SIG-NOC Tools Survey Results

Maria Isabel Gandía Carriedo, CSUC/RedIRIS

RIPE88 Meeting
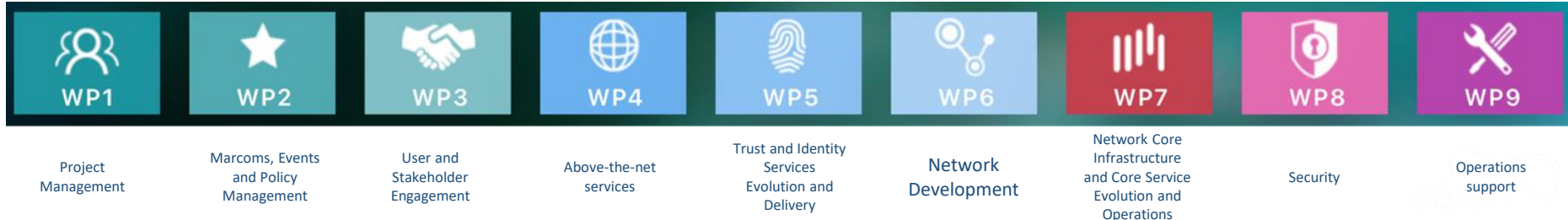21 May 2024, Kraków

GN5-1

Before we start...

- This presentation shows the results of a survey about NOC tools per function.

- I have no interest in promoting or going against any of the tools shown here.

Introduction - The GÉANT Project

GÉANT is the collaboration of European National Research and Education Networks (NRENs) on delivering an information ecosystem of infrastructure and services to advance research, education and innovation on a global scale:
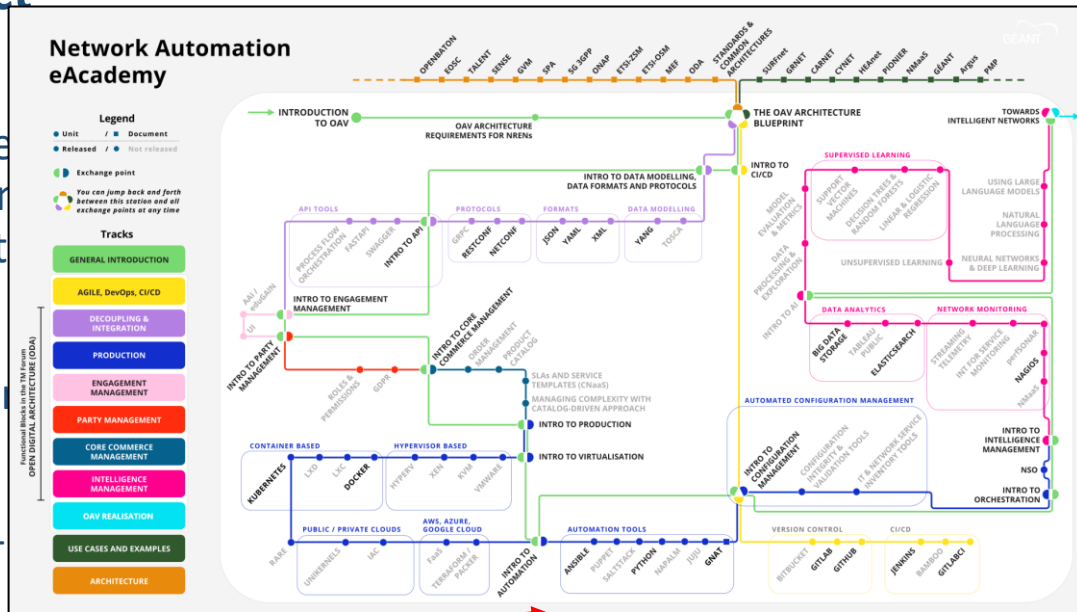
- 50 million users

- 500 contributors from 37 R&E partners

- 9 projects so far

- Current project generation: GN5-1

WP1	WP2	WP3	WP4	WP5	WP6	WP7	WP8	WP9
Project Management	Marcoms, Events and Policy Management	User and Stakeholder Engagement	Above-the-net services	Trust and Identity Services Evolution and Delivery	Network Development	Network Core Infrastructure and Core Service Evolution and Operations	Security	Operations support

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Introduction - GÉANT SIGs

GÉANT Special Interest Groups - SIGs are established under the auspices of GÉANT in order to create an

open forum

where experts from its community **exchange information, knowledge, ideas and best practices** about specific **technical or other areas** of business relevant to the research and education networking community.

Introduction - The Special Interest Group for Network Operation Centres (SIG-NOC)

- SIG-NOC is a forum to exchange and promote ideas, experience and knowledge on NOC tools, functions, workflows, procedures and best practices, making communication easier.

- Quite like any NOG, but for R&E!

Sharing Knowledge to Manage R&E Networks

The 4th SIG-NOC Tools Survey - Previous Work

- 1st Survey: July-October'11, published January'12.
  - NOCs' taxonomy, structures, resources, tools, standards…
  - 14 functions
  - 53 questions, 43 valid responses
  - Open boxes to add feedback

- 2nd Survey: December'15-February'16, published in June'16.
  - Tools, standards
  - 15 functions (14 + DDoS Mitigation)
  - 35 questions (66), 64 valid responses
  - Rating on importance (low/low-mid/mid-high/high) & quality (poor/fair/average/good/excellent)

- 3rd Survey: July-September'19, published in November'19.
  - Tools, standards
  - 16 functions (15 + Orchestration, Automation and Virtualisation)
  - 35 questions (74), 63 valid responses
  - Rating on importance (low/low-mid/mid-high/high) & quality (poor/fair/average/good/excellent)

The 4th SIG-NOC Tools Survey

- May-October'23, published in November'23.
    - Tools, standards
    - 17 functions (16 + Training)
    - 37 questions (82), 68 valid responses (82 responses, not all them valid*)
    - Rating on importance (low/low-mid/mid-high/high) & quality (poor/fair/average/good/excellent)

*What is an invalid response?
    - No answers given
    - Only a "Yes" in one section (usually monitoring) with no rating for tools
    - No valid name / dummy name
    - Duplicated (only one institution that answered twice but informed about different departments being responsible for different functions was kept)
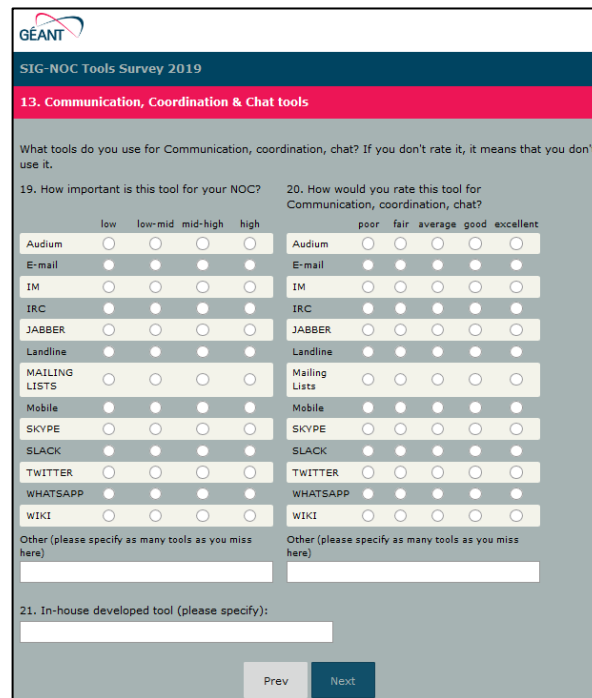
Structure of the Survey

For each one of the functions:

- Short definition of <function>

- Is your NOC responsible for <function>?
  - Yes → You were asked the questions below
  - No → Jump to the next function

- What tools do you use for <function>?
  - How important is this tool for your NOC?
  - How would you rate this tool for <function>?

⚠️ The pre-defined responses in the survey were all the tools that were rated or mentioned by two or more respondents in the 2019 survey

⚠️ Open boxes allowed adding other tools, including in-house developed solutions, for each function.

