System Administrators Prefer Command Line Interfaces, Don't They?

An Exploratory Study of Firewall Interfaces

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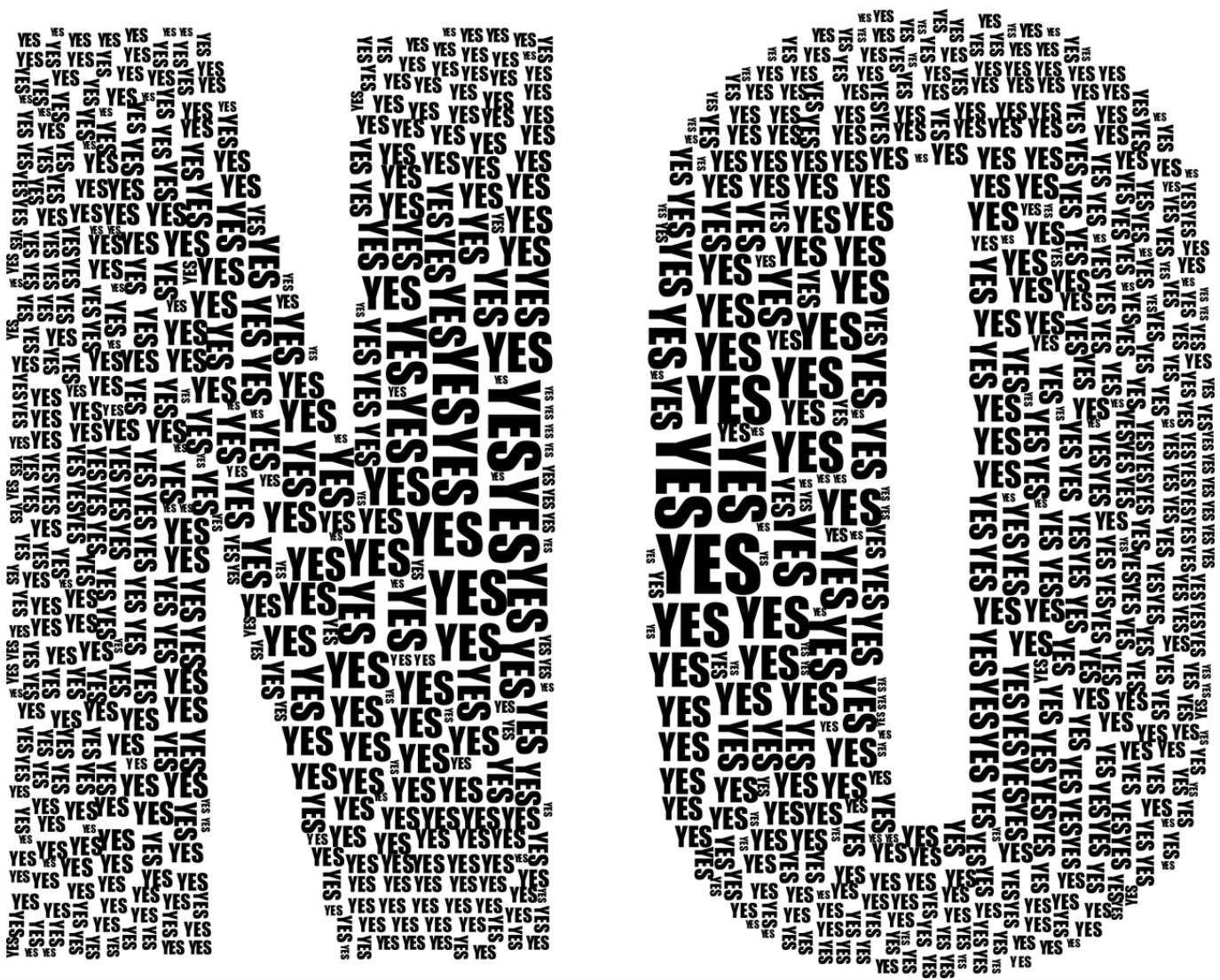
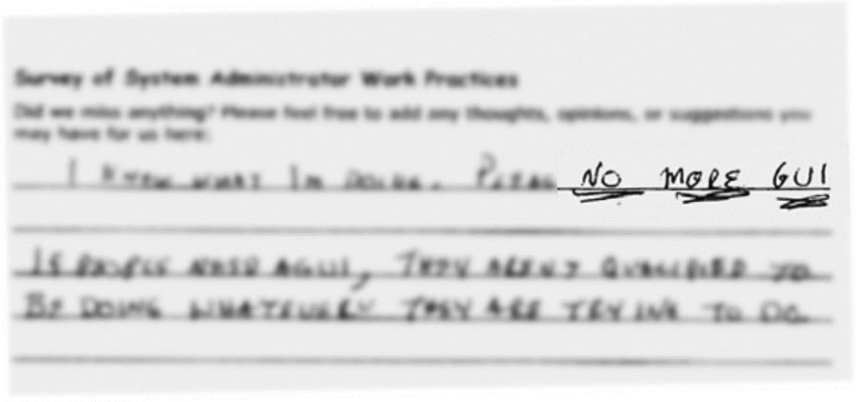

