State of the Workflow 2022 – USERS AND DEMOGRAPHICS

nextflow nf-core

WHO IS USING NEXTFLOW?

Bioinformaticians	70.6%
Principal Investigators	7.3%
Software Engineers	6.5%
Data Scientists	6.3%
Others	9.3%

Most Nextflow users are **Bioinformaticians**

NEXTFLOW USERS ARE GLOBAL

🇺🇸	26.0%	🇪🇸	4.4%	🇳🇱	2.1%	🇨🇦	1.0%
🇬🇧	19.3%		4.2%	🇨🇭	1.8%		1.0%
🇩🇪	13.8%		3.4%	🇩🇰	1.6%		0.8%
🇸🇪	8.1%	🇯🇵	2.1%	🇦🇺	1.3%	🇧🇷	0.8%

USERS BY INDUSTRY

ACADEMIA	RESEARCH	BIOTECH STARTUP
38.5%	24.5%	14.6%

HEALTH/CLINICAL	GOVERNMENT	PHARMA
7.6%	6.0%	5.2%

RAPID ADOPTION

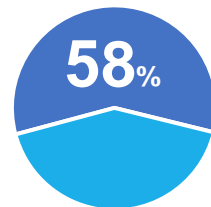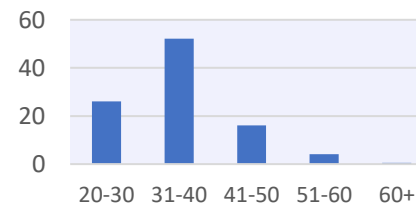|	
< 1 year	44.5%
1-3 years	35.7%
4-6 years	18.0%
>6 years	1.8%
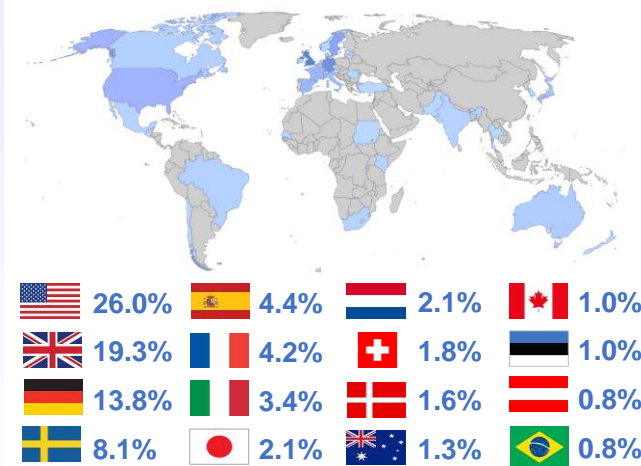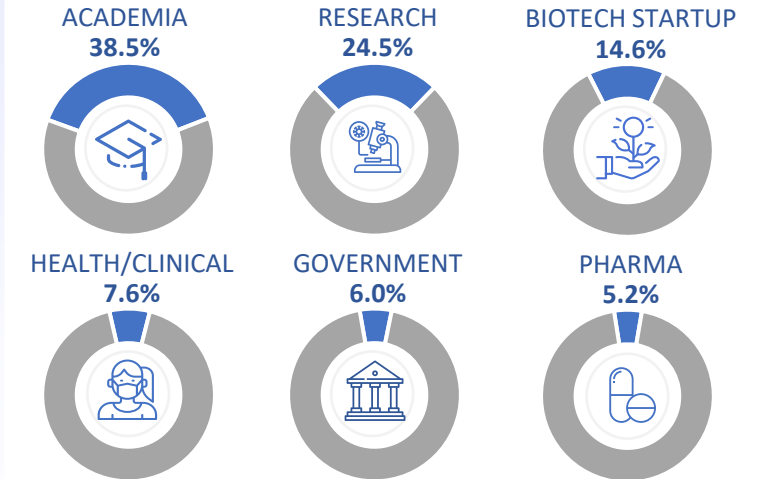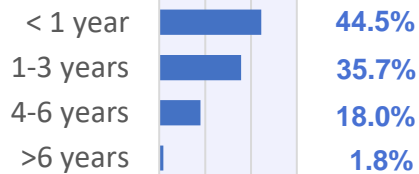
Almost half of Nextflow users are new in the last year

LANGUAGE

58%

Most speak **English** as their first language

AGE OF NEXTFLOW USERS

20-30 31-40 41-50 51-60 60+

~50% of users are between 31 and 40 years old

GENDER BREAKDOWN

77%
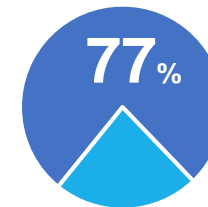
Most Nextflow users are male

HAPPY USERS

98% user satisfaction rate

- Delighted
- Very Satisfied
- Satisfied

96% would recommend Nextflow to a colleague

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WHERE DO YOU RUN NEXTFLOW?