Analysis of the Responses How-To
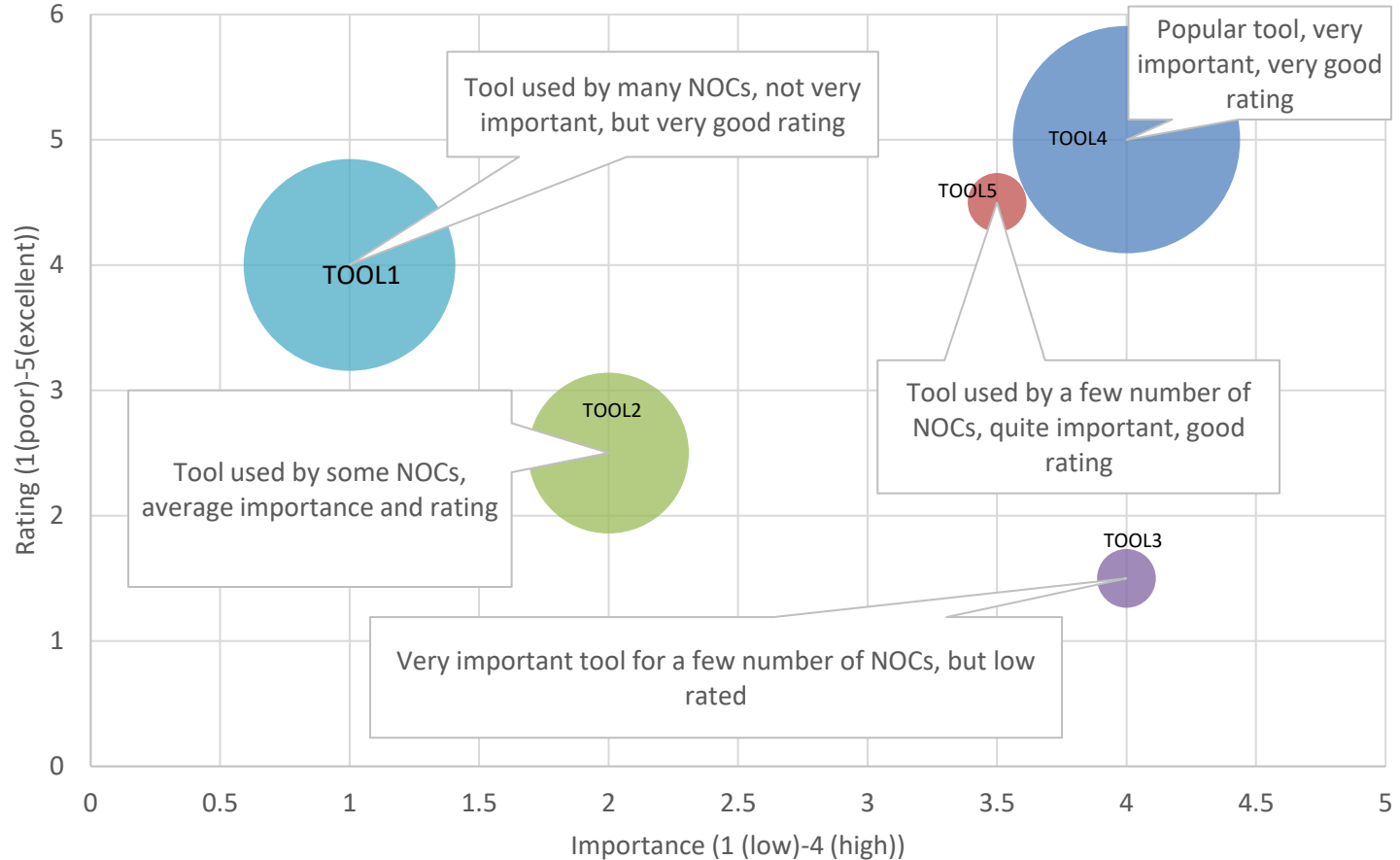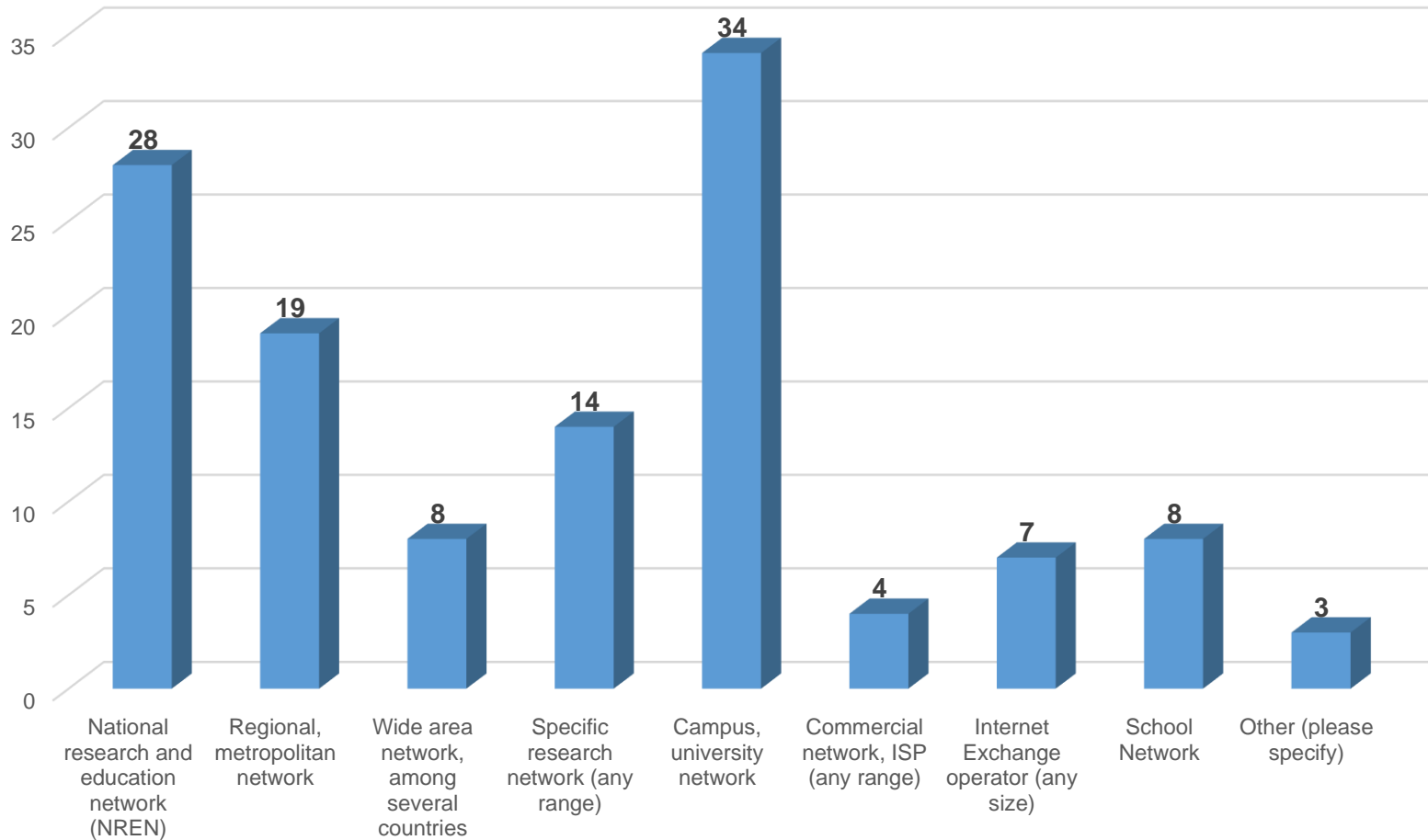
Analysis of the Matrix How-To

- The Matrix contains the number and the institutions that use each tool for each function.

- If you download the matrix and go to each cell with a number, you get the list of institutions that use it and that are ok with publishing the information.

Type (range) of the network that your organization is responsible for

NOC Functions

NOC Functions 2023	2016	2019	2023	Trend	
Monitoring	1	1	1	▬	0
Problem Management	2	2	2	▬	0
Ticketing	3	3	3	▬	0
Knowledge Management and Documentation	8	6	4	▲	2
Reporting and Statistics	5	4	5	▼	-1
Communication, Coordination and Chat	7	10	6	▲	4
Configuration Management and Backup	6	5	7	▼	-2
Performance Management	4	7	8	▼	-1
Inventory Management	12	9	9	▬	0
Resources Management	14	12	10	▲	2
Out-of-band Access Management	10	11	11	▬	0
Change Management	9	13	12	▲	1
Training			13	NEW	
Security Management	11	8	14	▼	-6
Data Aggregation, Representation, Visualization	15	15	15	▬	0
DDoS Mitigation	13	14	16	▼	-2
Orchestration, automation and virtualisation		16	17	▼	-1

Average Number of Tools per Function
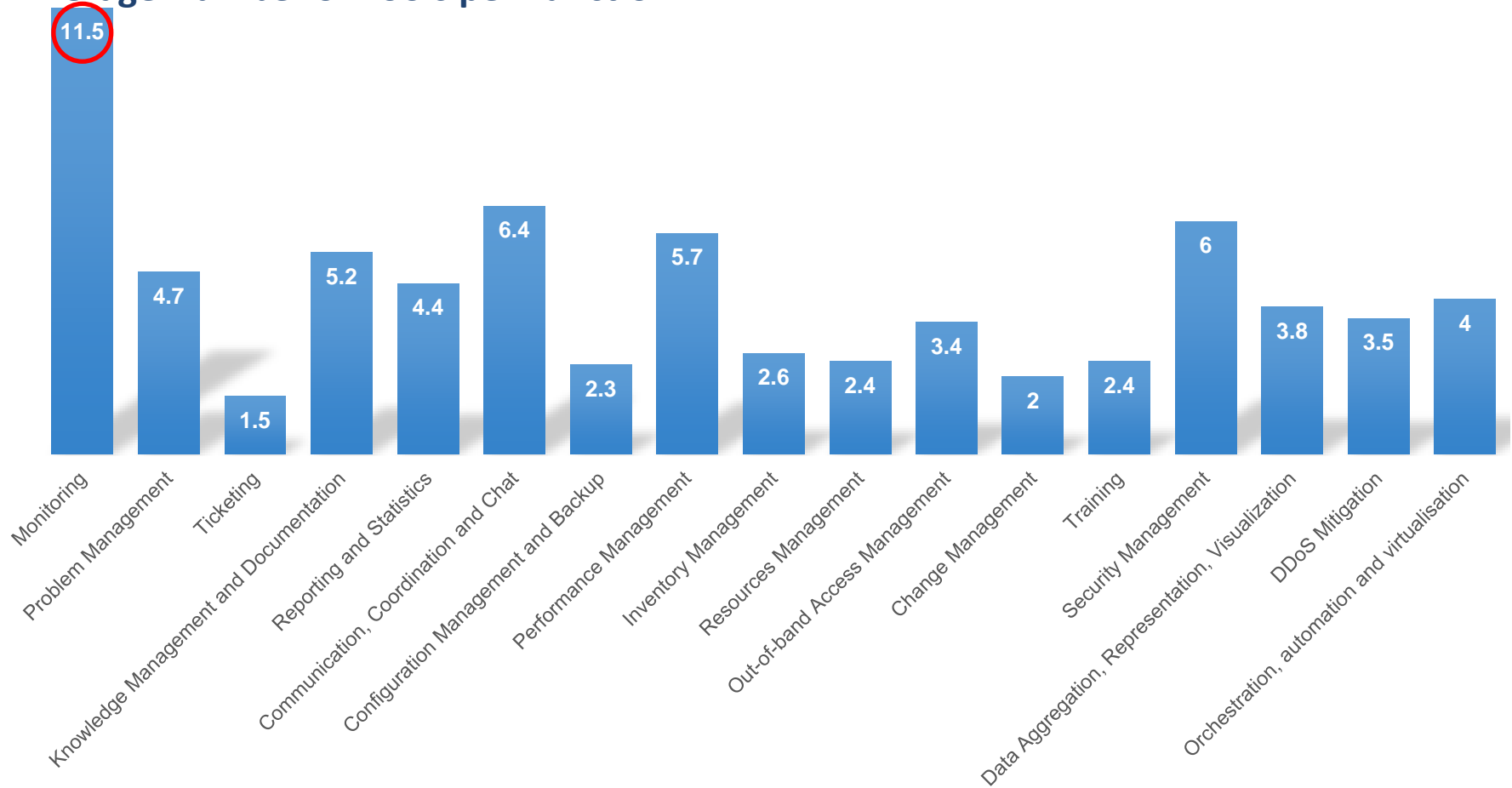
Monitoring Tools: Importance & Frequency for each Type of Methodology
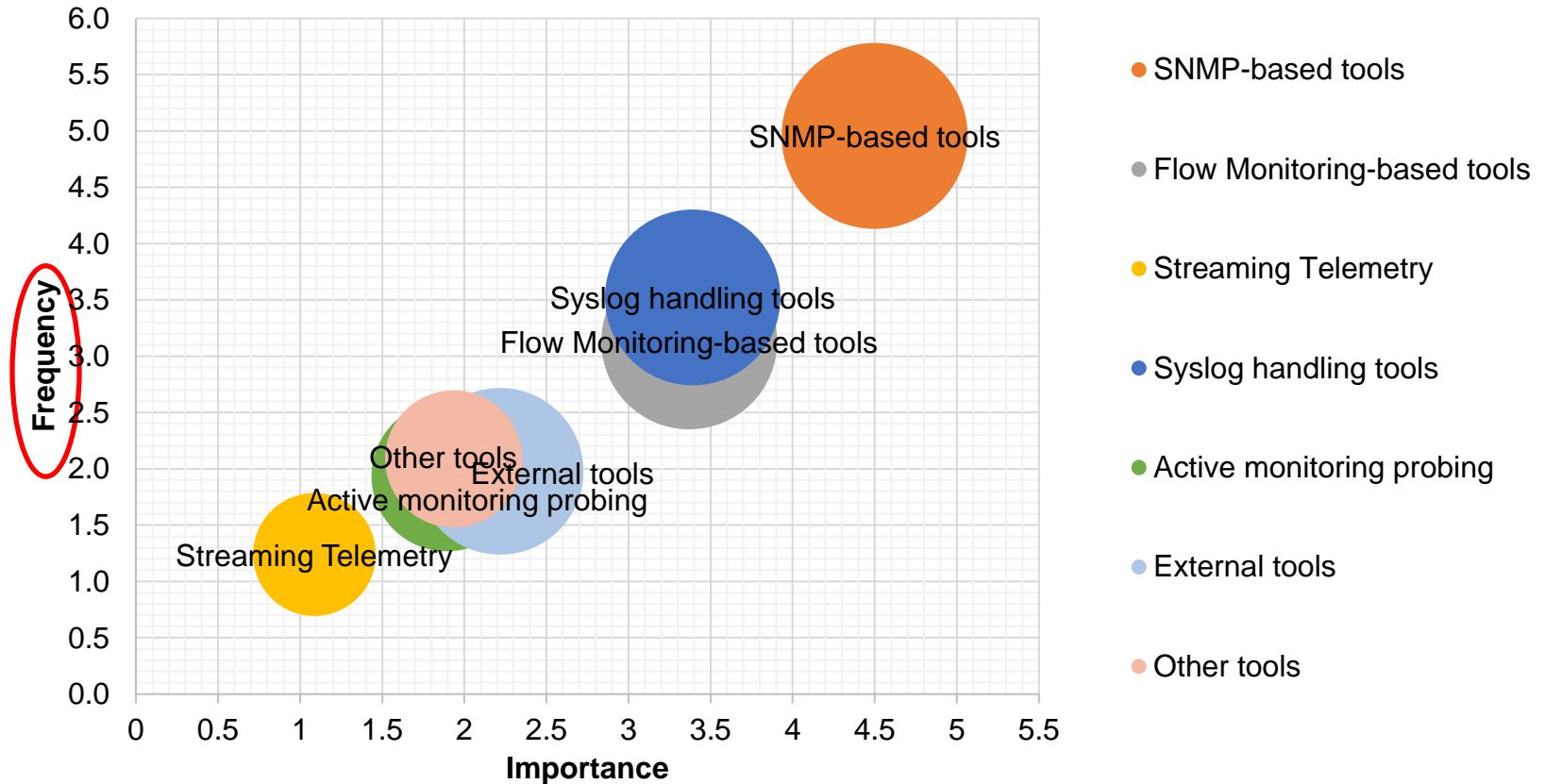
Frequency: daily / few times a week / once a week / once a month / only in case of incident