NO

Before we start…

What we knew



from Takayama and Kandogan 2006

Towards Understanding IT Security Professionals and Their Tools

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Trust as an Underlying Factor of System Administrator Interface Choice

Design Guidelines for System Administration Tools Developed through Ethnographic Field Studies

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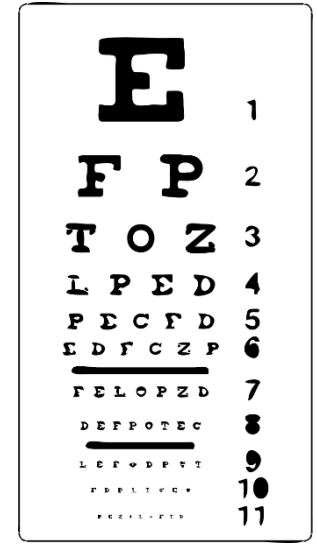
Abstract
System administrators are the unsung heroes of the information age, working behind the scenes to configure, maintain, and troubleshoot the computer infrastructure that underlies much of modern life. While Graphical User Interfaces (GUIs) are being offered as system administration tools, they mostly continue to use Command-Line Interfaces (CLIs). Based on an extensive survey of system administrators, we provide insights regarding this preference, analyze why many of these power users perceive CLIs as more effective than GUIs, and discuss findings as supported by observations from our parallel field studies. Our

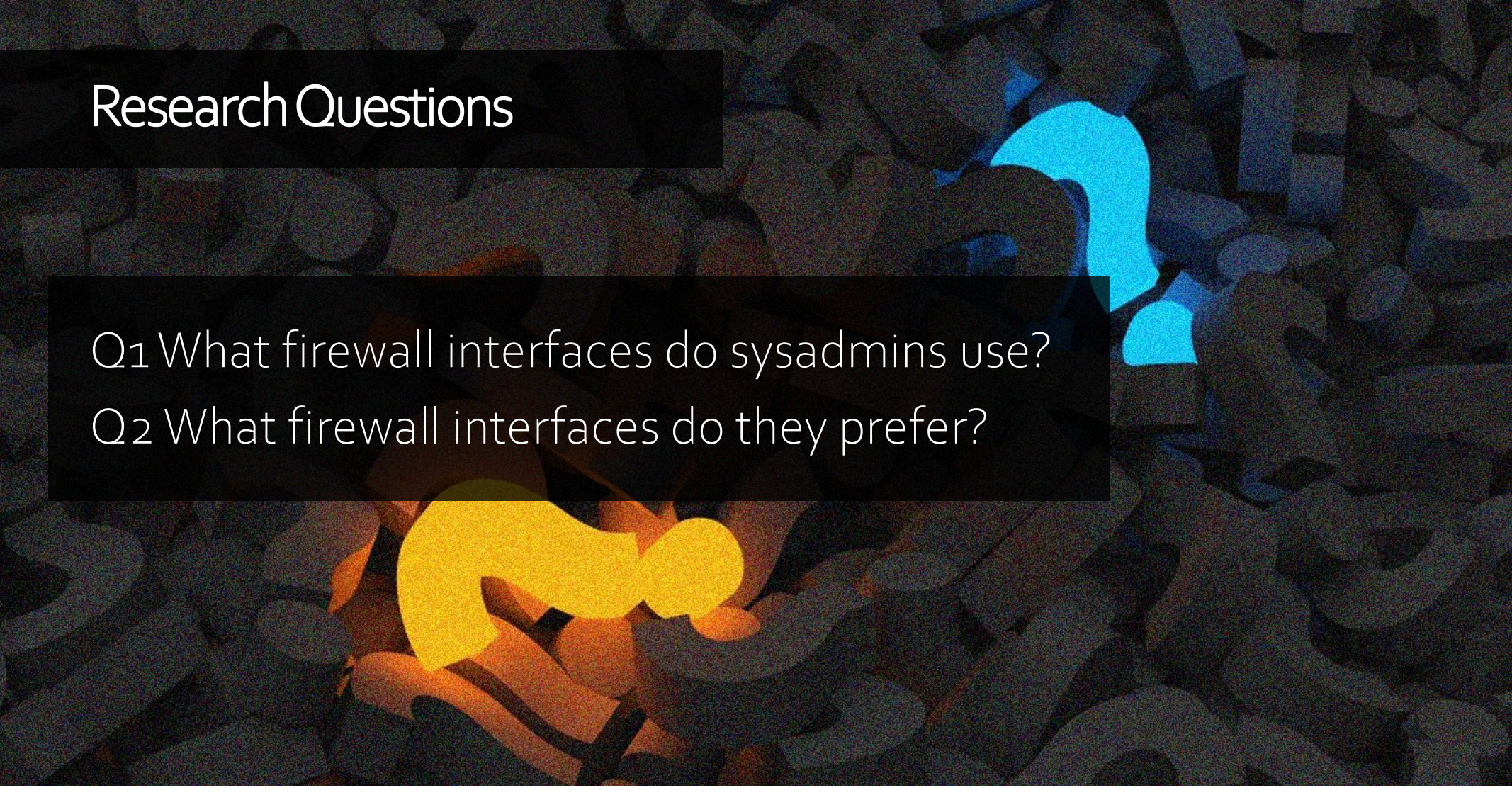
Before we start…

What we knew

! What we see



Research Questions



Q1 What firewall interfaces do sysadmins use?

