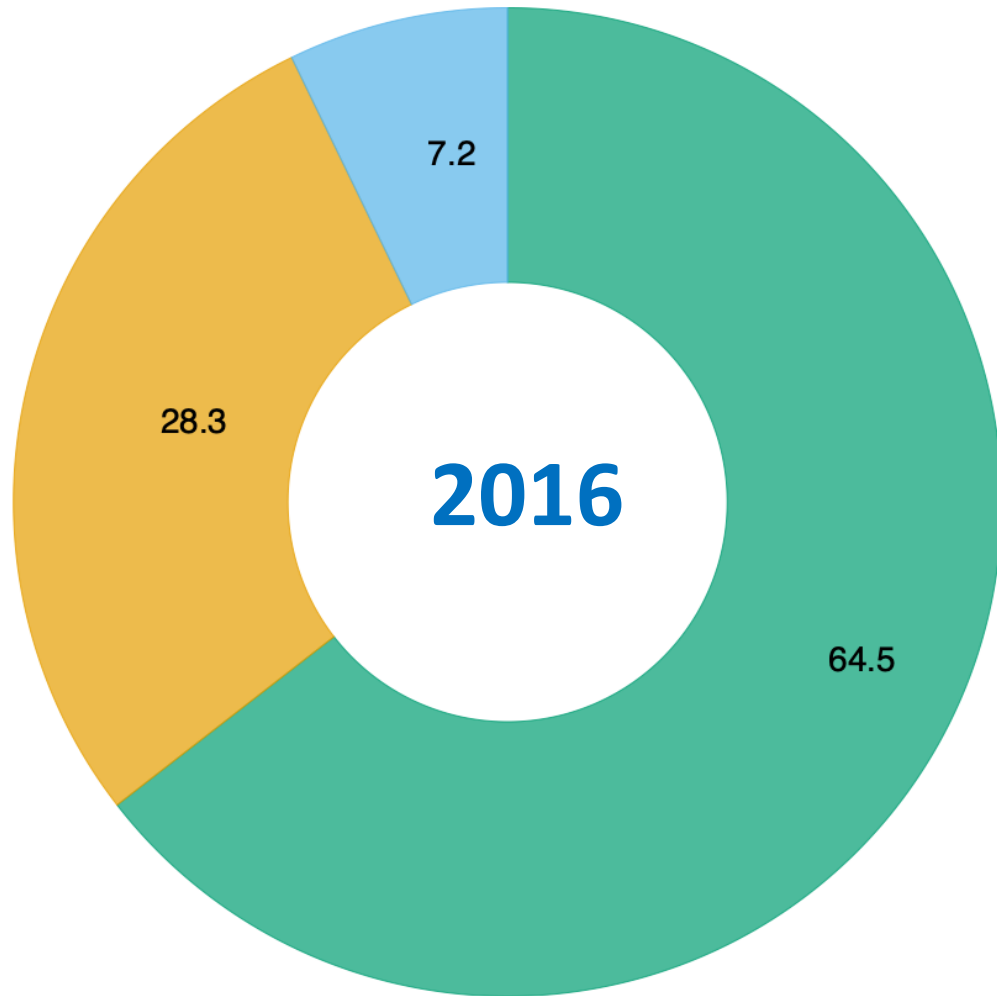(auto-remediation, auto-change-validation)

- No
- Partially
- Yes

13.5
53.9
32.6

NetDevOps Survey (2019)
Have you automated the decision to deploy a new configuration?
(auto-remediation, auto-change-validation)

Legend:
- No
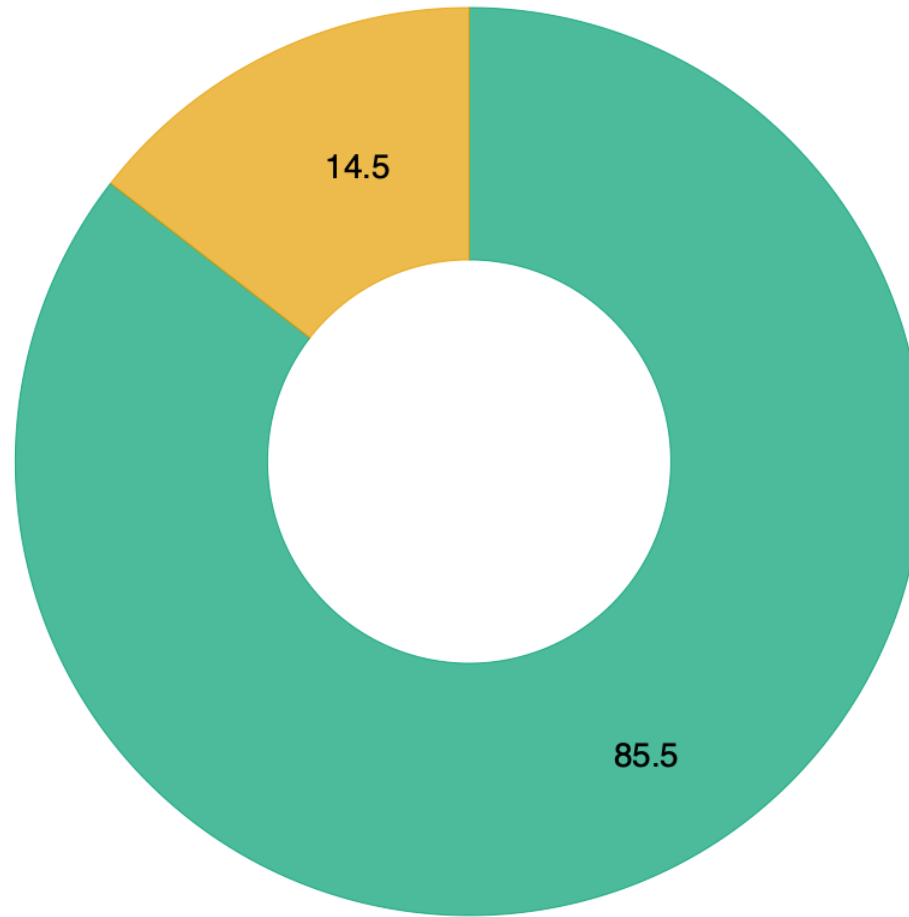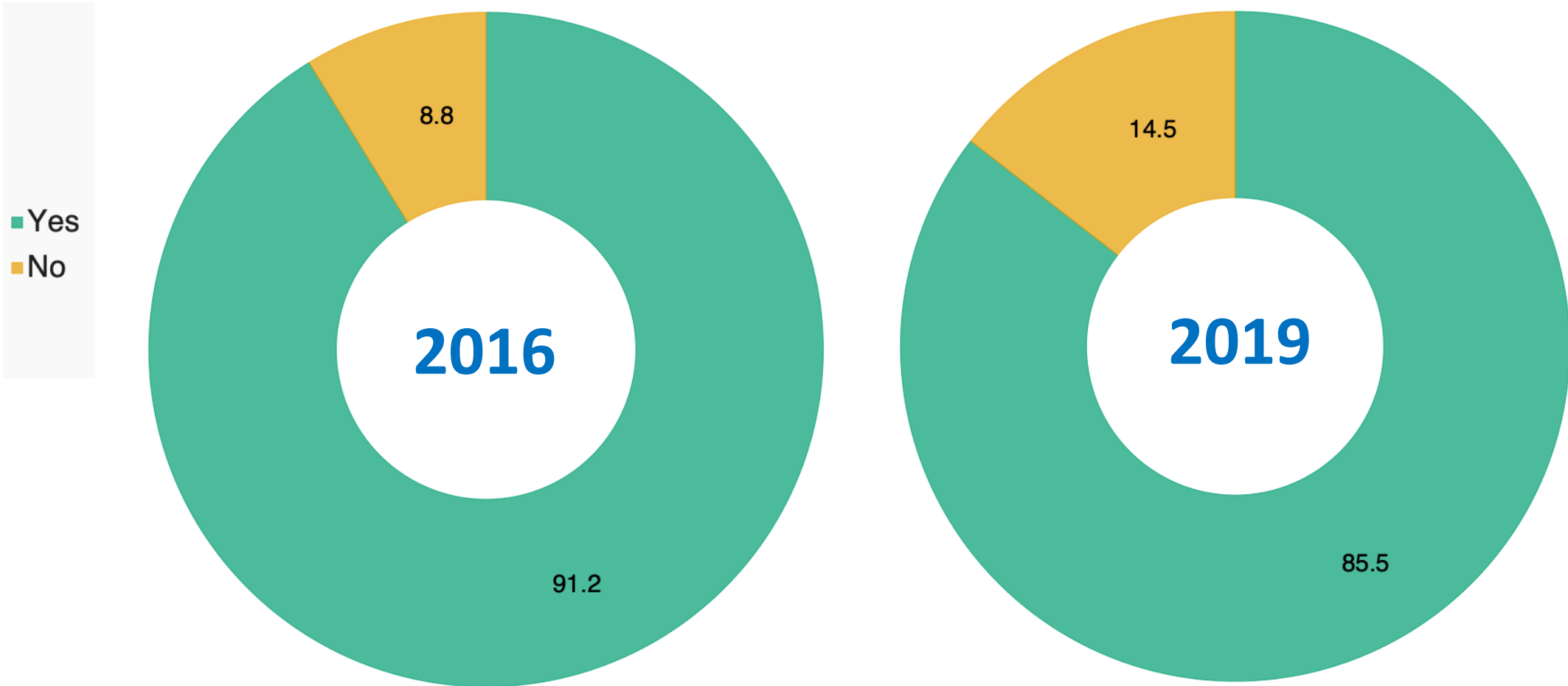- Partially
- Yes