Monitoring Tools
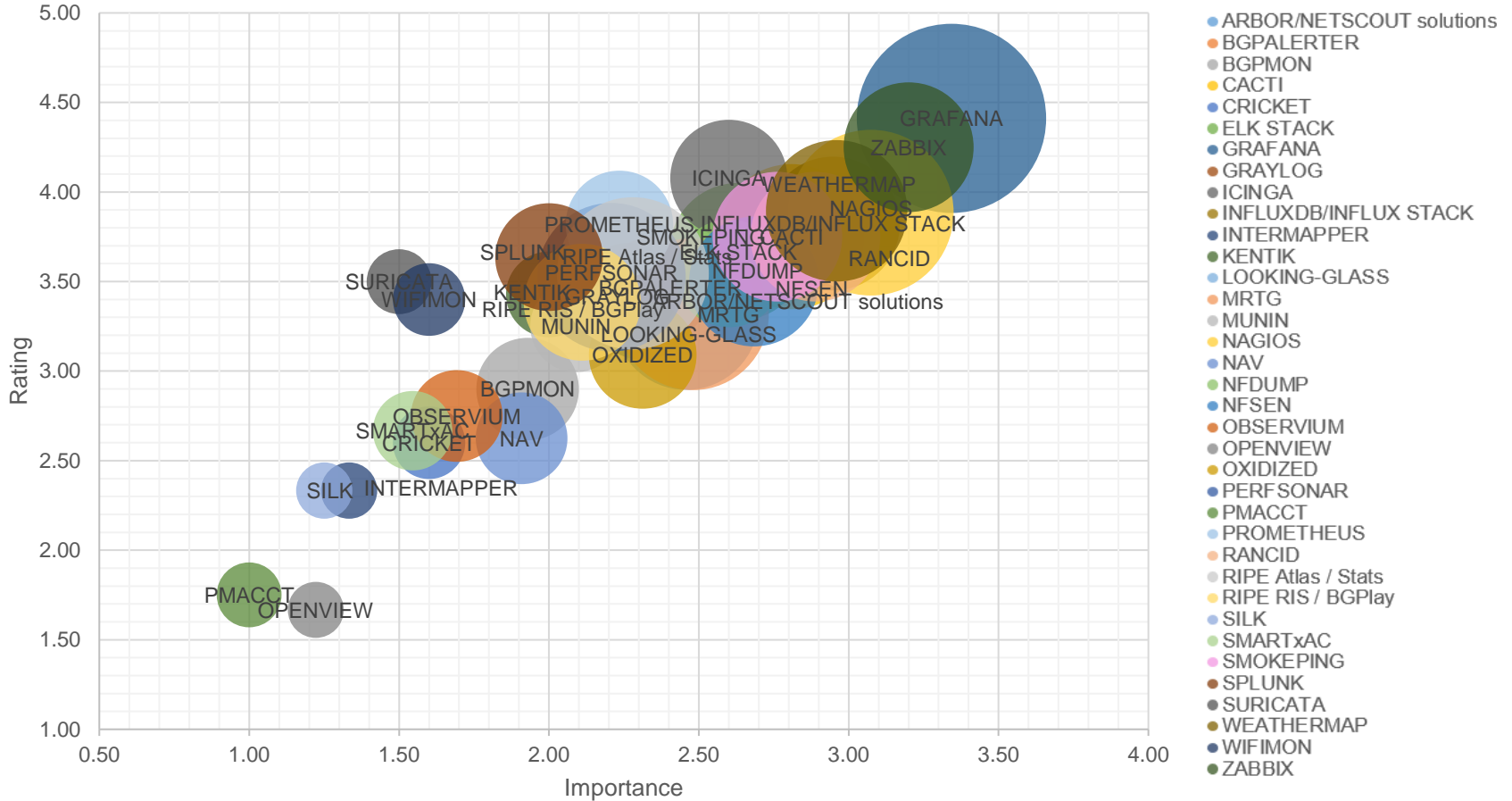
Monitoring Tools – Zoom in: Only the Top-5
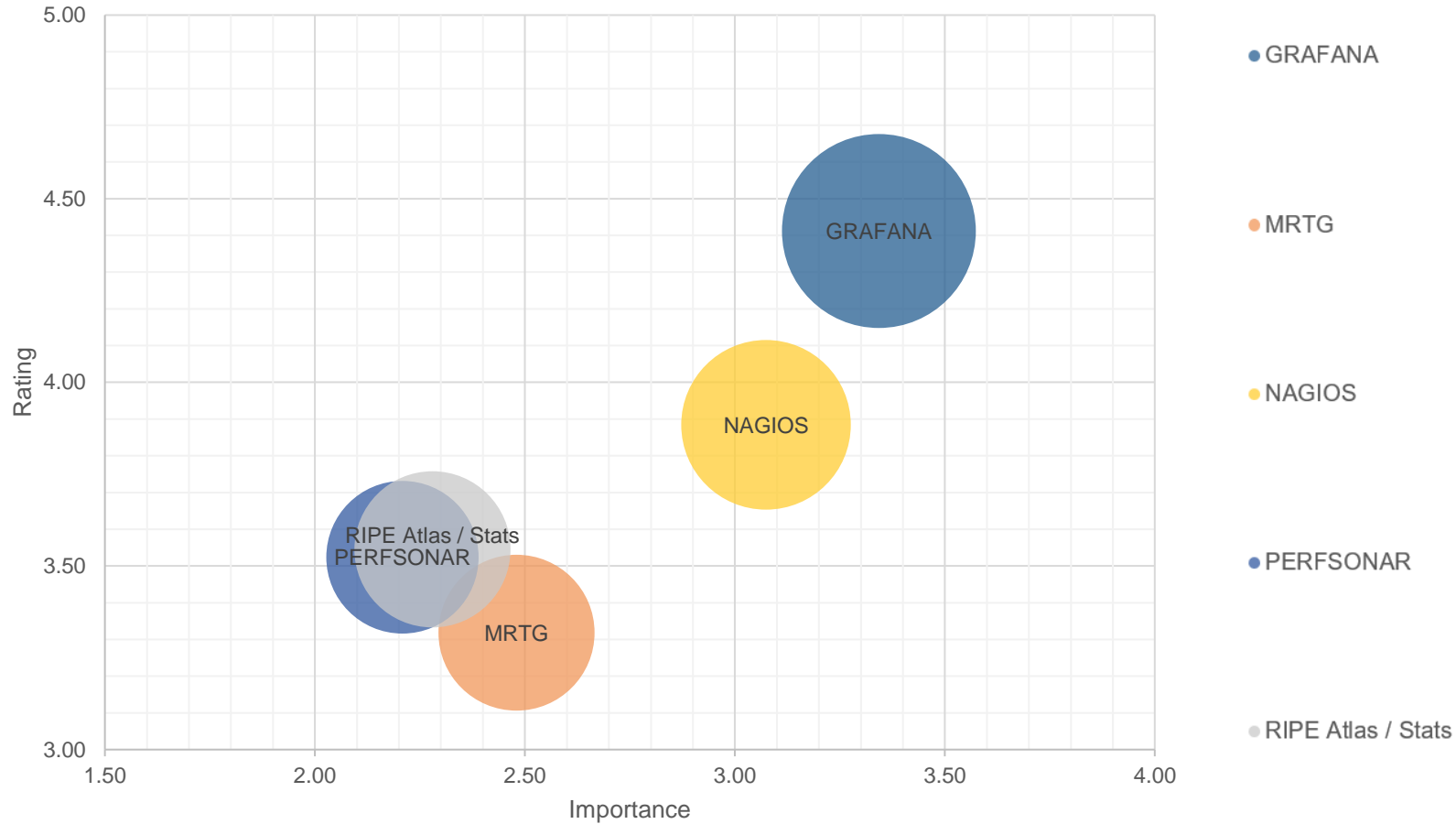
Monitoring Tools – Zoom in: Only the Top-10
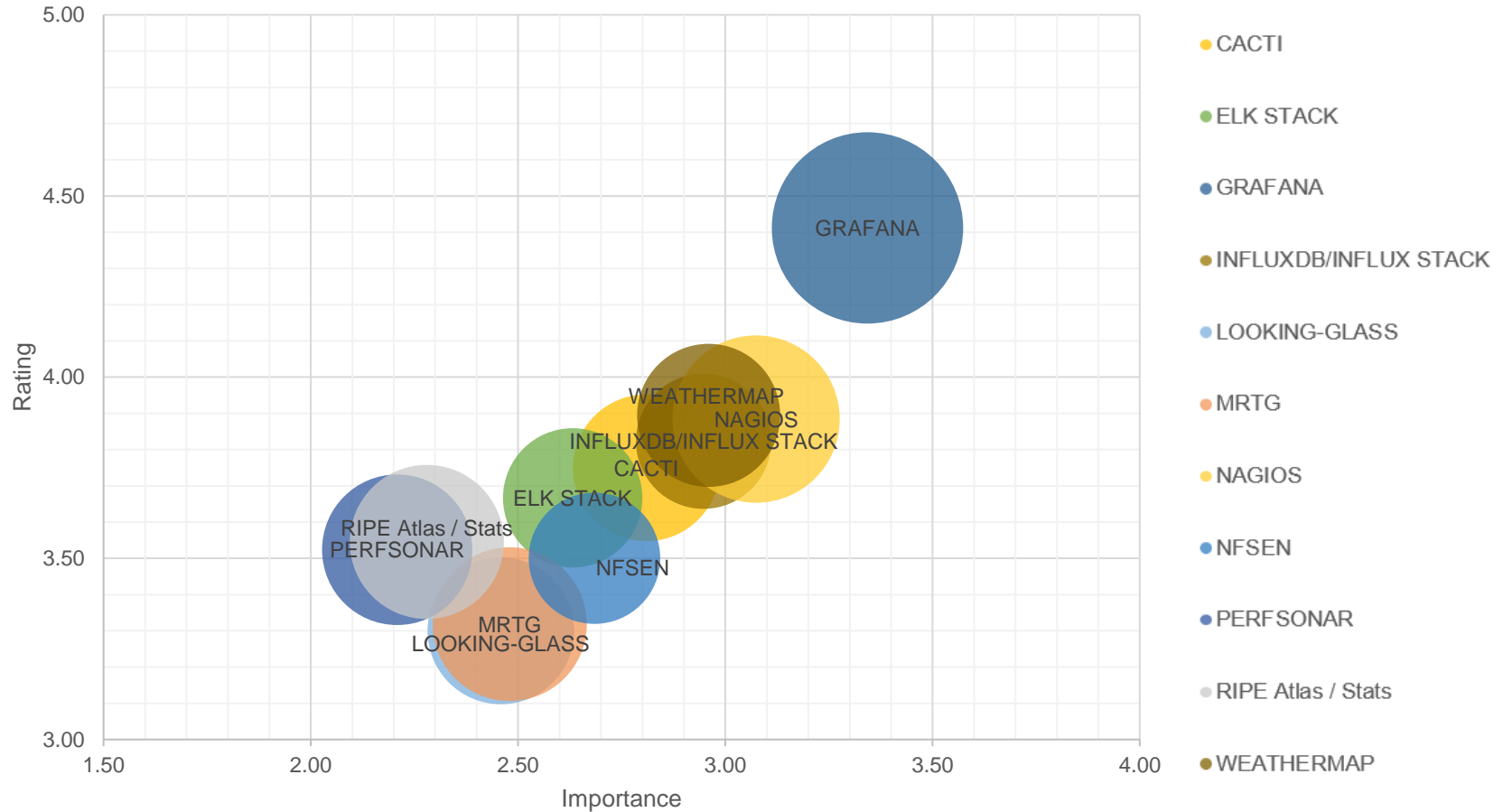
Monitoring Tools – Zoom in: Only the Top-16
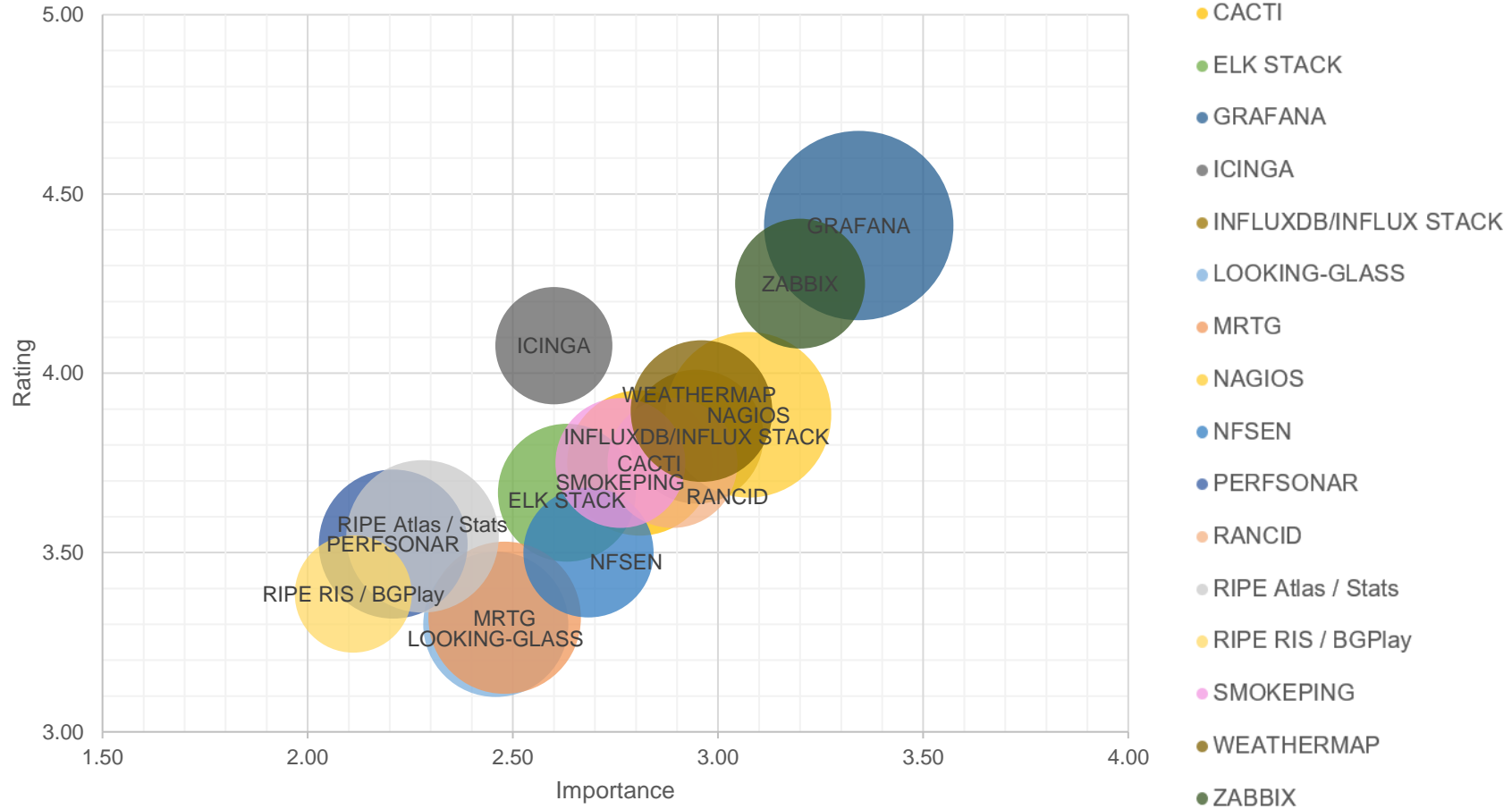
Trends for Monitoring – Top 10
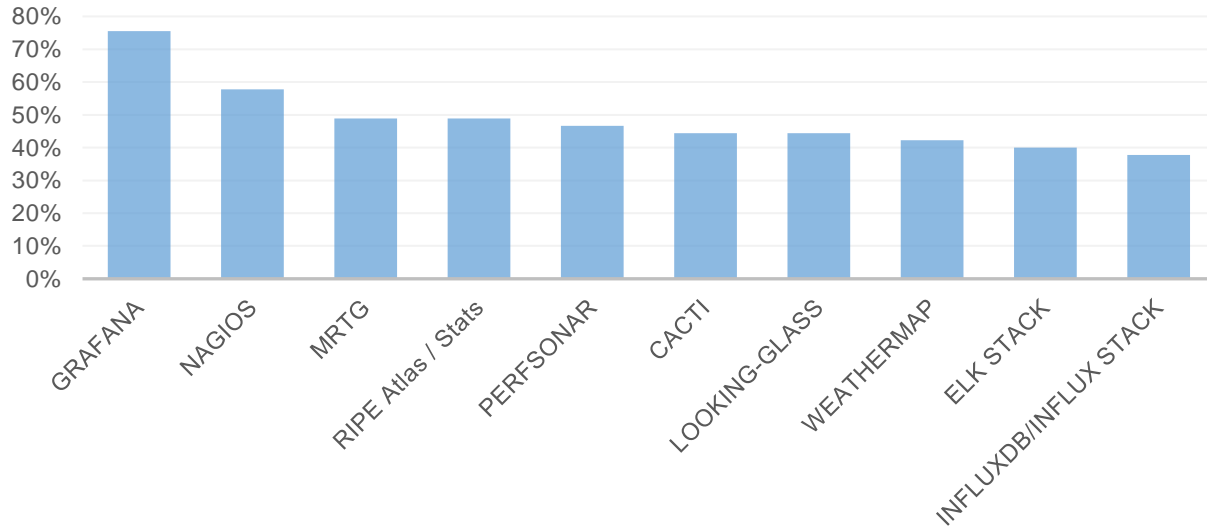
Tool	2016	2019	2023	Trend	
GRAFANA			1	NEW	
NAGIOS	2	1	2	▼	-1
MRTG	6	6	3	▲	3
RIPE Atlas / Stats	4	7	4	▲	3
PERFSONAR	11	12	5	▲	7
CACTI	1	3	6	▼	-3
LOOKING-GLASS	3	2	7	▼	-5
WEATHERMAP		4	8	▼	-4
ELK STACK		5	9	▼	-4
INFLUXDB/INFLUX STACK			10	NEW	
NFSEN		11	11	▬	0