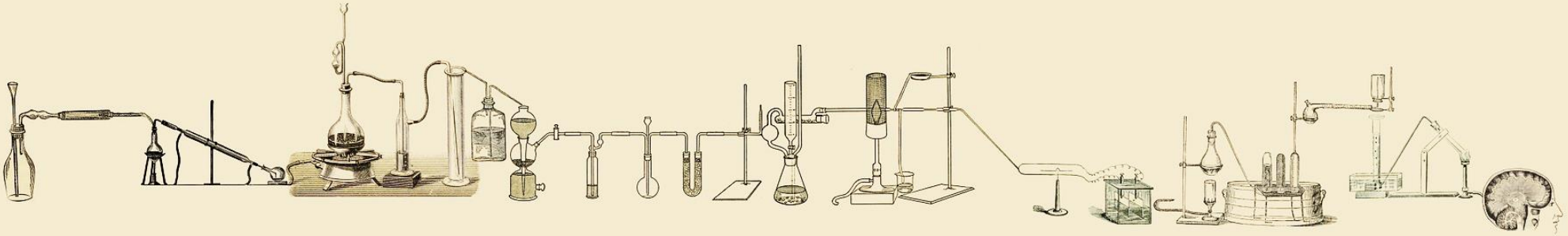
Q2 What firewall interfaces do they prefer?

Outline

Online Survey

Data Analysis
Quantitative + Qualitative

Design Recommendations

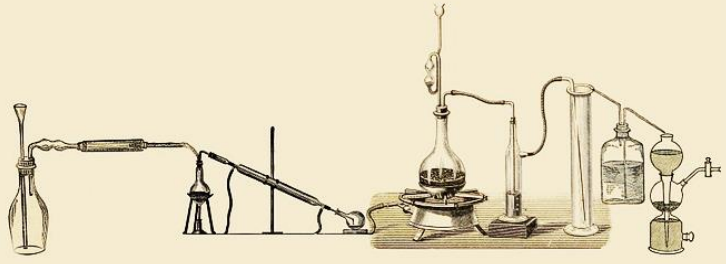


Online Survey

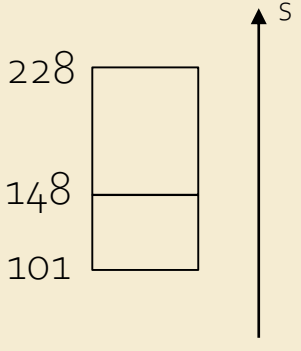
up to 14 Questions (4 open-ended) - skip logic

- avg time working with firewalls
- which interface was mainly used and which interface was the preferred one
- which tasks are easier with each interface
- what are their strengths and limitations