2016
- 7.2 (Yes)
- 28.3 (Partially)
- 64.5 (No)

2019
- 13.5 (Yes)
- 32.6 (Partially)
- 53.9 (No)

NetDevOps Survey (2019)
Do you allow configurations to be manually changed via CLI in addition to automated deployments?

Legend:
- Yes
- No

14.5

85.5

NetDevOps Survey (2016)
Do you allow configurations to be manually changed via CLI in addition to automated deployments?

Yes
No

2016
8.8
91.2

2019
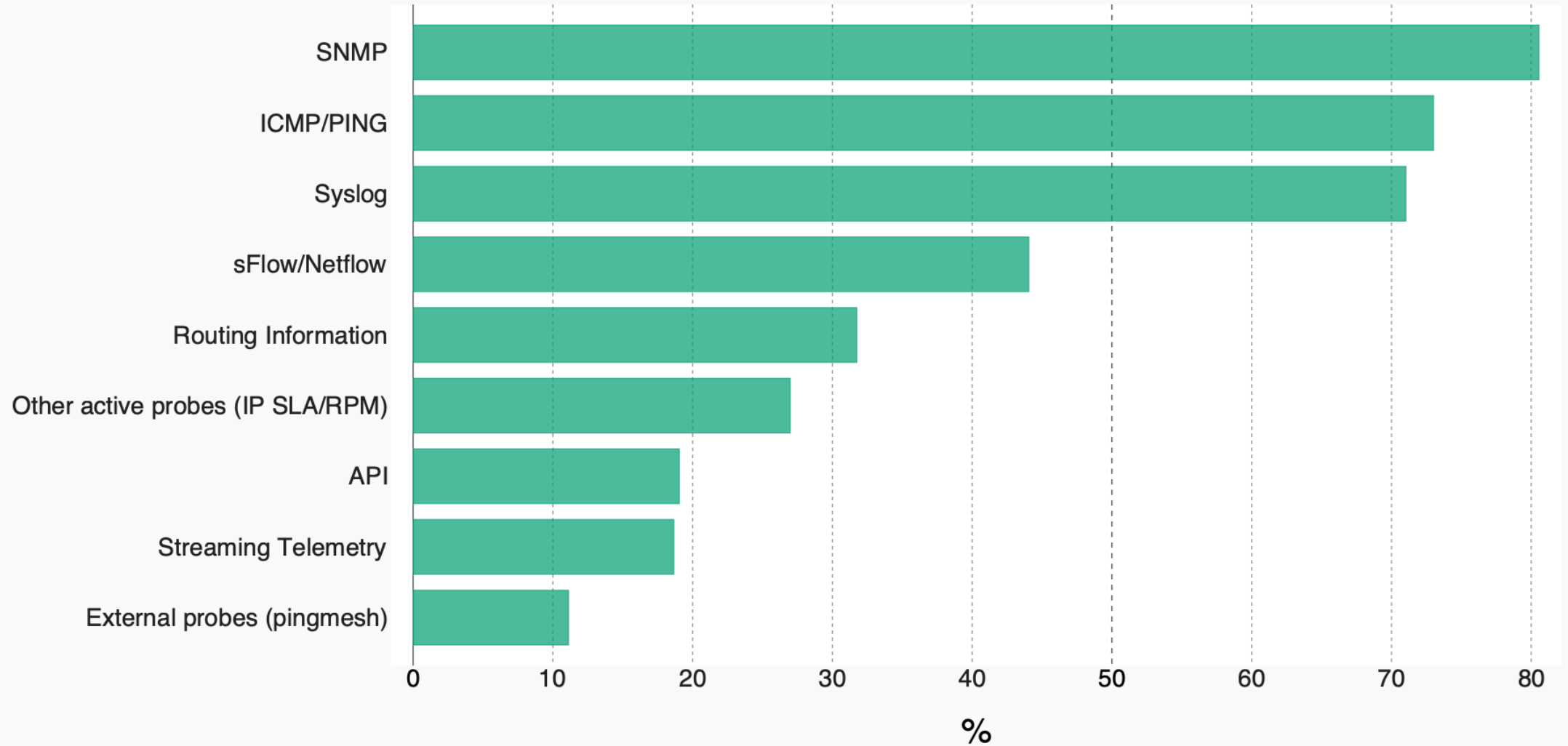14.5
85.5

Anomaly Detection

What data sources are you using to detect problems in your network?

What mechanism are you using to identify problems in your network?