- First appearance of Grafana, directly to the first position.

- Nagios and Cacti are still popular, with MRTG going up.

- perfSONAR takes off and reaches the Top-10 for the first time.

- Smokeping and NFDUMP disappear from the Top-10 (but they are close)

- On average, each institution uses 11.5 different tools for monitoring

Problem Management Tools
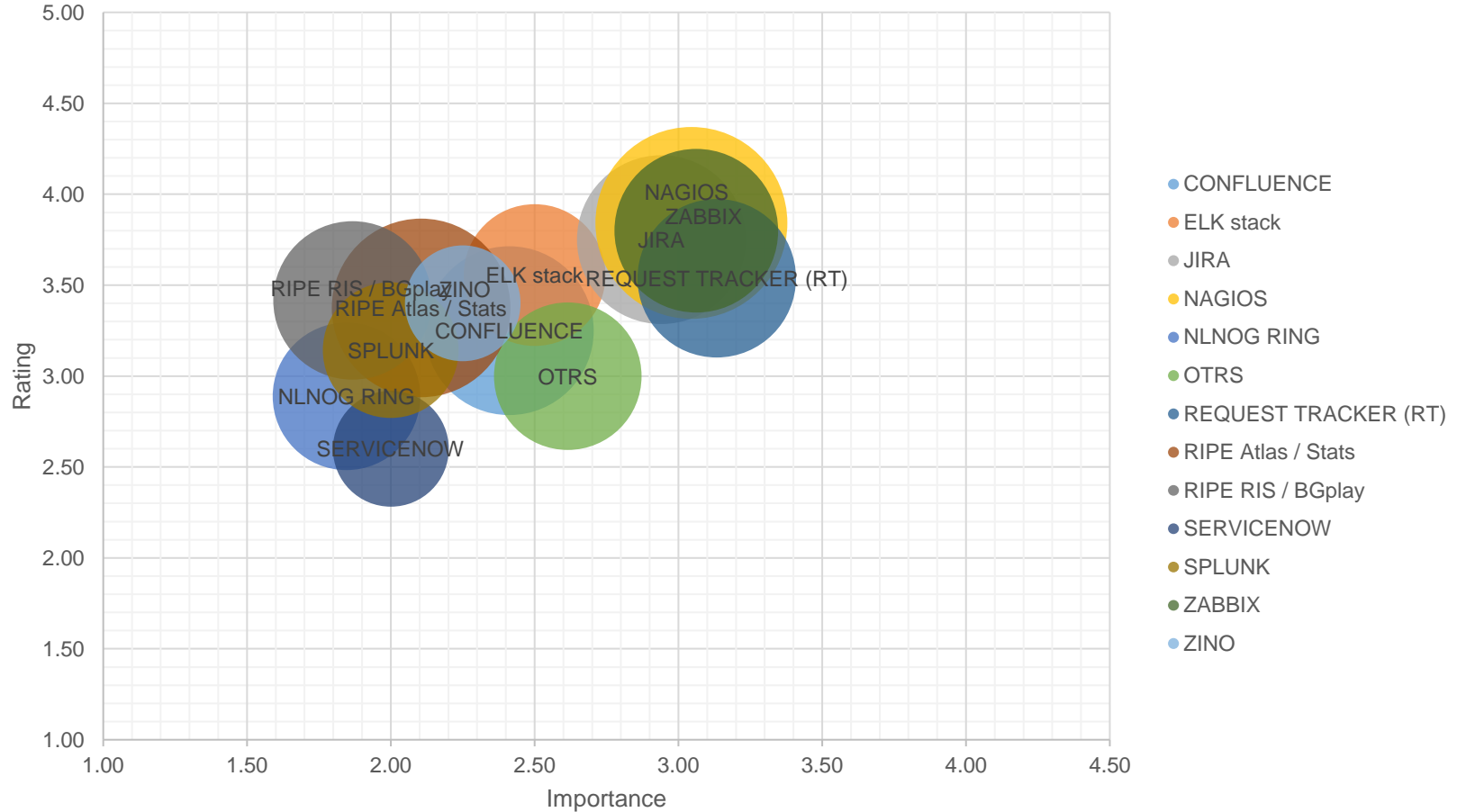
Trends for Problem Management – Top 10

Tool	2016	2019	2023	Trend	
NAGIOS	1	2	1	▲	1
RIPE Atlas / Stats	3	6	2	▲	4
CONFLUENCE		4	3	▲	1
JIRA	11	1	4	▼	-3
ZABBIX	8	5	5	▬	0
REQUEST TRACKER (RT)	2	9	6	▲	3
RIPE RIS / BGplay	5	7	7	▬	0
NLNOG RING	7	10	8	▲	2
OTRS	4	8	9	▼	-1
ELK stack	9	3	10	▼	-7

- Mix of open-source / vendor-based and distributed tools.