- demographics



- Time to answer: avg 177 sec SD=106



Recruitment

- Sysadmin Volunteers
  no financial compensation

very hard to recruit

- Sysadmin forums and email lists +

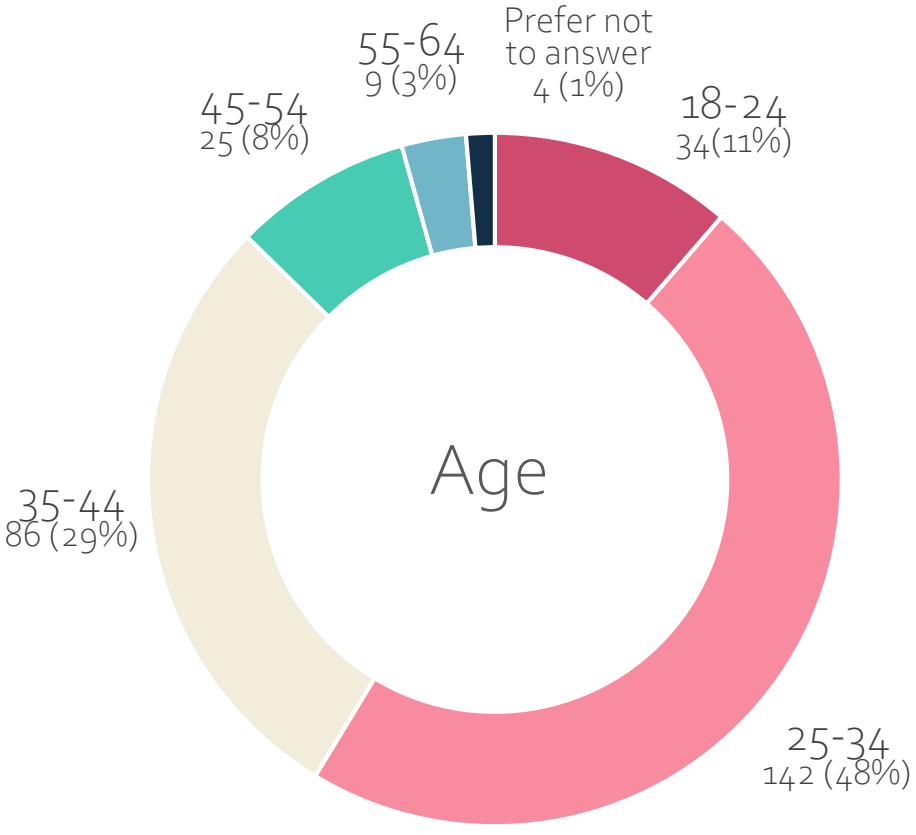
reddit

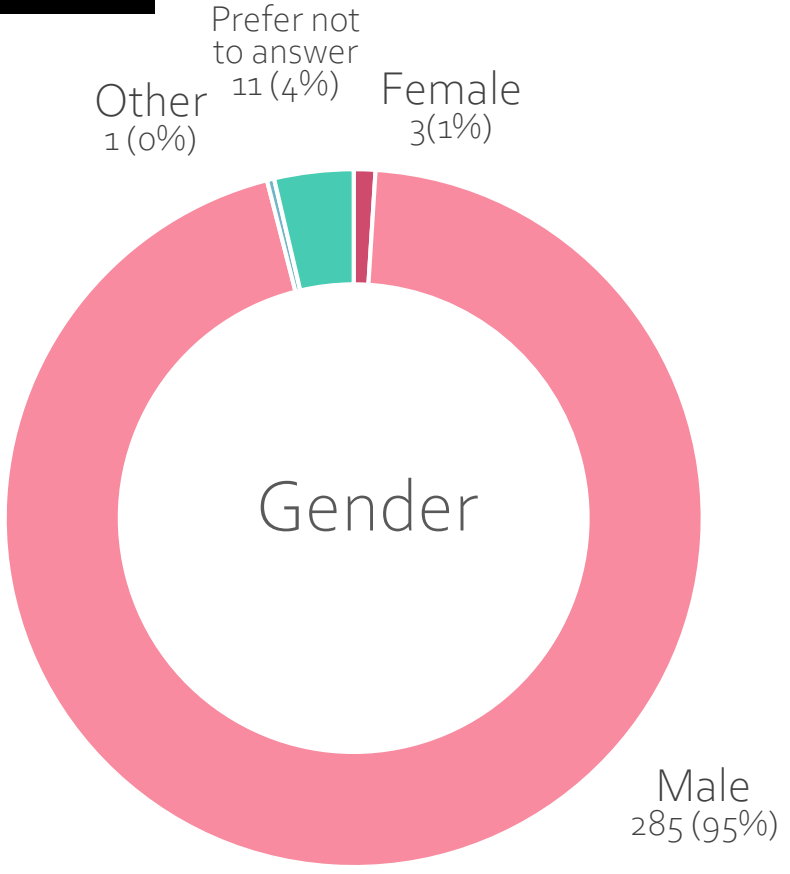
r / sysadmin /



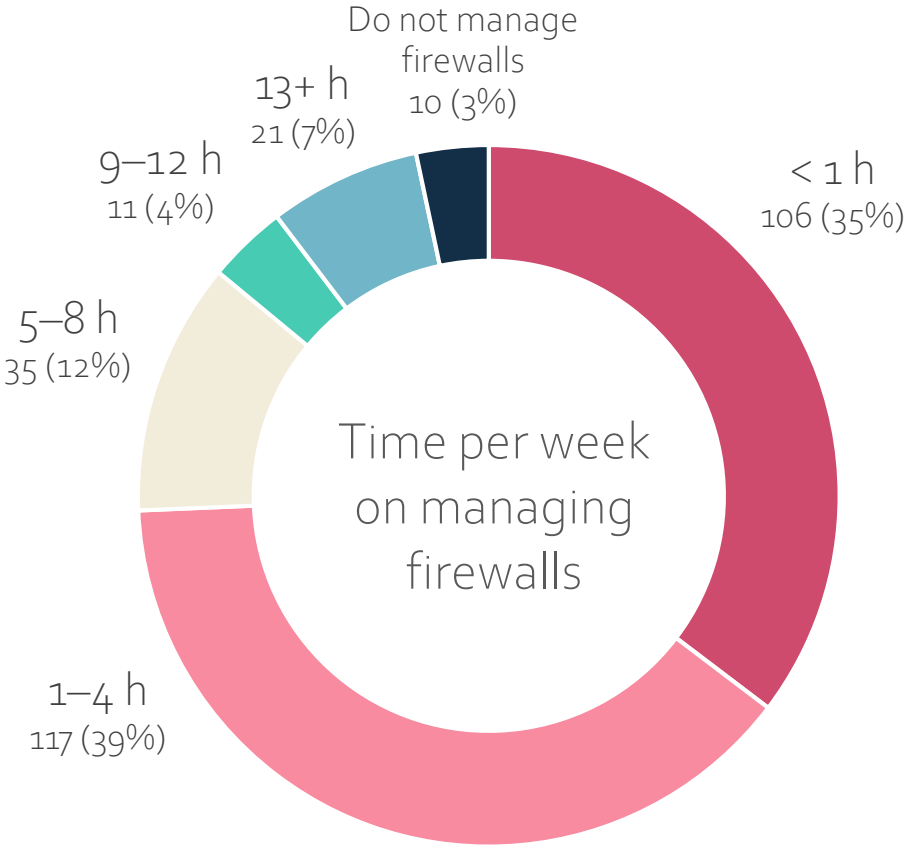
- 300 participants *with firewall experience*