NetDevOps Survey (2019)
Anomaly detection – what data sources are you using to detect problems in your network ?
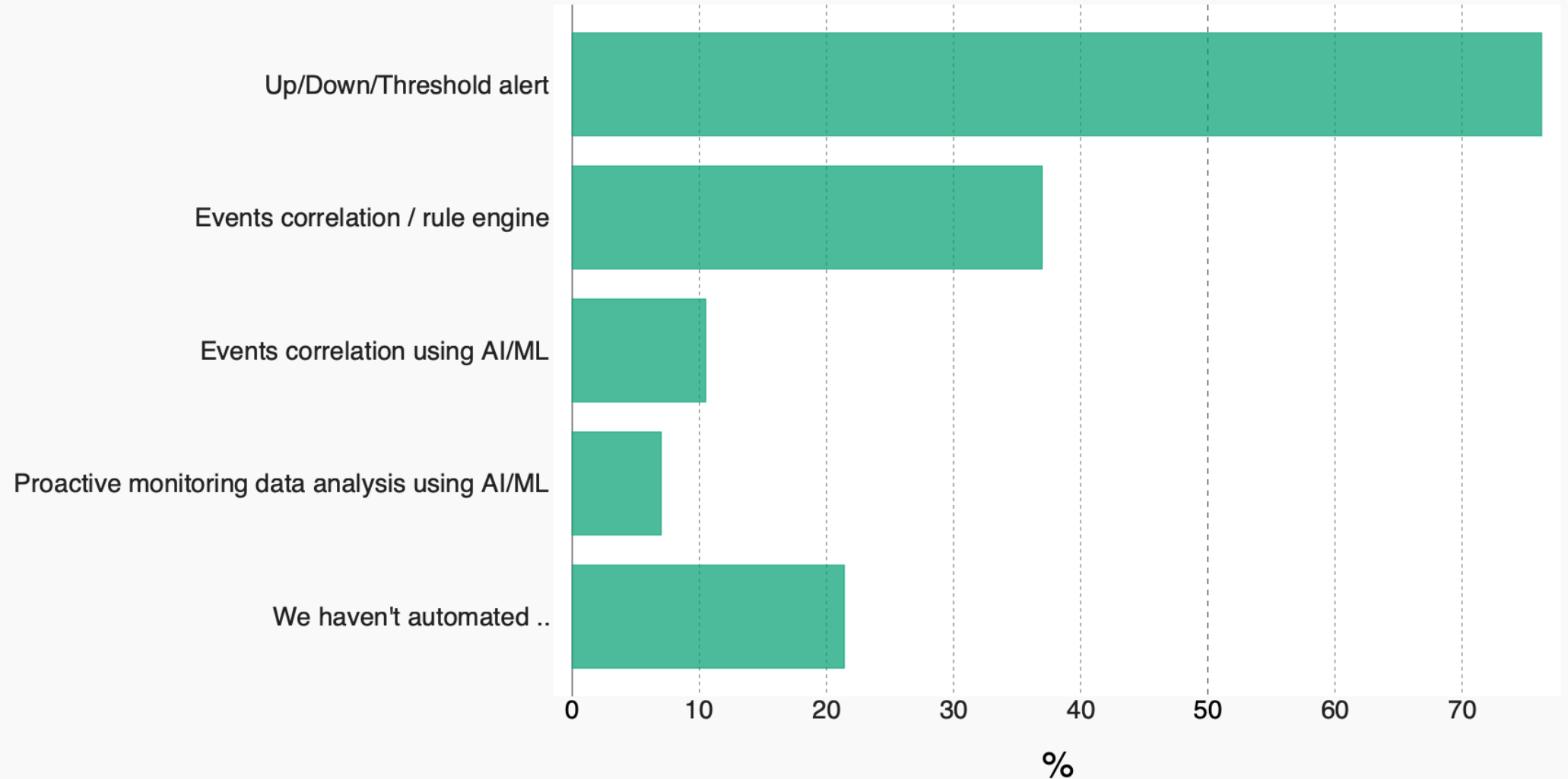### Stats: 3.77 avg, max 9

Data Source	%
SNMP	~81
ICMP/PING	~73
Syslog	~71
sFlow/Netflow	~44
Routing Information	~32
Other active probes (IP SLA/RPM)	~27
API	~19
Streaming Telemetry	~19
External probes (pingmesh)	~11

NetDevOps Survey (2019)
Anomaly detection – What mechanism are you using to identify problems in your network ?
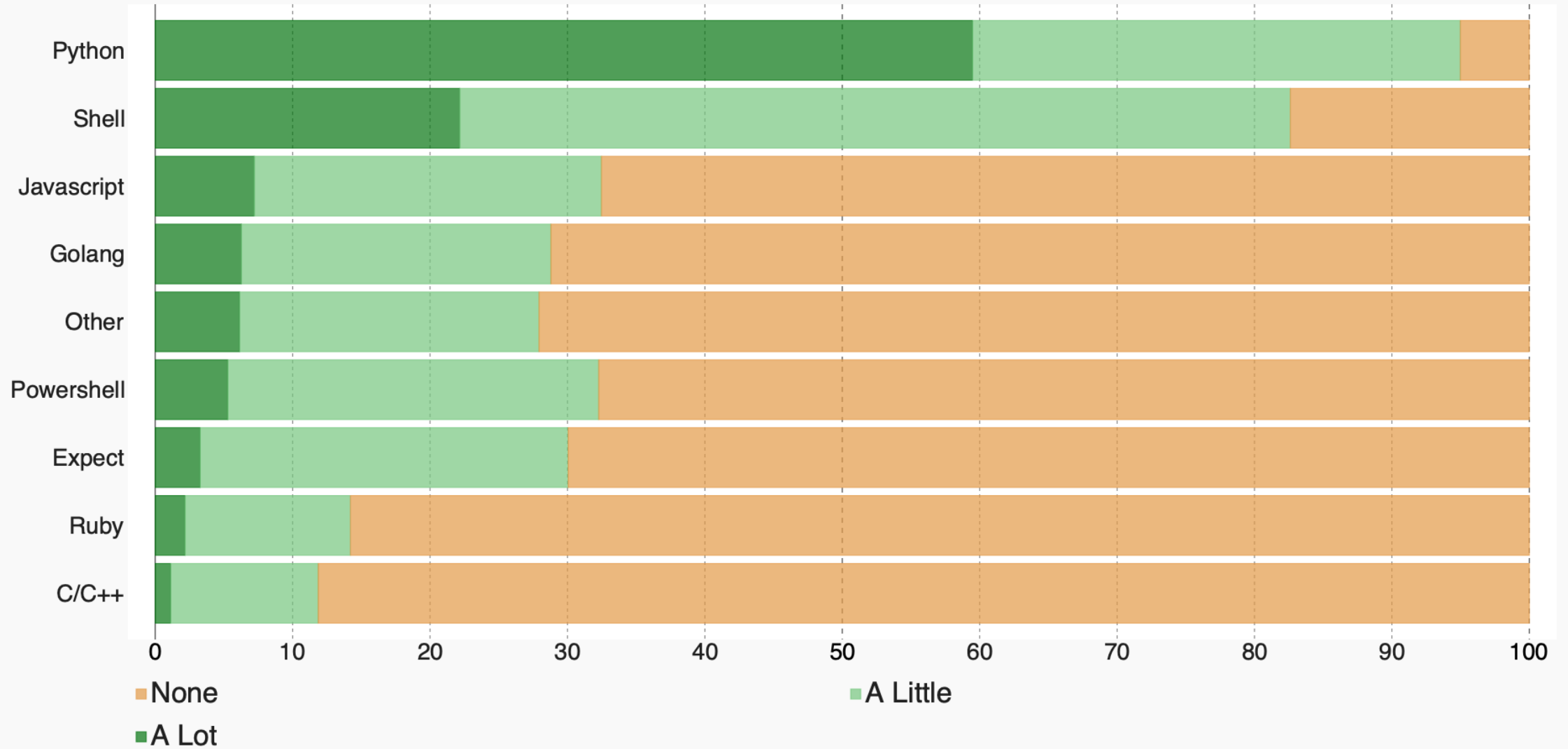Stats: 1.53 avg, max 4

Network telemetry and analytics is the next big transformation.