- Increasing usage of RIPE Atlas / Stats.

- Jira goes down from the 1st to the 3rd / 4th position.

- Less usage of the ELK stack (but still 31% of the respondents use it)

- On average, each institution uses 4.7 different tools for problem management

Ticketing Tools
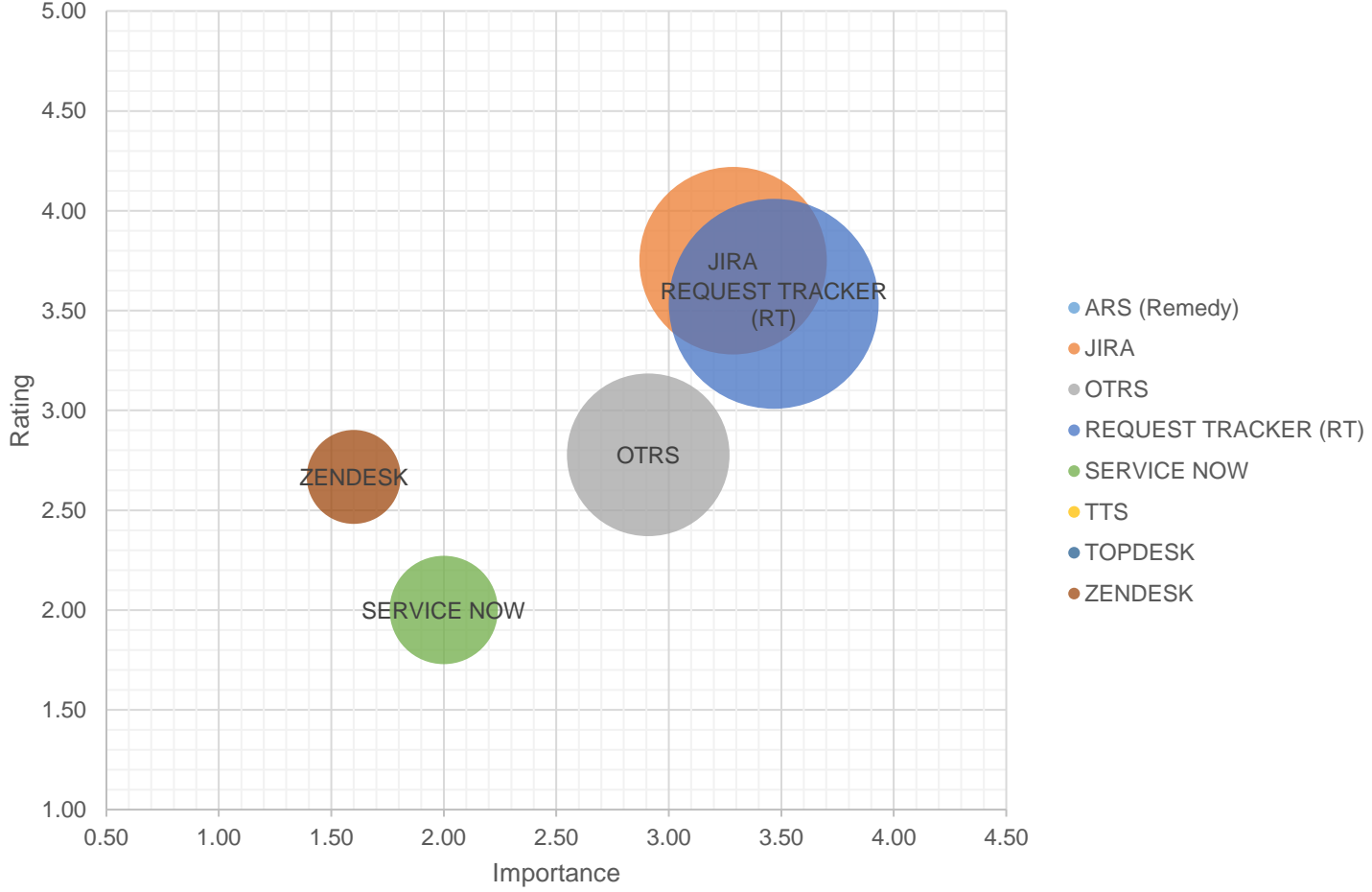
Trends for Ticketing Tools – Top 5
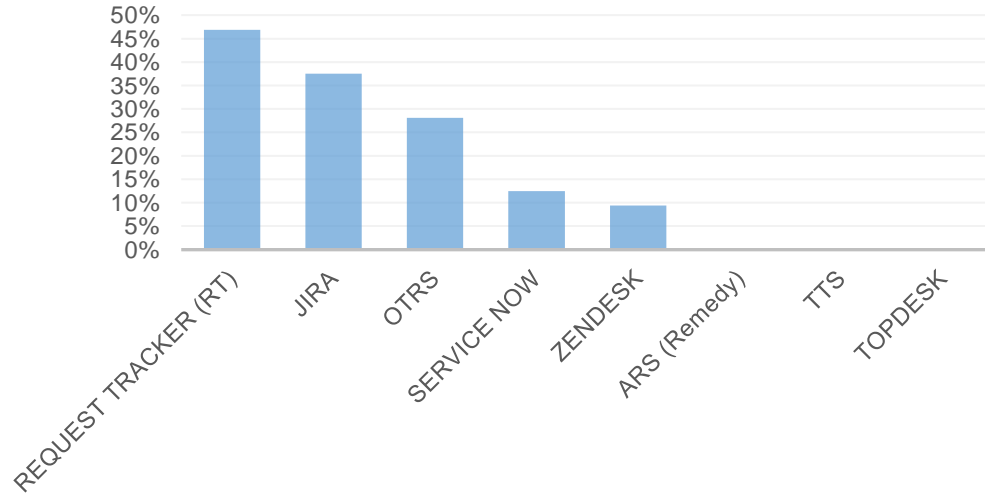
Tool	2016	2019	2023	Trend	
REQUEST TRACKER (RT)	1	3	1	▲	2
JIRA	3	1	2	▼	-1
OTRS	2	2	3	▼	-1
SERVICE NOW	5	4	4	▬	0
ZENDESK		5	5	▬	0
ARS (Remedy)	4	6			
TTS	6	7			
TOPDESK		8			

- Request tracker goes back to the first position after being replaced by Jira in 2019.

- Not even the most popular tool reaches 50% of the respondents for this question.

- ARS Remedy disappears, but 1 respondent mentions RemedyForce (the cloud version)

- Other tools mentioned once: ProactivaNet and Youtrack.

- On average, each institution uses 1.5 tools for Ticketing

Knowledge Management and Documentation Tools
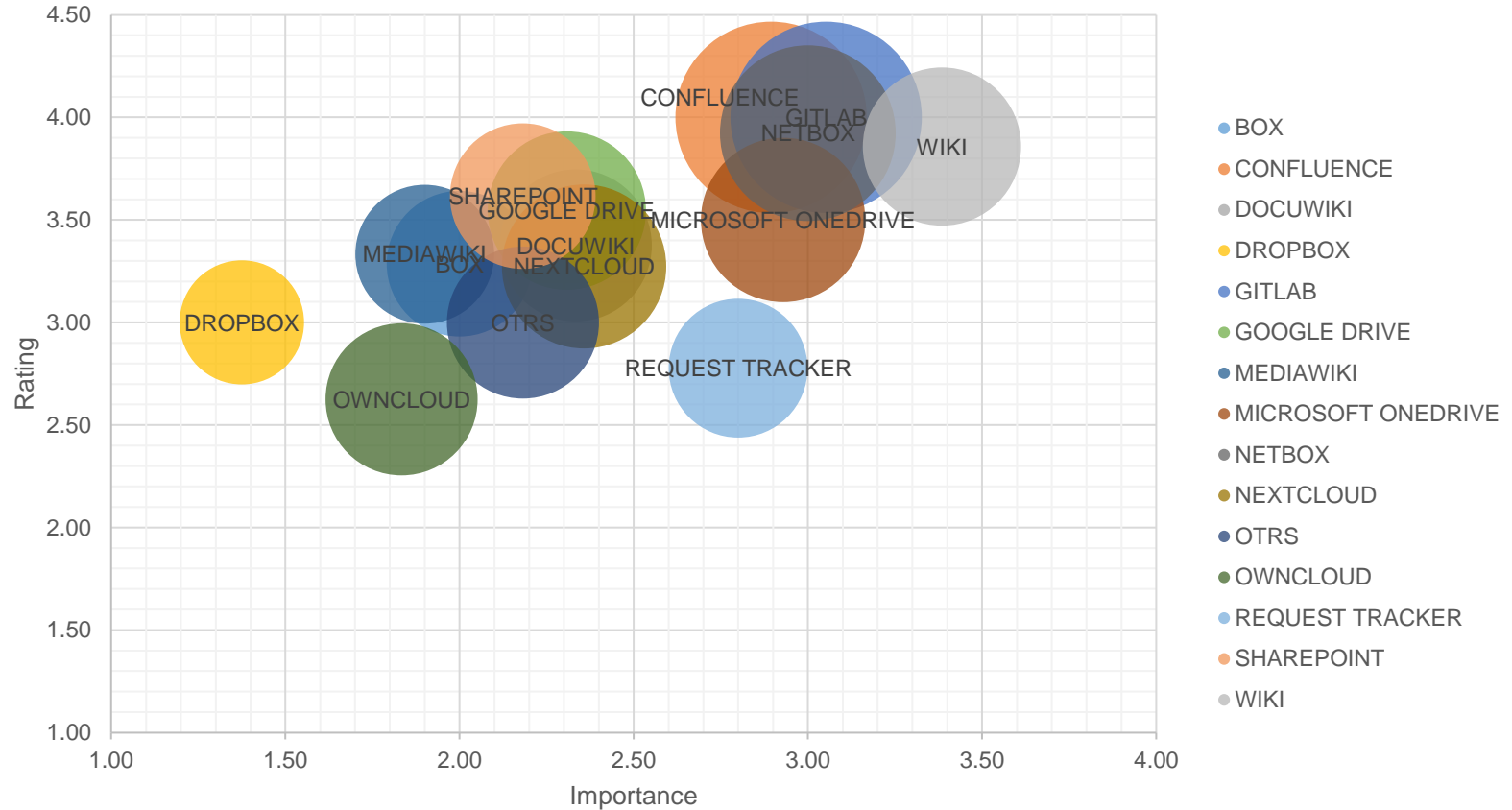
Trends for Knowledge Management and Documentation – Top 10
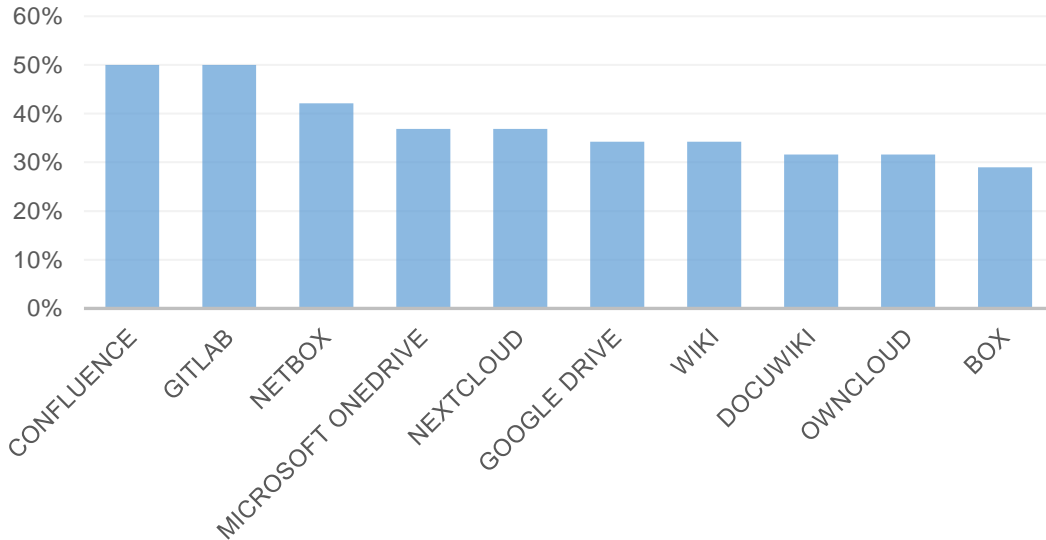
Tool	2016	2019	2023	Trend	
CONFLUENCE	5	1	1	▬	0
GITLAB			2	NEW	
NETBOX			3	NEW	
MICROSOFT ONEDRIVE	10	4	4	▬	0
NEXTCLOUD			5	NEW	
GOOGLE DRIVE		2	6	▼	-4
WIKI	1	3	7	▼	-4
DOCUWIKI	6	7	8	▼	-1
OWNCLOUD	9	5	9	▼	-4
BOX		12	10	▲	2