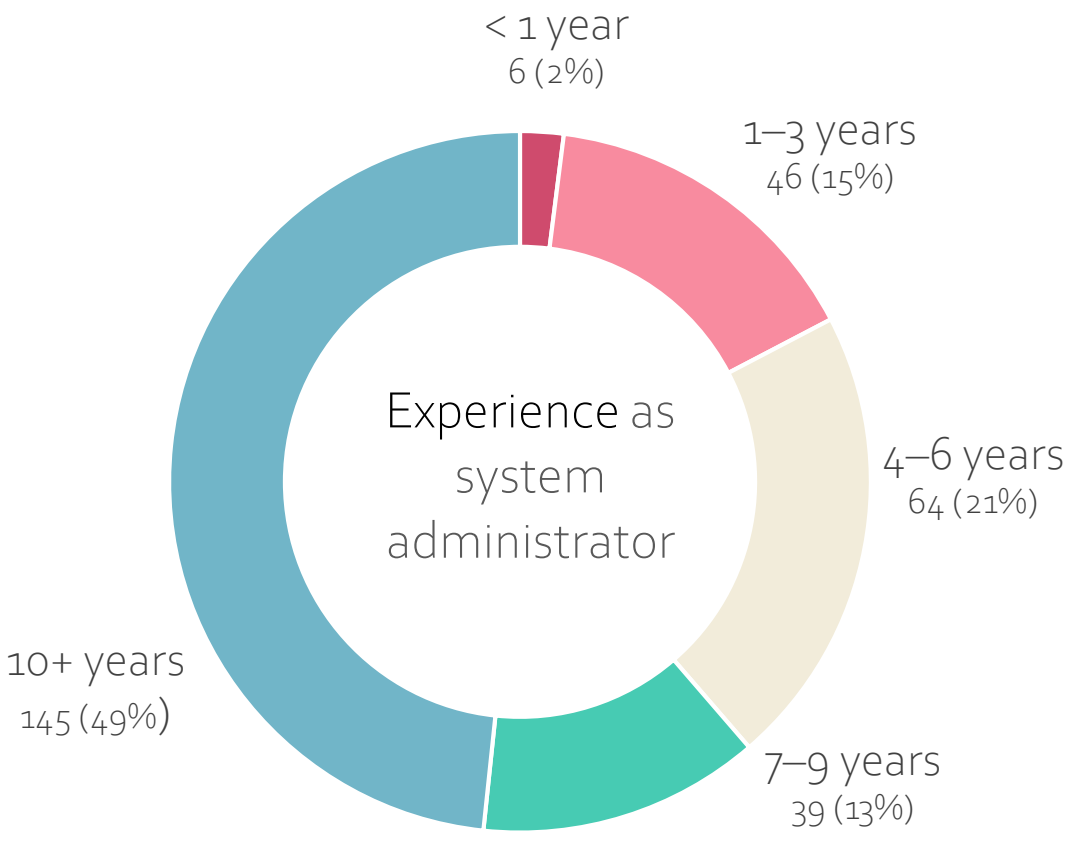
Demographics I



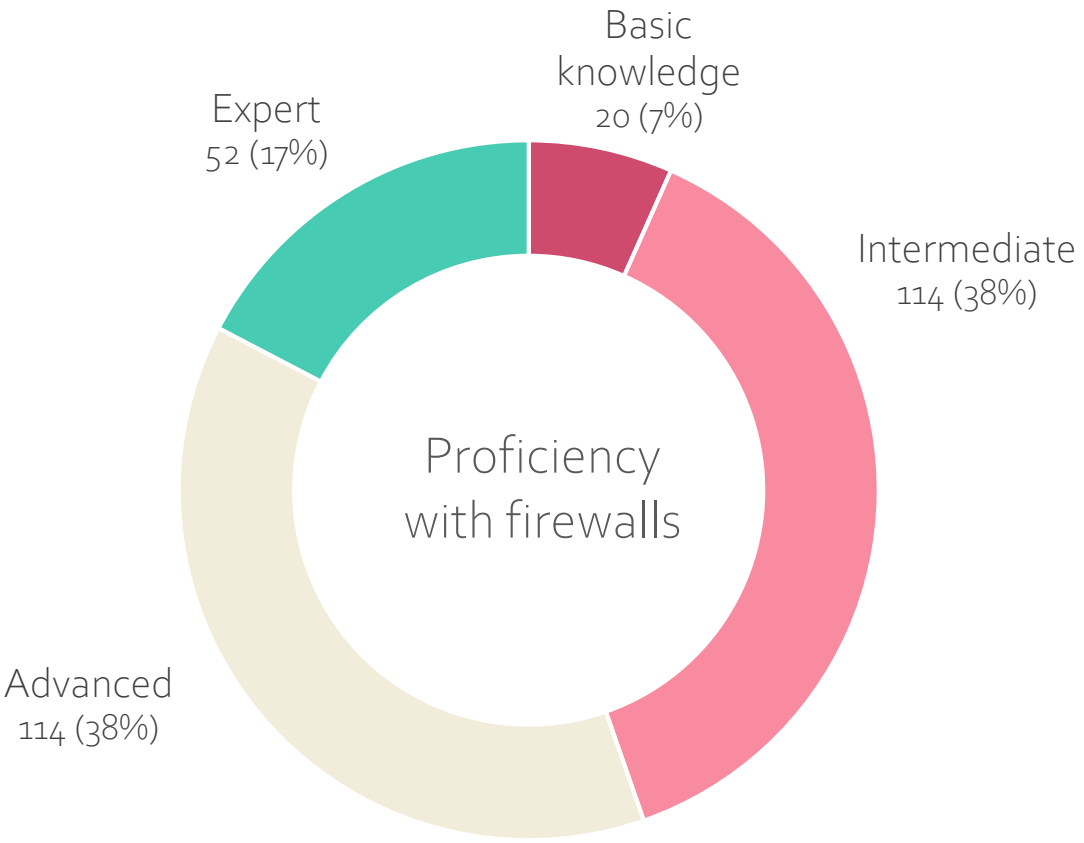


Demographics II





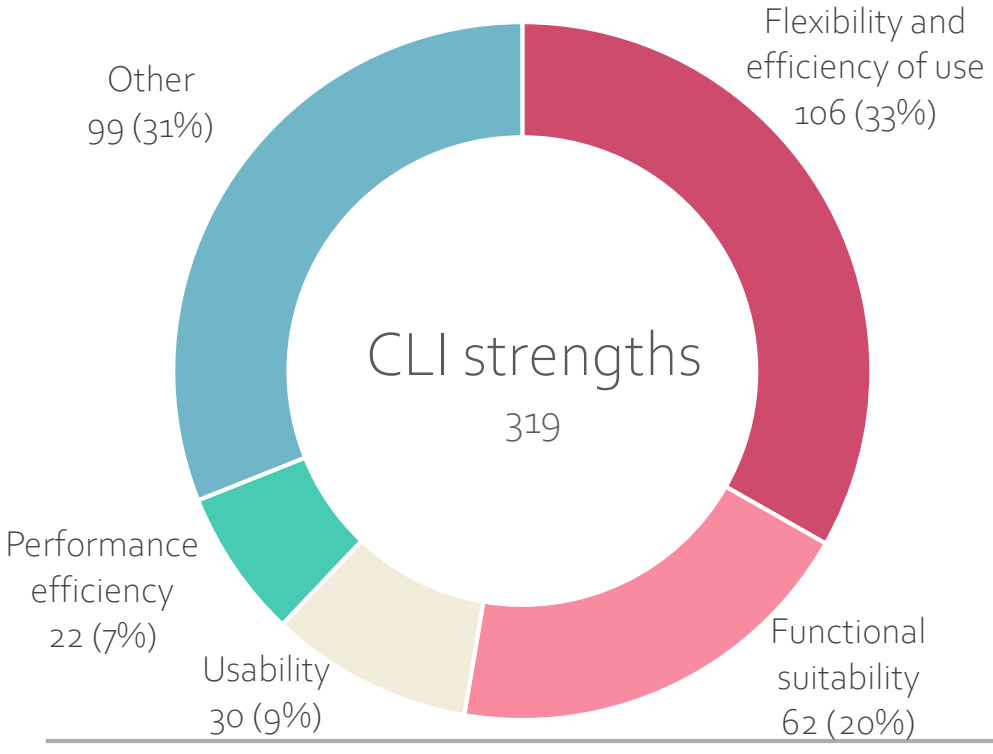
Demographics III



Preferred and Primarily Used Interfaces

		Preferred interface			Total
		CLI	GUI	API + Other	
Primarily used	CLI	61	7	5	73 (24.3%)
	GUI	30	169	10	**209 (69.7%)**
	API + Other	4	3	11	18 (6.0%)
Total		95 (31.7%)	**179 (59.7%)**	26 (8.6%)	300 (100.0%)