NetDevOps Survey (2019)
What programmatic language(s) are you using?

3

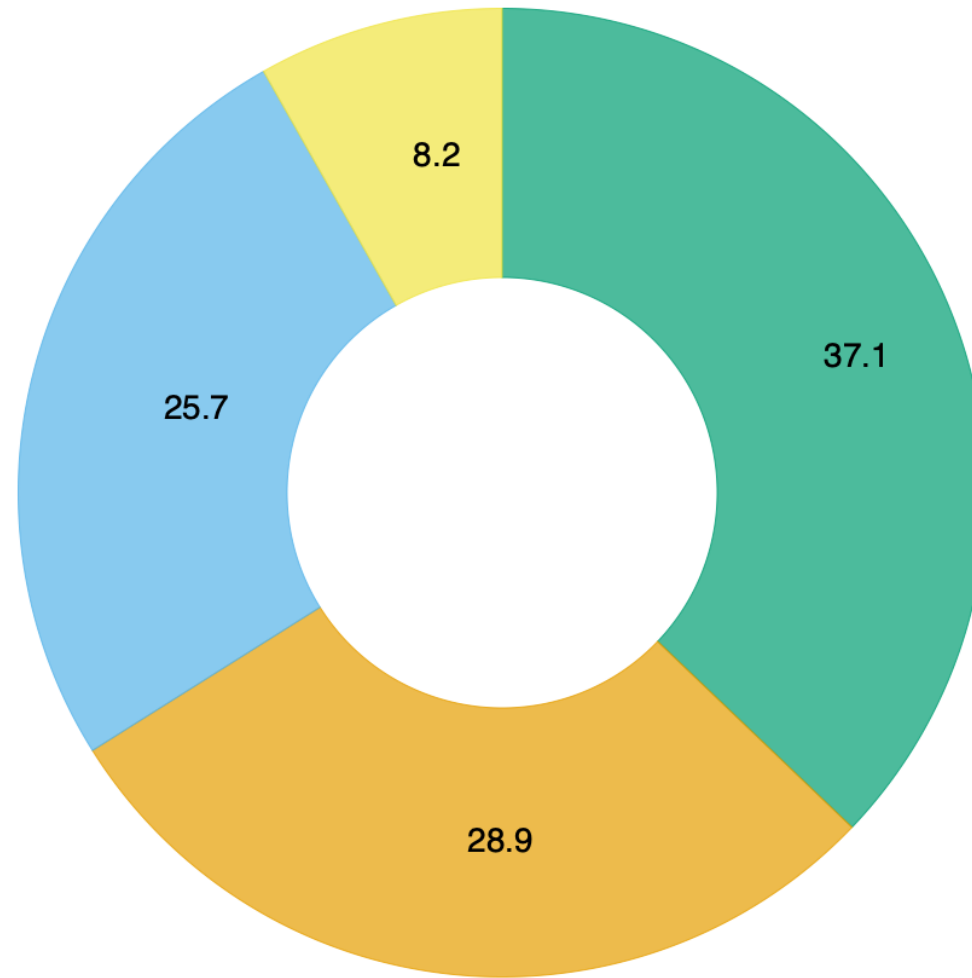## Transition to Network Automation

Team / Organization Transition

For how long have you been leveraging automation in your network in a significant way?

What actions did your team take to transition to network automation?

NetDevOps Survey (2019)
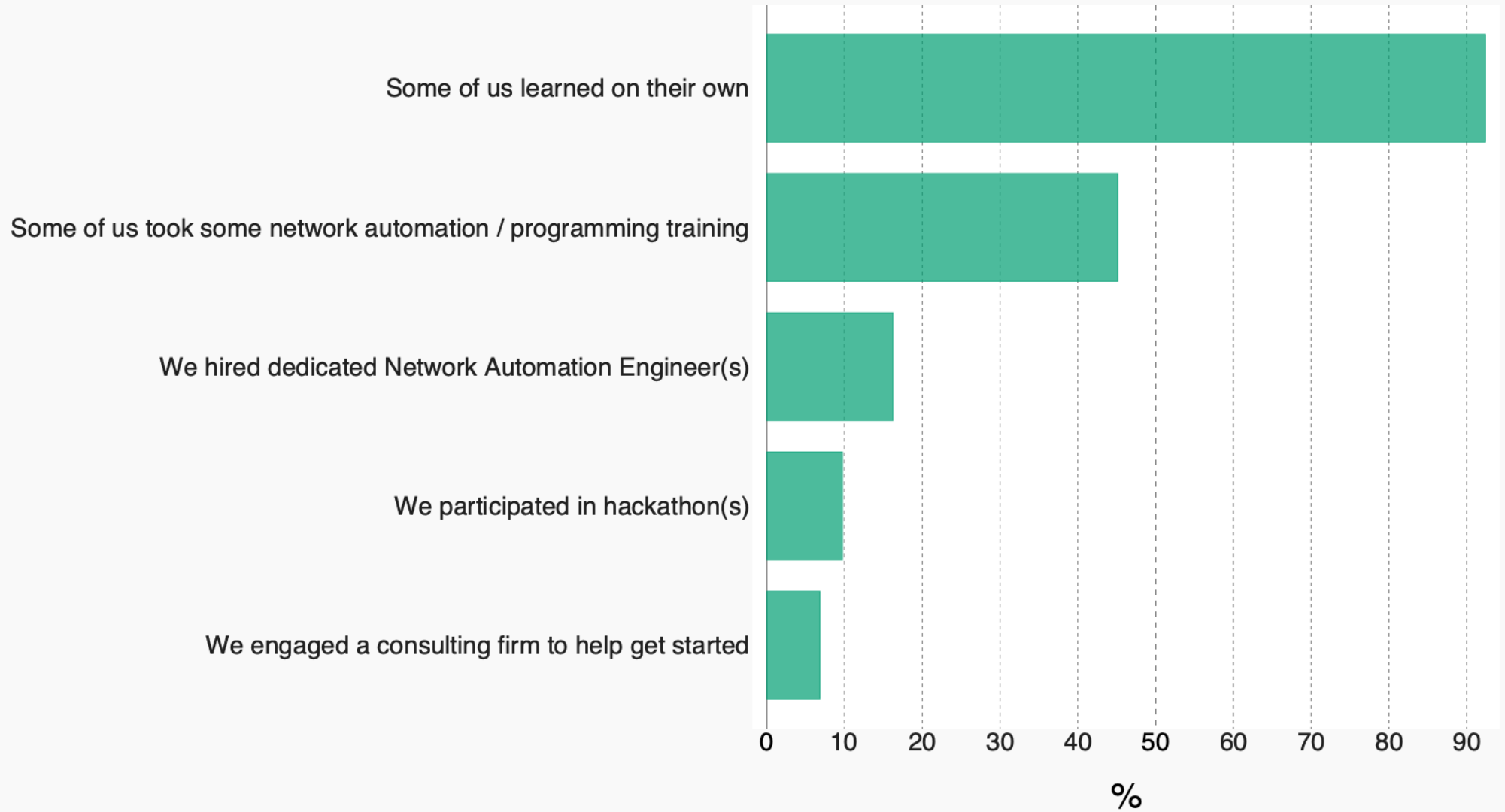## For how long have you been leveraging automation in your network in a significant way