- Confluence remains on the first position
- New tools appear in the upper part of the Top-10: Gitlab, Netbox, Nextcloud.
- Several tools going down: Google Drive, Wiki and Owncloud go 4 positions down.
- OTRS, Sharepoint, Mediawiki, Request Tracker and Dropbox disappear from Top-10.
- On average, each institution uses 5.2 tools for Knowledge Management

Reporting and Statistics Tools
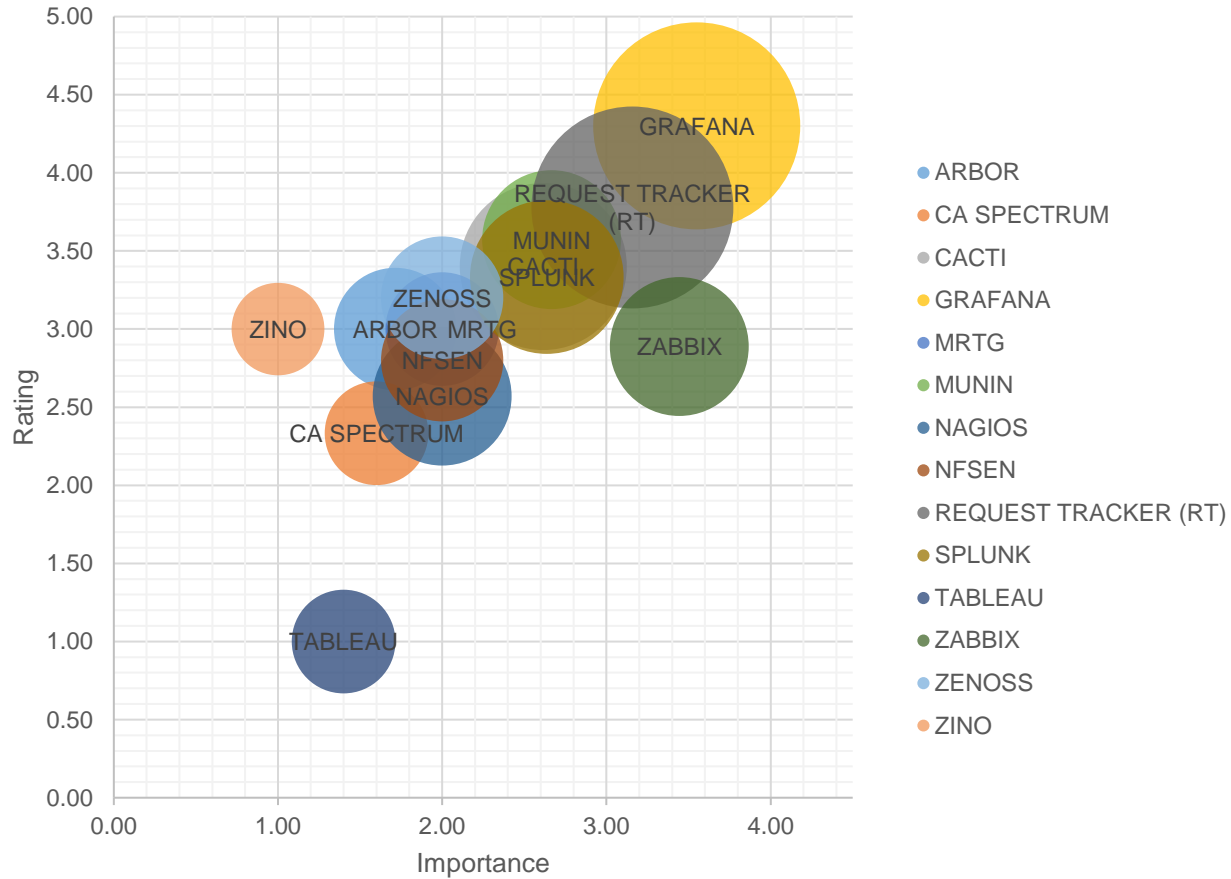
Trends for Reporting and Statistics – Top 10
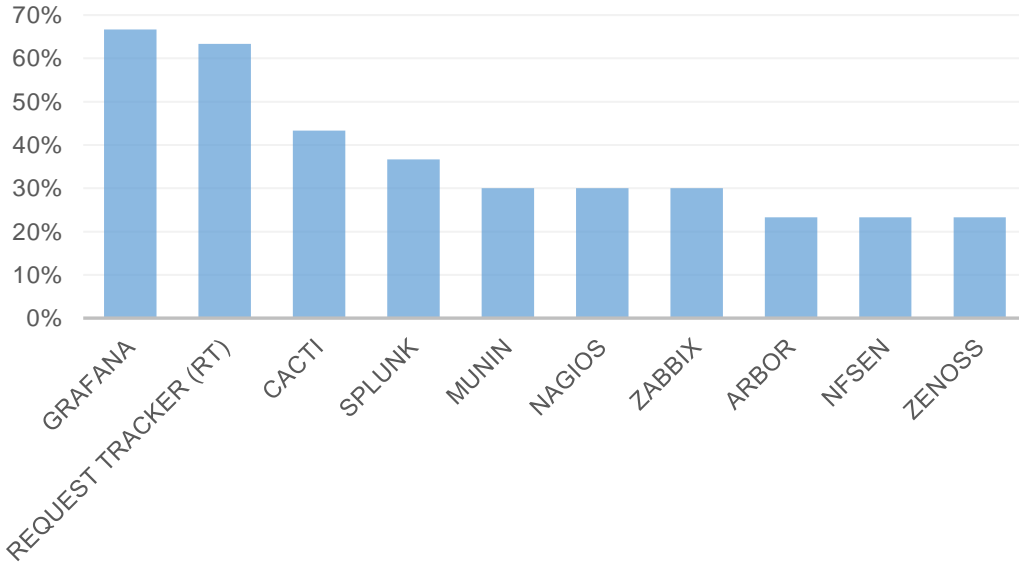
Tool	2016	2019	2023	Trend	
GRAFANA	5	1	1	▭	0
REQUEST TRACKER (RT)	12	9	2	▲	7
CACTI	1	2	3	▼	-1
SPLUNK	8	8	4	▲	4
MUNIN	6	11	5	▲	6
NAGIOS	3	4	6	▼	-2
ZABBIX	13	5	7	▼	-2
ARBOR	7	6	8	▼	-2
NFSEN	4	7	9	▼	-2
ZENOSS	9	13	10	▲	3

- Grafana is again the most popular tool, shortly followed by Request Tracker.
- Increasing usage of Splunk and Munin.
- On average, each institution uses 4.4 tools for Reporting and Statistics