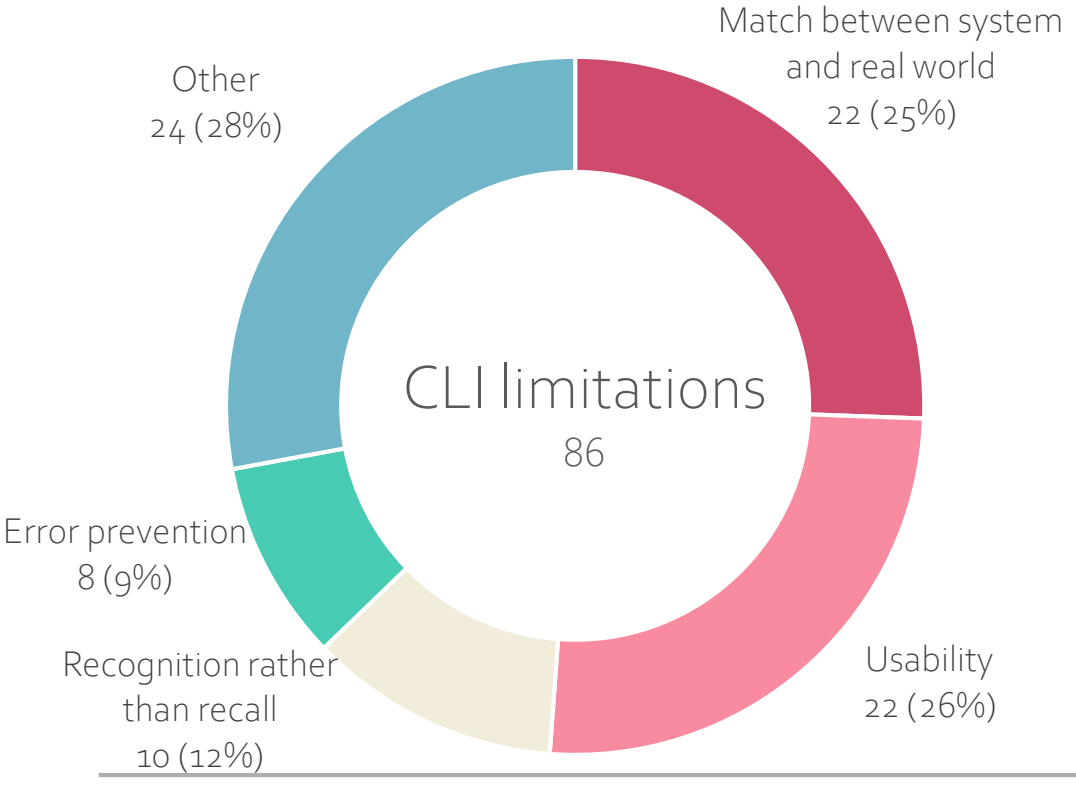
The Good of CLI



" CLIs have a high signal-to-noise ratio, and are therefore preferable to everything else "

" 100% coverage of all firewall functionality supported by the OS kernel, unlike GUIs… "

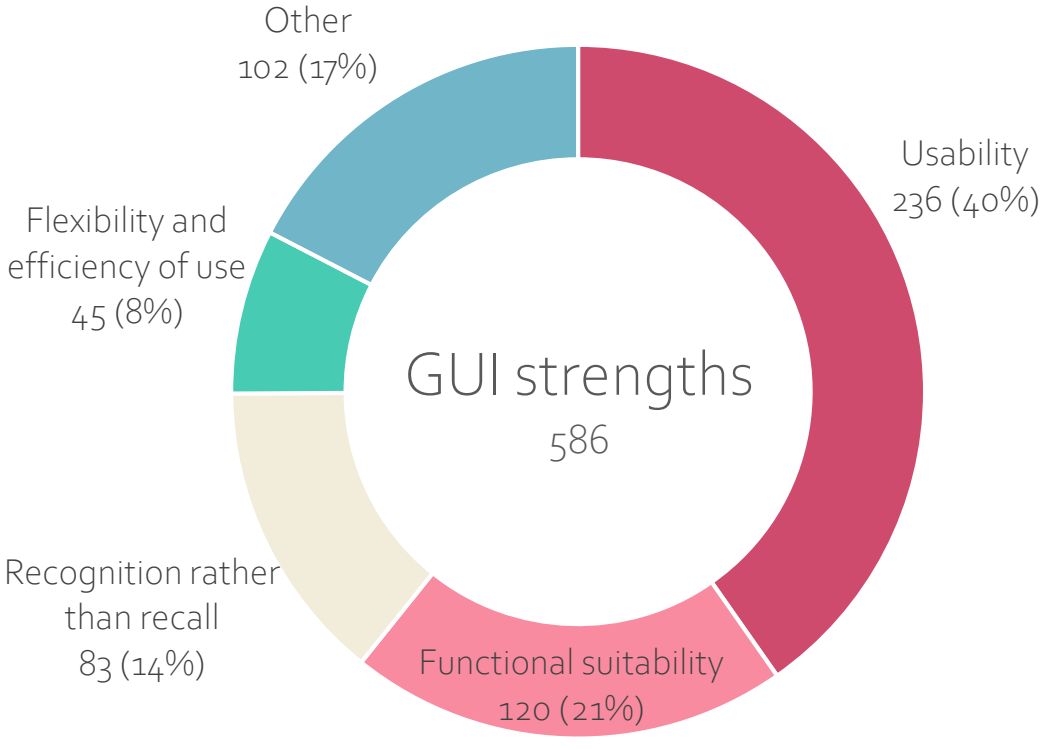
The Bad of CLI



" CLI may be scary / overwhelming for a beginner / untrained user "