On-Premises Cluster	**69.0%**
Single Computer	**47.9%**
Public Cloud	**35.7%**
Private Cloud	**10.7%**
Other	**3.1%**
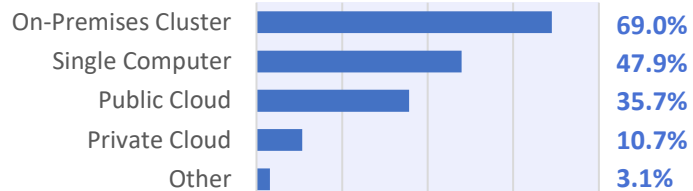
On-premises HPC clusters remain the dominant runtime platform for Nextflow

SLURM RULES THE *HPC ROOST*

83% Use an HPC workload manager

■ Slurm ■ Grid Engine ■ IBM Spectrum LSF ■ Others

Slurm is used to manage **53%** of all Nextflow Clusters
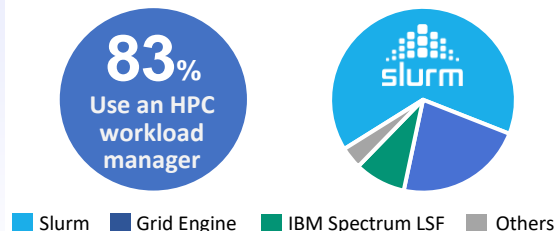
WORKLOADS SHIFT TO THE CLOUD

35.7% Use public cloud today

68.2% Plan to migrate to the cloud
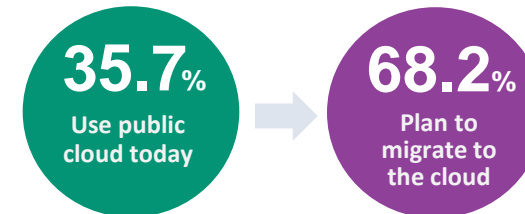
13.4% of Nextflow users use more than one public cloud [1]

NEXTFLOW USERS ALSO RUN:

Snakemake **33.7%**

Galaxy Project **14.7%**

CWL **8.8%**
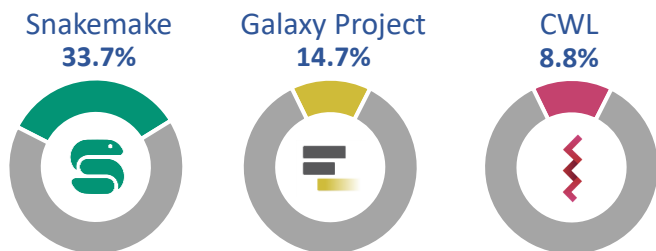
Half of users use more than one tool. Others include Cromwell, Spark, and Airflow

LIMITED KUBERNETES ADOPTION

Kubernetes **7.2%**

Kubernetes adoption was unchanged from 2021
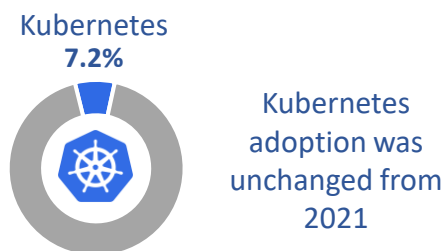
Amazon EKS, Google GKE, Azure AKS, OpenShift, and Rancher

PREFERRED CLOUDS

Among users planning a move to the cloud within 2 years, most plan to use AWS

■ Amazon (45.8%)
■ Google Cloud (12.5%)
■ Microsoft Azure (5.2%)
■ Oracle Cloud (0.8%)
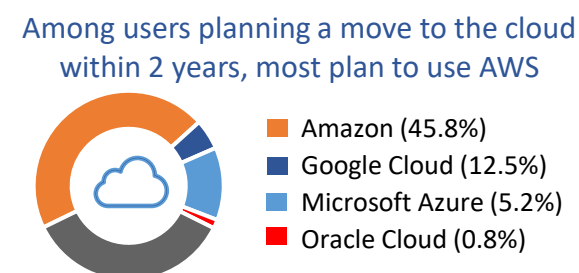
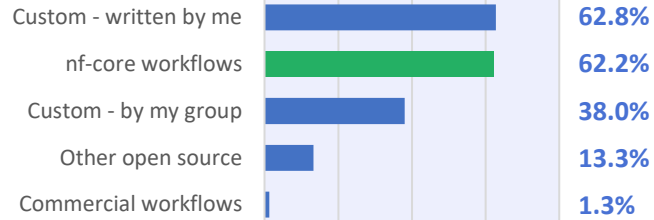Public cloud adoption is higher among private sector users – **77% use public cloud** [2]