- Less than 1 ye…
- 1 to 2 years
- 2 to 5 years
- More than 5 ye…

8.2

37.1

25.7

28.9

NetDevOps Survey (2019)
What actions did your team take to transition to network automation
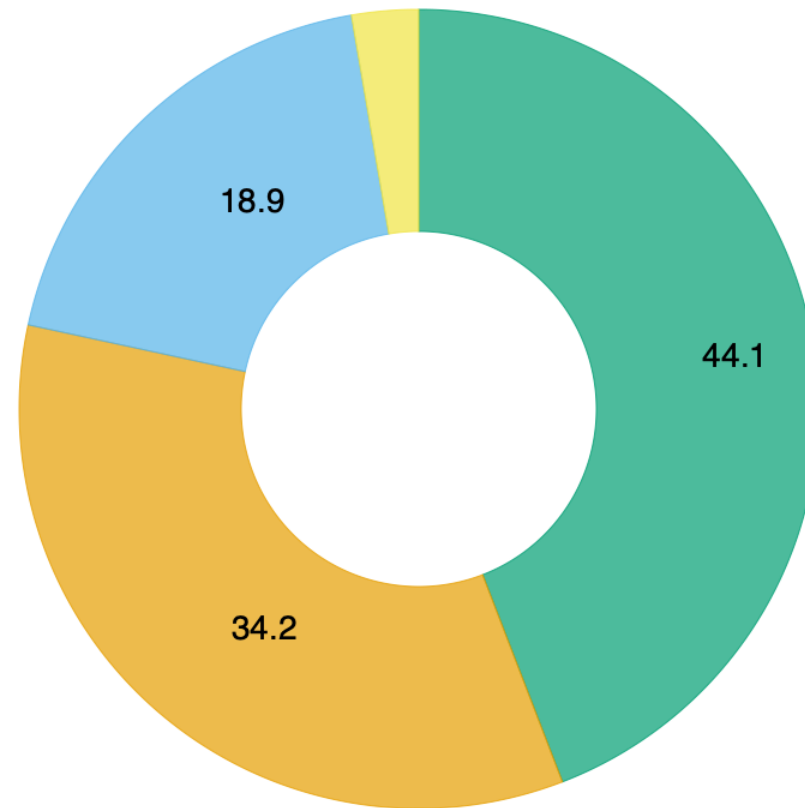### Stats: 1.7 avg, max 5

Personal Transition

- How long did it take you to make the transition?
- How many hours did you put in training / self-learning?
- How did you manage to find time for this transition?

NetDevOps Survey (2019)
If you (personally) have transitioned from a network engineer role to a network automation role, how long did it take you to make the transition?
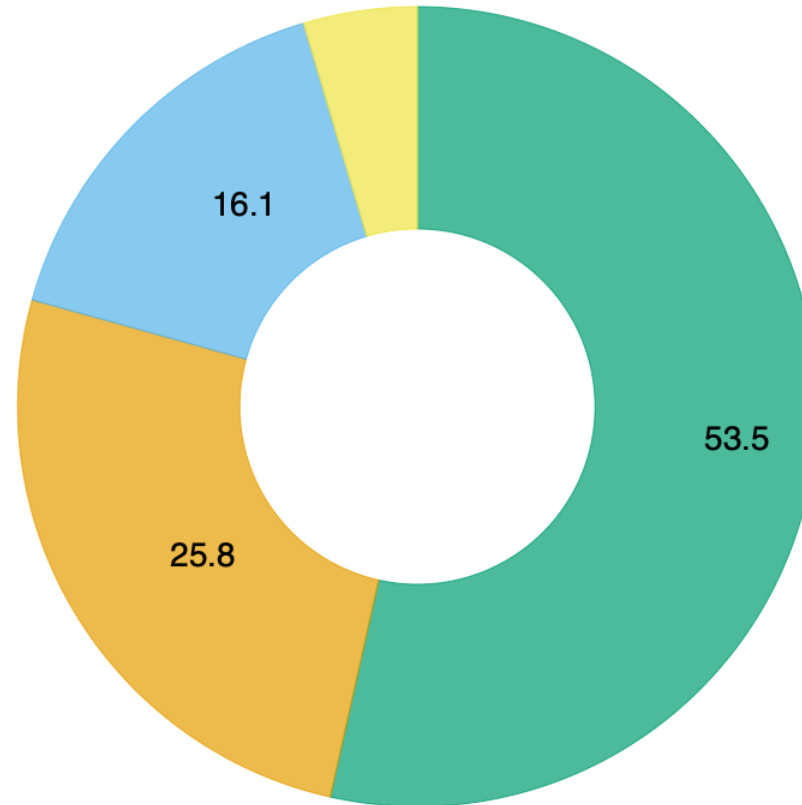
- 1 to 2 years
- Less than 1 ye…
- 2 to 5 years
- More than 5 ye…

18.9

44.1

34.2

NetDevOps Survey (2019)
If you (personally) have transitioned from a network engineer role to a network automation role, How many hours did you put in training / self-learning?
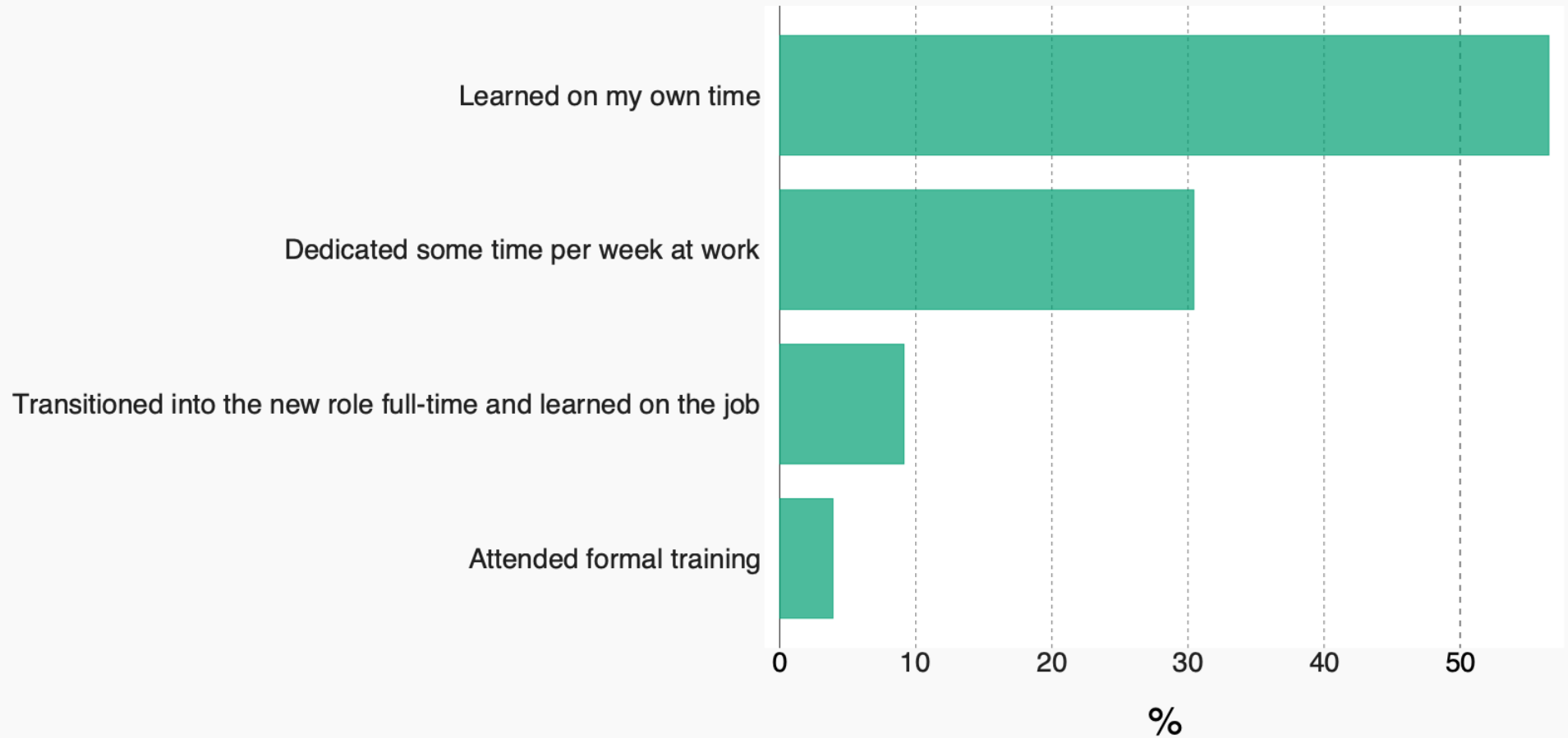
Legend:
- 201-1000
- 0-200
- 1001-4000
- More than 4000