" CLIs are terrible at generating visual inform. that is comprehensible by non-experts… "

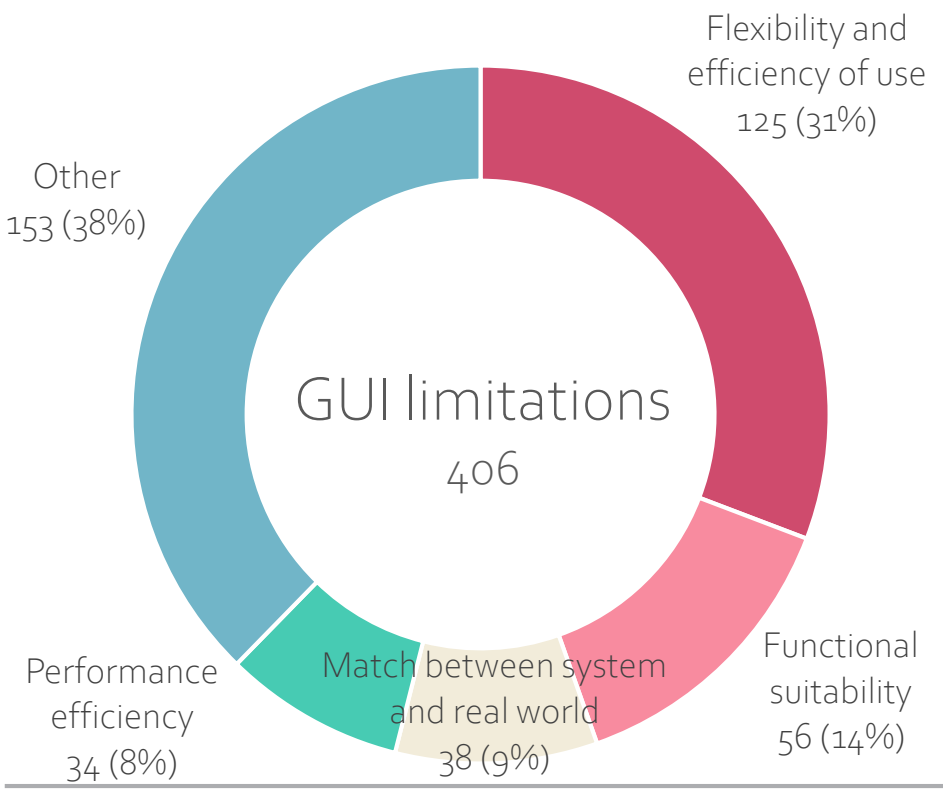
The Good of GUI



" it allows me to have a better understanding of a firewall's configuration while having that **information displayed in a more organized manner** when compared to a CLI. "

" because of my responsibilities as a general sysadmin, management of the firewall takes up only a **small part of my time**, and having using the GUI for management means that **I do not have to remember CLI commands**. "

The Bad of GUI



" missing a lot of features/settings, so that you have to use CLI to make changes "

" documenting a GUI is mostly useless and defeats most of the purpose of a GUI "

Discussion

a shift towards GUI

▪ Interfaces getting better?	(supported by our data)
▪ More sys admins with limited expertise?	(inconclusive)
▪ Sys admins are doing much more than they used to do?	(supported by our data)

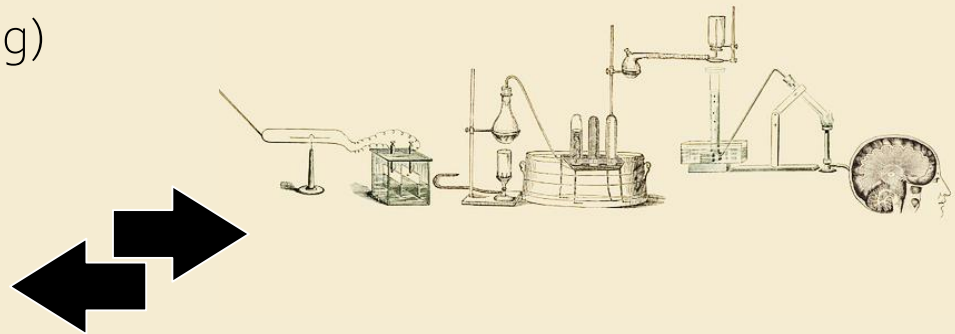
Design Recommendations

Better GUIs

- Lighter to run, not bloated
- Simplify setup and installation
- Customization of shortcuts (scripting)

Better CLIs

- Syntatical verification of commands
- Integrated knowledge base of examples



Thank You!

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Preferred and Proficiency

		Preferred interface			Total
		CLI	GUI	API + Other	
Proficiency	Basic	5	14	1	20 (6.7%)
	Intermed.	30	72	12	114 (38%)
	Advanced	43	65	6	114 (38%)
	Expert	17	28	7	52 (17.3%)
Total		95 (31.7%)	179 (59.7%)	26 (8.6%)	300 (100.0%)