[1] Out of 142 respondents who identified as public cloud users om Q14, 19 used two or more clouds
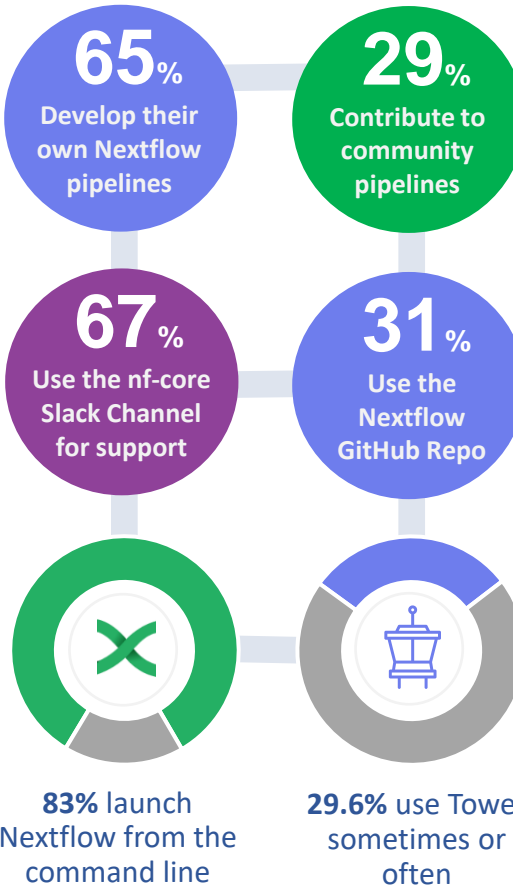*[2] Includes respondents who self-identified as being in Biotech startups, Pharmaceutical companies, or healthcare/diagnostics/clinical care*
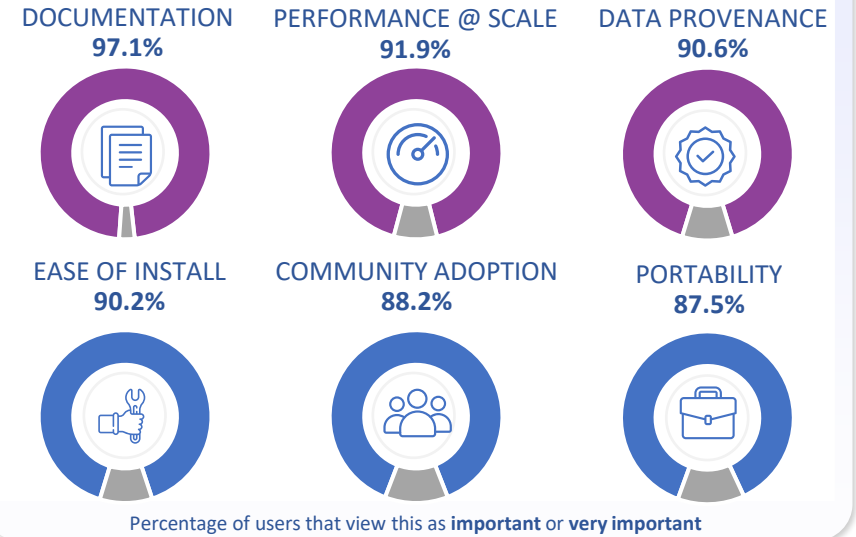
Bioinformatics community survey – March 2022 - sample size n=384

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State of the Workflow 2022 – COMMUNITY & NF-CORE

WHAT TYPES OF WORKFLOWS DO YOU USE?

Custom - written by me	62.8%
nf-core workflows	62.2%
Custom - by my group	38.0%
Other open source	13.3%
Commercial workflows	1.3%

nf-core pipelines are used by **62.2%** of respondents

WHAT MATERIALS ARE MOST USEFUL?

Nextflow reference doc.	87.2%
nf-core website	73.4%
Implementation patterns	62.3%
Seqera nf tutorials	44.2%
Seqera & Nextflow blogs	41.3%
nf-core #bytesize	40.3%
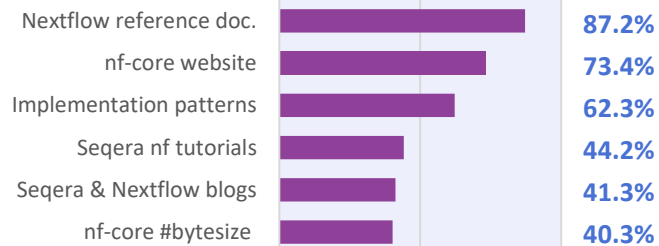
Percentage of respondents viewing materials as *important* or *very important*

HANDS-ON, COMMUNITY-MINDED

65% Develop their own Nextflow pipelines

29% Contribute to community pipelines

67% Use the nf-core Slack Channel for support

31% Use the Nextflow GitHub Repo

83% launch Nextflow from the command line

29.6% use Tower sometimes or often

WHAT IS IMPORTANT IN A WORKFLOW MGR?

DOCUMENTATION
97.1%

PERFORMANCE @ SCALE
91.9%

DATA PROVENANCE
90.6%

EASE OF INSTALL
90.2%

COMMUNITY ADOPTION
88.2%

PORTABILITY
87.5%

Percentage of users that view this as **important** or **very important**

MOST VALUED NEXTFLOW TOWER FEATURES

RECOMMENDATIONS TO REDUCE COST
37.7%

CONTROL VIA CLI OR API
33.6%

WEB UI TO MONITOR FLOWS
32.4%

Percentage of users that view this as **very important**

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