53.5
25.8
16.1

NetDevOps Survey (2019)
If you (personally) have transitioned from a network engineer role to a network automation role, How did you manage to find time for this transition?
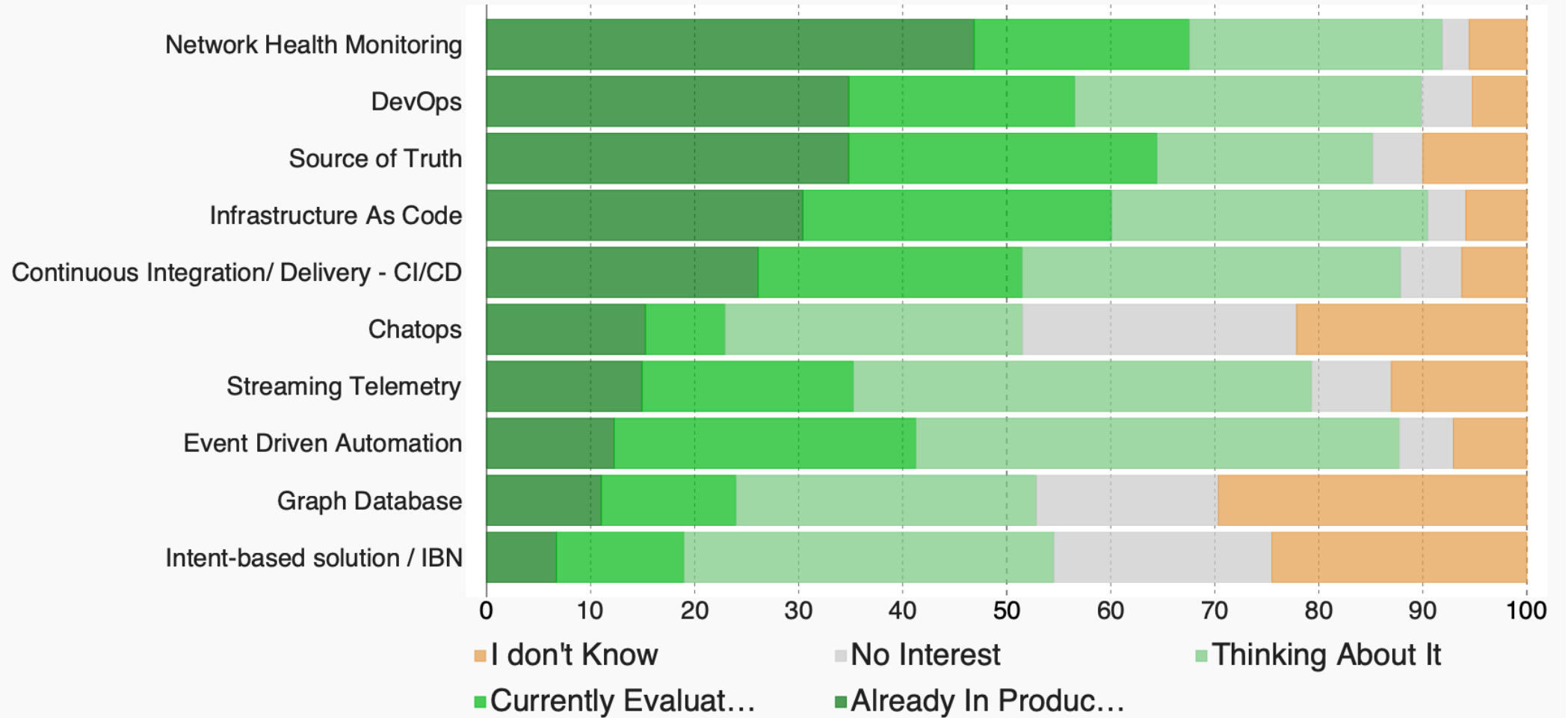
Stats: 1.0 avg, max 1
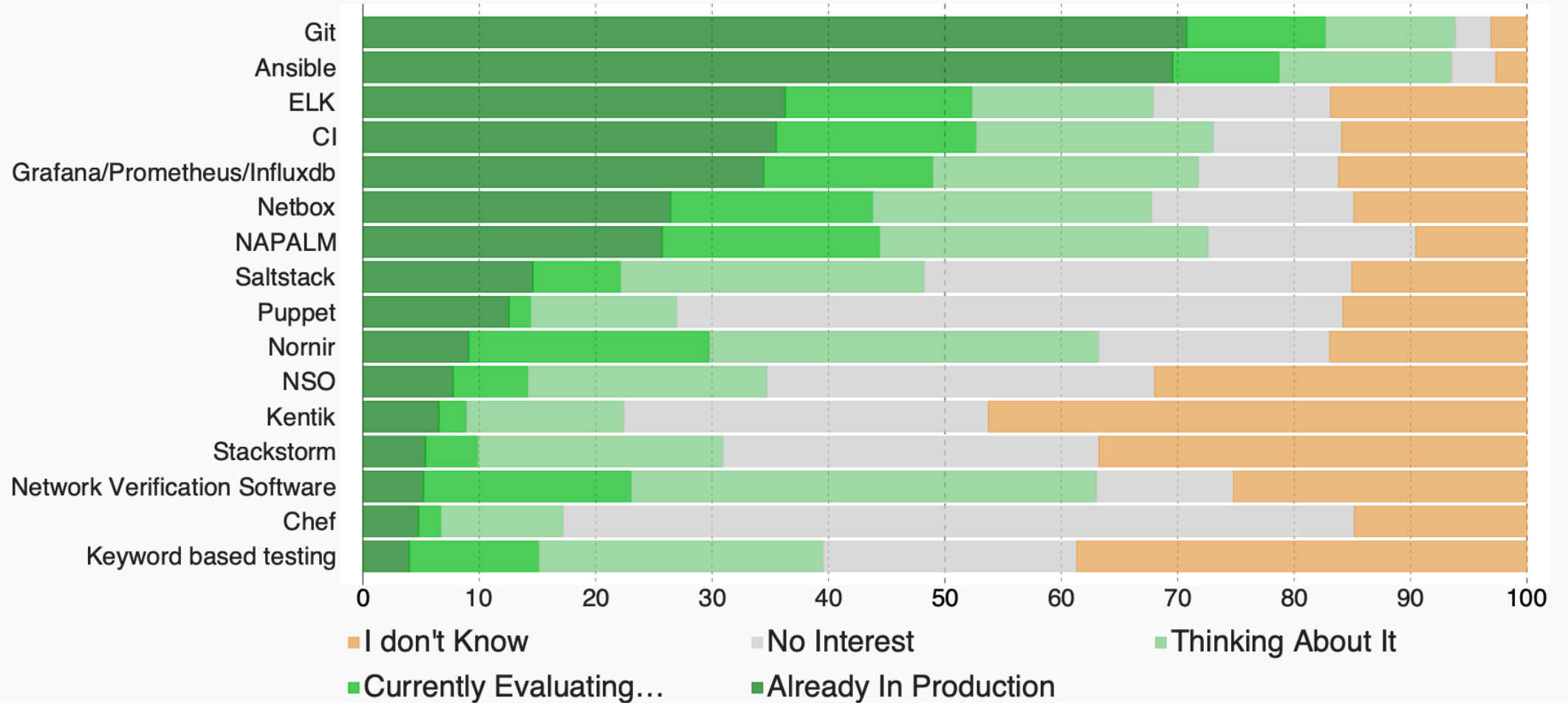
4