Communication, Coordination and Chat Tools – Bi-directional
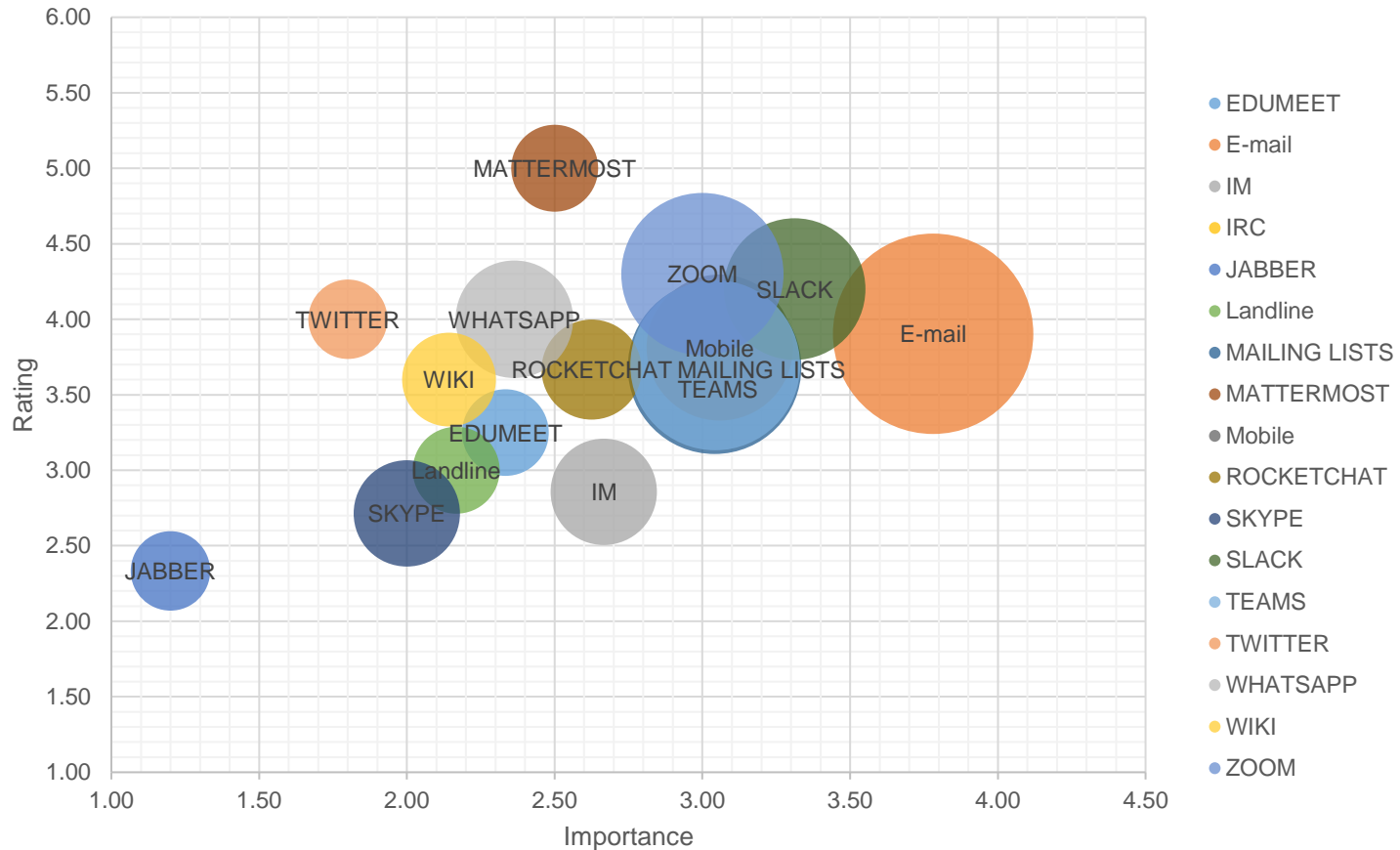
Trends for Communication, Coordination and Chat Tools – Bi-directional – Top 10
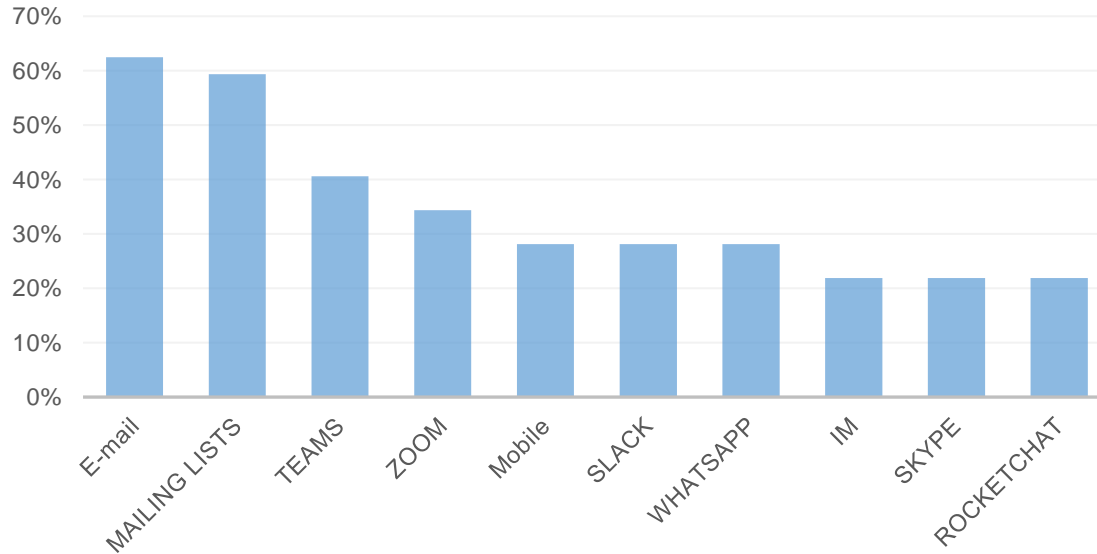
Tool	2016	2019	2023	Trend	
E-mail	1	1	1	▬	0
MAILING LISTS	2	2	2	▬	0
TEAMS			3	NEW	
ZOOM			4	NEW	
Mobile	5	3	5	▼	-2
SLACK	12	8	6	▲	2
WHATSAPP	10	7	7	▬	0
IM	7	11	8	▲	3
SKYPE	4	6	9	▼	-3
ROCKETCHAT			10	NEW	

- We still use traditional e-mail-based tools for communication (E-mail and mailing lists).

- More relevance of asynchronous chat tools.

- Telephone calls are less relevant. Landline is even out of the Top-10.

- On average, each institution uses around 6.4 tools for Bidirectional Communication, coordination & Chat

Communication, Coordination and Chat Tools – Uni-directional
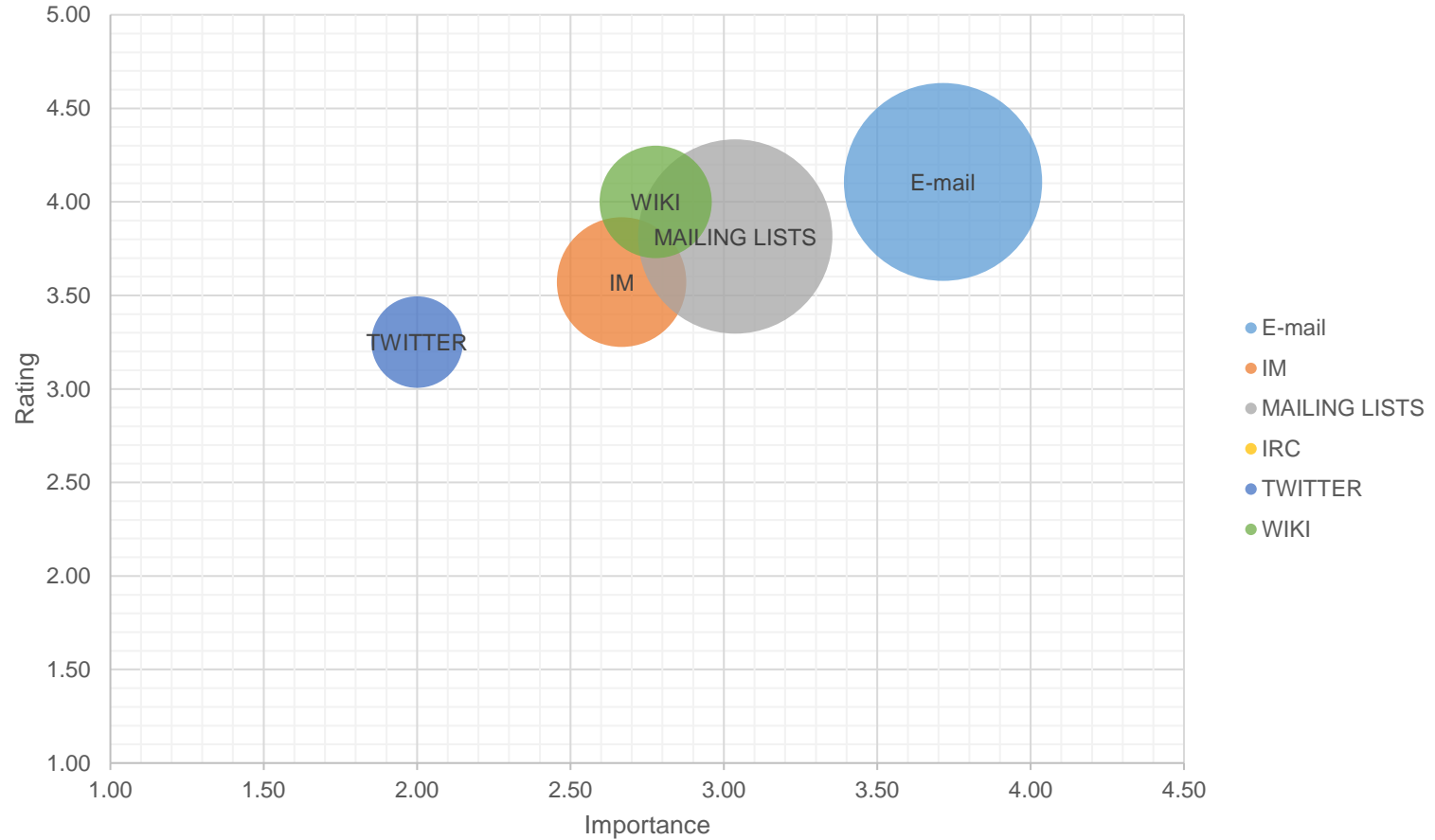
Trends for Communication, Coordination and Chat Tools – Uni-directional – Top 5
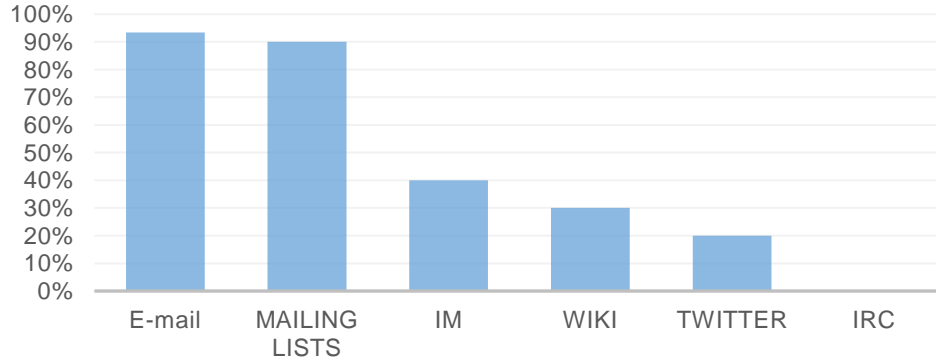
Tool	2016	2019	2023	Trend	
E-mail	1	1	1	▬	0
MAILING LISTS	2	2	2	▬	0
IM	7	11	3	▲	8
WIKI	3	5	4	▲	1
TWITTER	8	10	5	▲	5
IRC	11	13			

- We still use traditional e-mail-based tools for communication (E-mail and mailing lists).