Industry Trends

NetDevOps Survey (2019)
In the following list of topic, which one are you interested about or have currently implemented ?
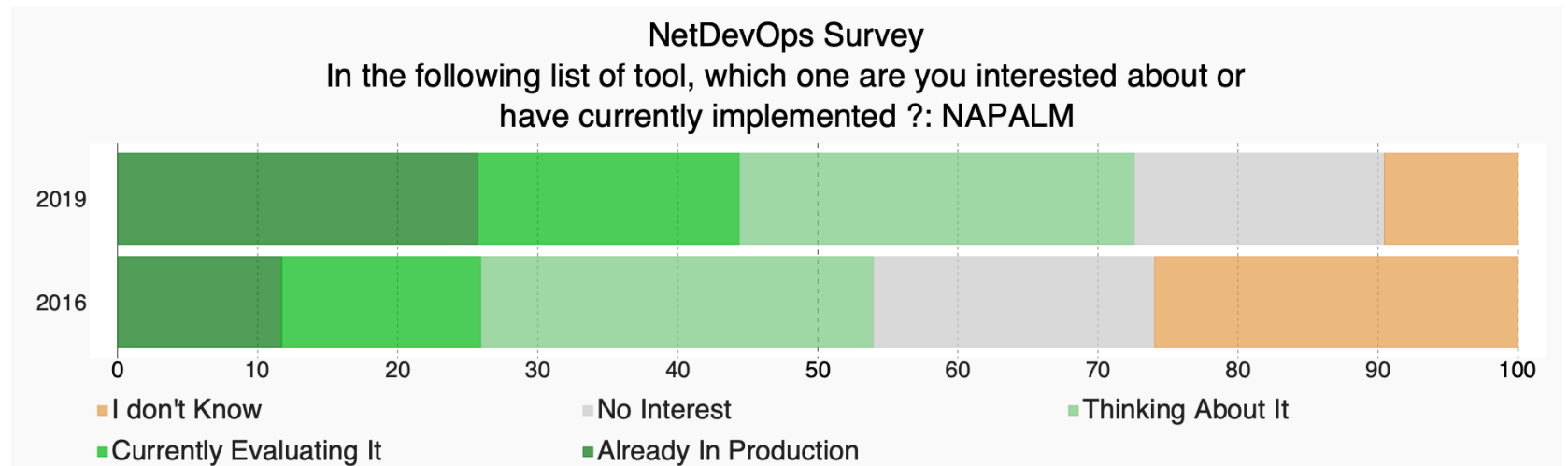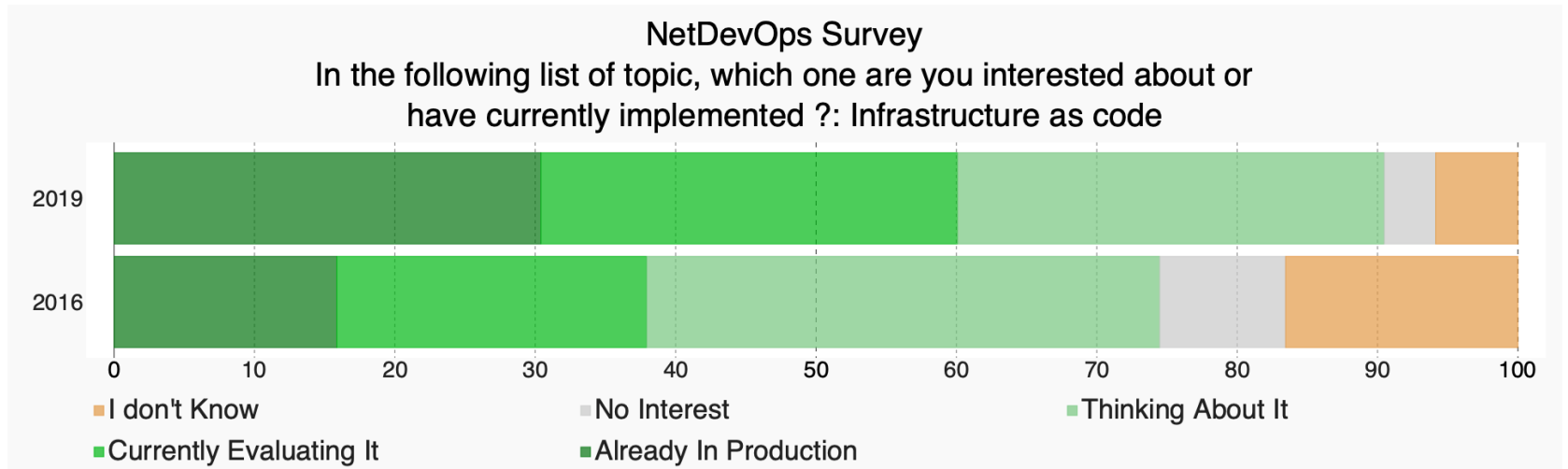
NetDevOps Survey (2019)
In the following list of tool, which one are you interested about or have currently implemented ?

Outliers 1/2

Infrastructure as Code

NetDevOps Survey
In the following list of topic, which one are you interested about or have currently implemented ?: Infrastructure as code

NAPALM

NetDevOps Survey
In the following list of tool, which one are you interested about or have currently implemented ?: NAPALM

Outliers 2/2

Puppet

NetDevOps Survey
In the following list of tool, which one are you interested about or have currently implemented ?: Puppet

Event Driven Automation
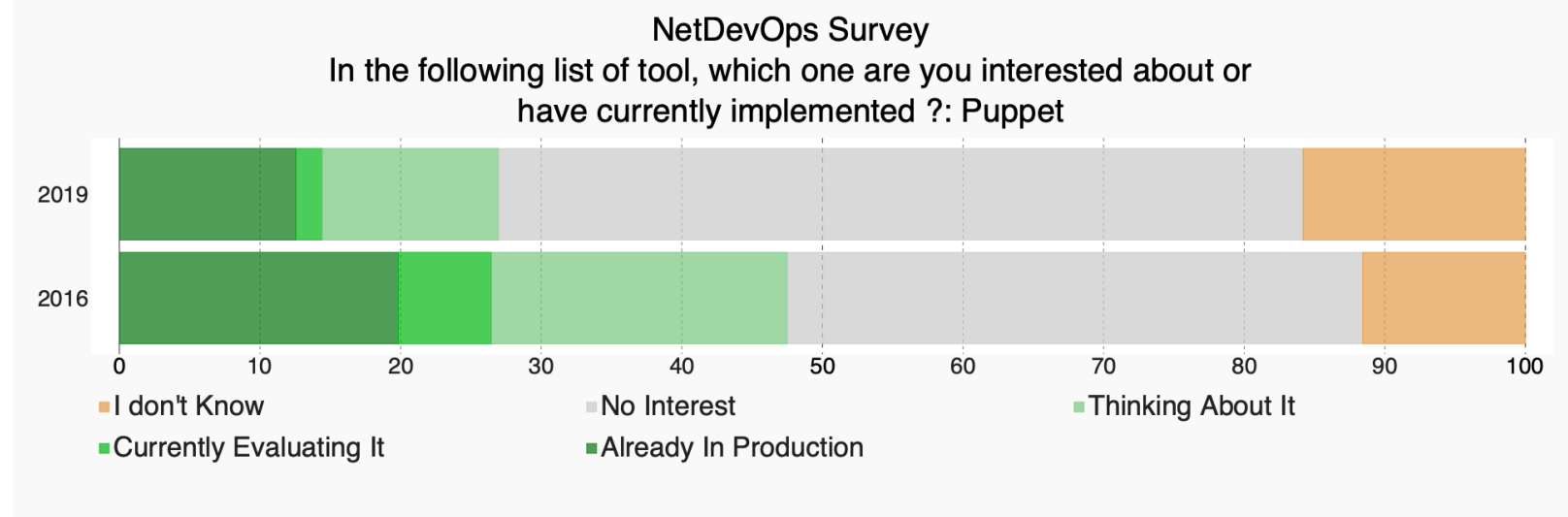

NetDevOps Survey
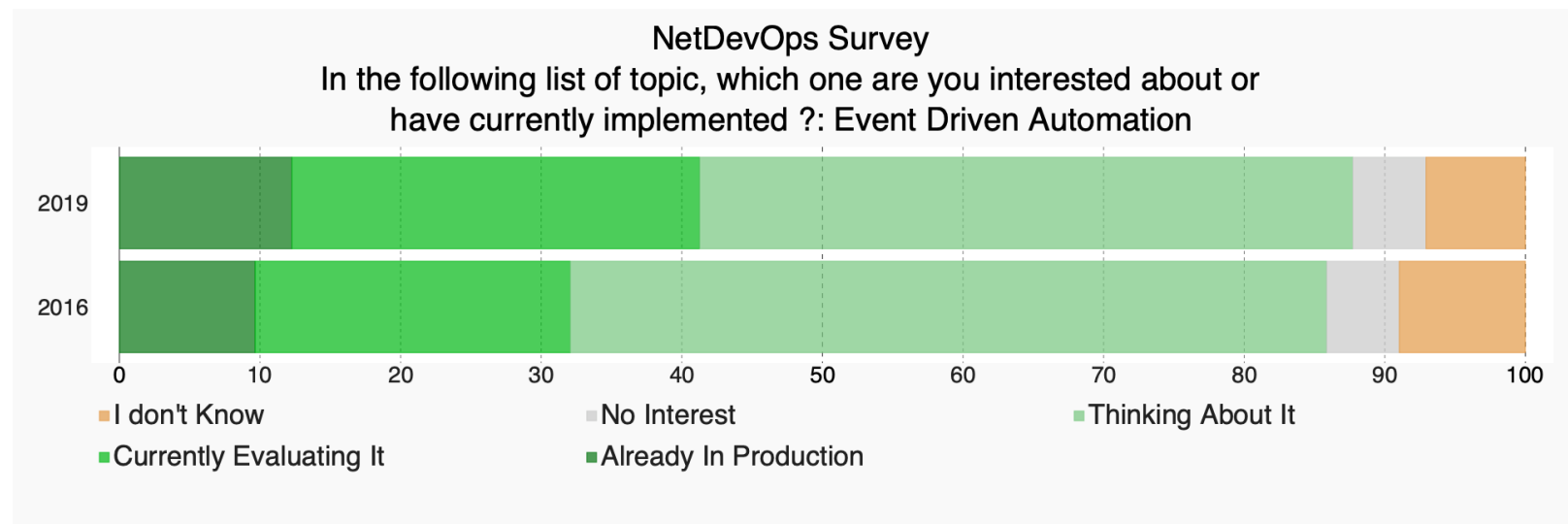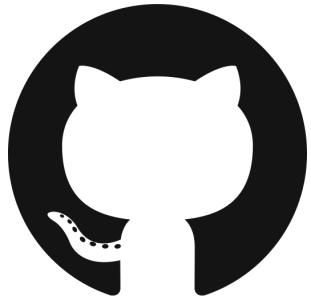In the following list of topic, which one are you interested about or have currently implemented ?: Event Driven Automation

5

NetDevOps Survey Projects

NetDevOps Project : Join the discussion

- GitHub :

  github.com/dgarros/netdevops-survey
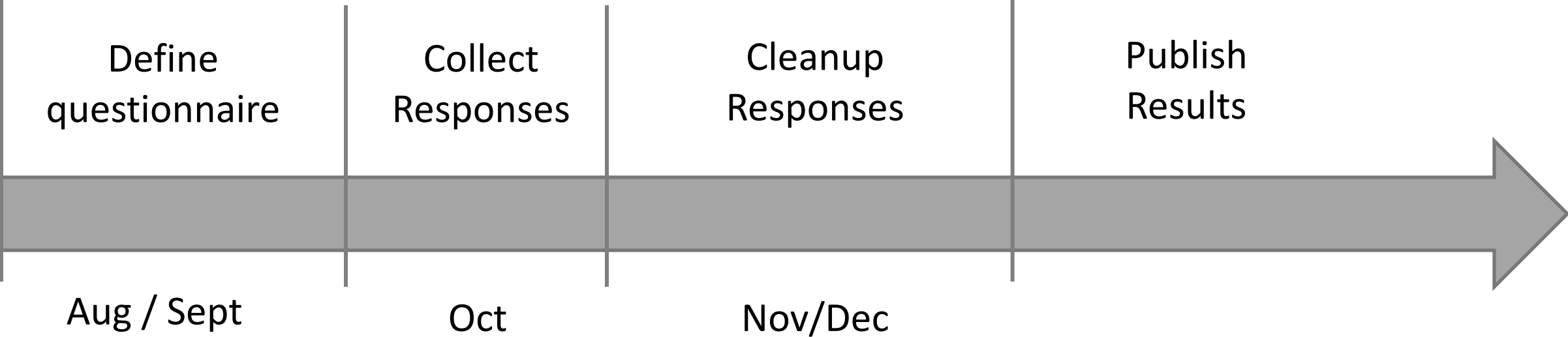
- Slack : Network to Code

  #netdevops_survey

NetDevOps Project : Results

Results are available in GitHub

- TSV format

- SQLite database

- Graphs in PNG (150+ graphs available)

NetDevOps Project : Process

Define questionnaire — Collect Responses — Cleanup Responses — Publish Results

Aug / Sept — Oct — Nov/Dec

NetDevOps Project : GitHub

Open an issue or a PR to:

- Ask a question

- Add a vendor for the next edition

- Propose a new question / section

NetDevOps Project : How can you help ?

- Spread the word

    - Social Media

    - Marketing (if working for a vendor)

- Provide feedback, suggestions

THANK YOU