- IRC has zero users

- Some organisations use Twitter for unidirectional communication

- On average, each institution uses around 2.8 tools for Unidirectional Communication, coordination & Chat

Configuration Management and Backup Tools
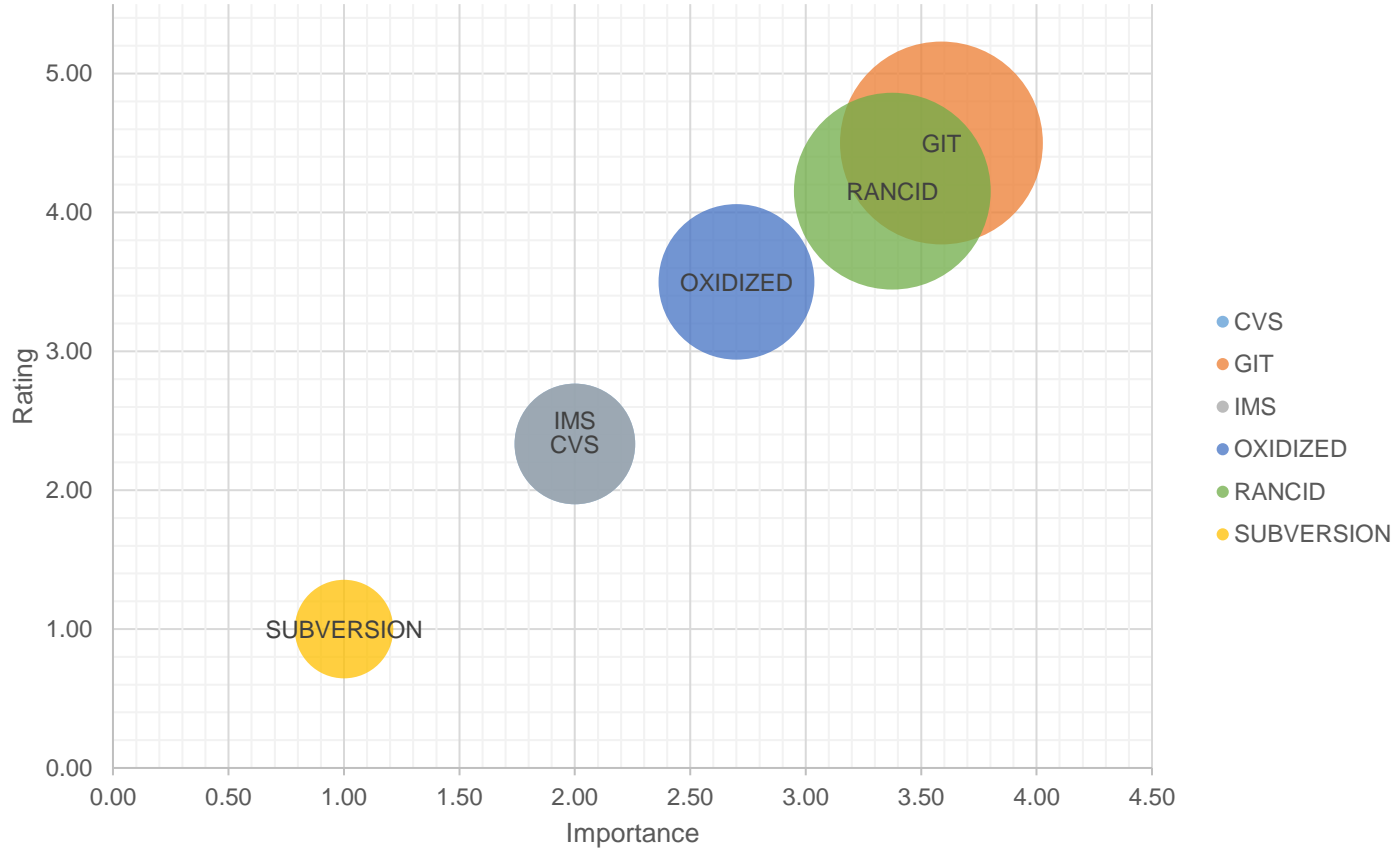
Trends for Configuration Management and Backup Tools– Top 6
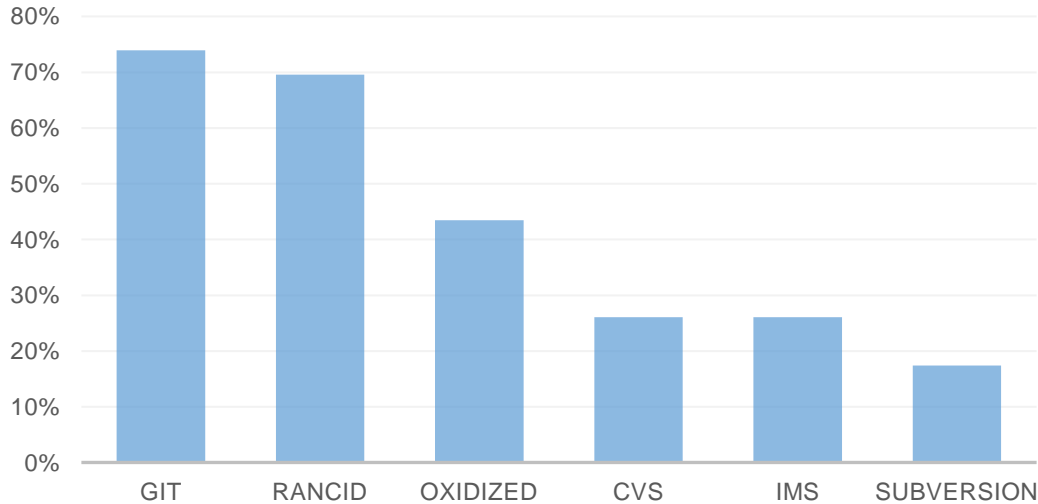
Tool	2016	2019	2023	Trend	
GIT	2	2	1	▲	1
RANCID	1	1	2	▼	-1
OXIDIZED	6	5	3	▲	2
CVS	4	3	4	▼	-1
IMS	5	6	5	▲	1
SUBVERSION	3	4	6	▼	-2

- Git & Rancid are the most popular tools. The rest are used by less than 50% of respondents

- Subversion goes down in the ranking.

- On average, each institution uses 2.3 tools for Configuration Management and Backup

Resources Management Tools
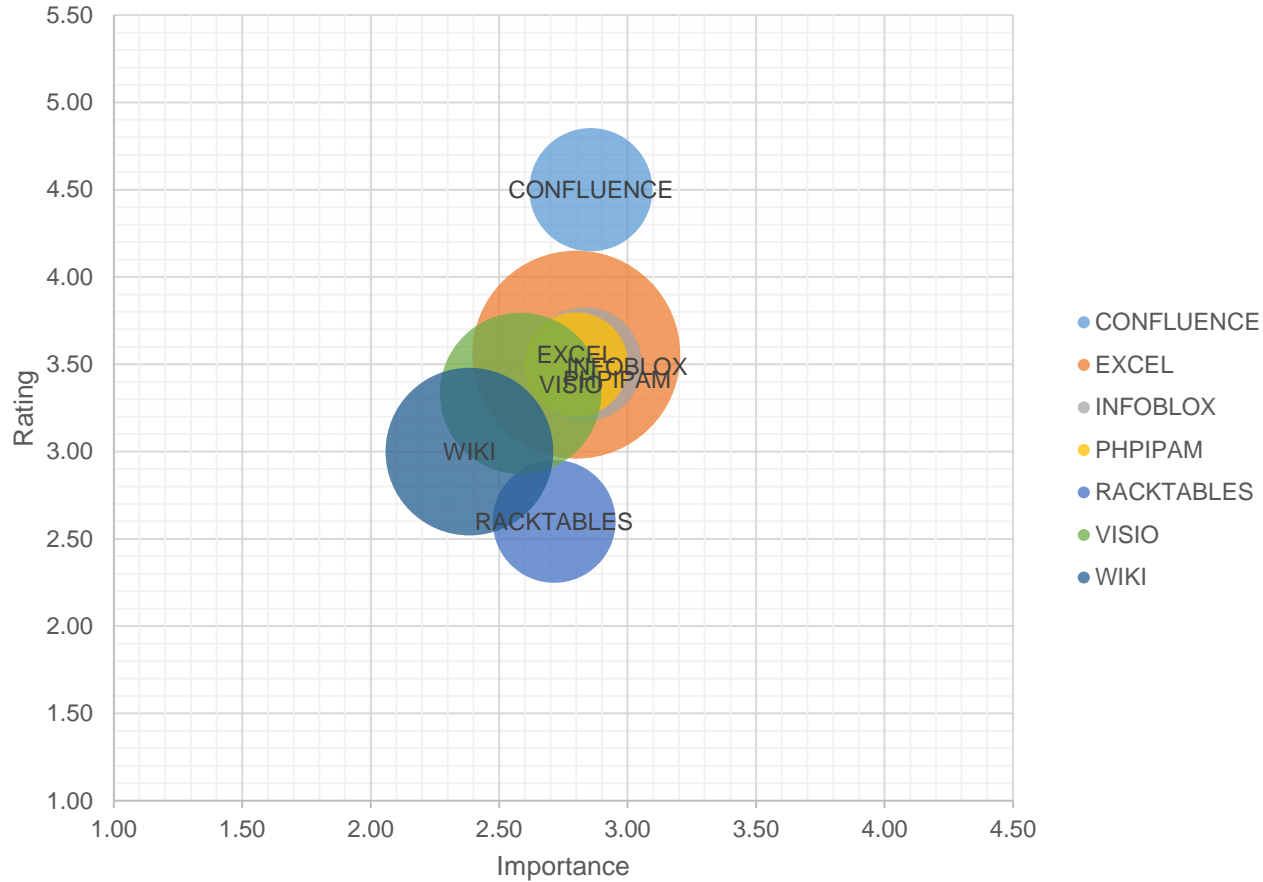
Trends for Resources Management Tools – Top-8
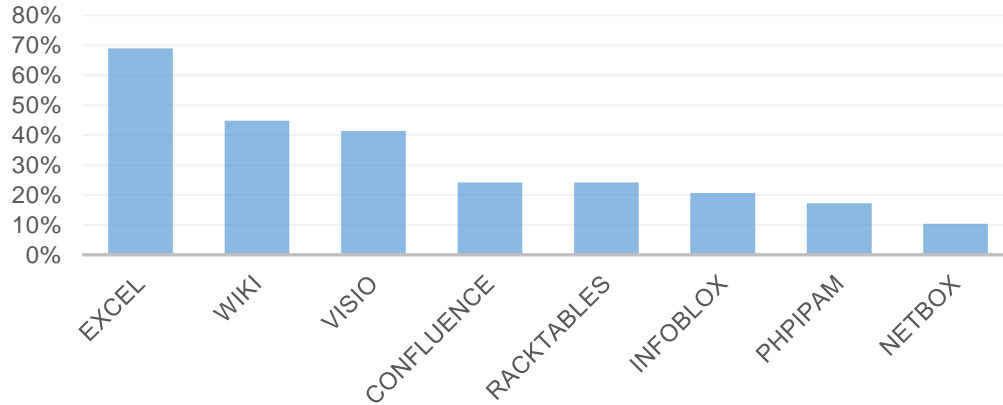
Tool	2016	2019	2023	Trend	
EXCEL	2	1	1	▭	0
WIKI	3	3	2	▲	1
VISIO	1	2	3	▼	-1
CONFLUENCE	5	4	4	▭	0
RACKTABLES	4	5	5	▭	0
INFOBLOX	9	6	6	▭	0
PHPIPAM			7	NEW	
NETBOX			8	NEW	

- Excel remains the most popular tool.

- Most of the tools are in the middle of the table (medium rating and importance).

- Confluence is the best rated, but it is only used by 24% of the respondents.

- Netbox was mentioned by 3 respondents in "Other".

- On average, each institution uses 2.4 tools for Resources Management

Other Functions & Facts

Other facts:

- Although Netbox or Confluence are the best rated, Excel remains the most popular tool for Inventory Management and Resources Management.
- As more institutions have SOCs, the percentage of NOCs who feel responsible for Security Management decreased (from 63% to 45%).
- Automation is still the function less NOCs feel responsible for.

You can see the results for other functions here:
https://wiki.geant.org/display/SIGNOC/SIG-NOC+Tools+Survey+2023

Conclusions

- The ecosystem is huge and biodiverse, NOCs work with dozens of tools.

- There is no tool that has all we need, even for the same function.

- There is no tool that works for all the functions, or even for a high percentage of them.

- Having a mix of open-source / vendor-based and distributed tools is the common rule.

- If you are starting a NOC, the survey can give you some ideas. Taking the 5 or 10 most popular and best rated tools should probably help making decisions.

- The survey helps you understand which tools are more popular for the community and for which functions, and also past trends.

- But if you have a wonderful tool that works for you, no need to change it!

Thank you!

netdev@lists.geant.org