ASF

ANNUAL REPORT

2022

Contents

We exist to provide software for the public good.

ASF software is integral to nearly every end-user computing device, from laptops to tablets to mobile devices across enterprises and mission-critical applications. ASF projects power most of the Internet, manage exabytes of data, execute teraflops of operations, and store billions of objects in virtually every industry.

Community over code is the ASF Way.

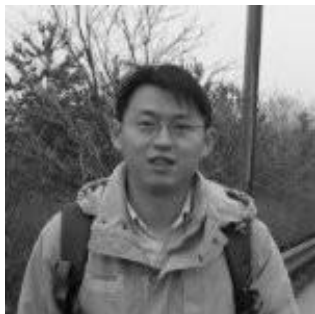# Board Members & Officers

Rich Bowen

Bertrand Delacretaz

Christopher Dutz

Roy T. Fielding

Sharan Foga

Willem Ning Jiang

Sam Ruby

Roman Shaposhnik

Sander Striker

Officers

Board Chair	Sander Striker
Vice Chair	Shane Curcuru
President	David Nalley
Exec. V.P.	Ruth Suehle
Treasurer	Craig McClanahan
Assistant Treasurer	Myrle Krantz
Secretary	Matt Sicker
Assistant Secretary	Craig L Russell
V.P., Legal Affairs	Roman Shaposhnik
Assistant V.P., Legal Affairs	Justin Mclean
V.P., Security	Mark J. Cox
V.P., Data Privacy	Christian Grobmeier
V.P., W3C Relations	Andy Seaborne

The President has appointed the following corporate officers of the ASF:

Office	Individual
V.P., Brand Management	Mark Thomas
V.P., Conferences	Rich Bowen
V.P., Diversity and Inclusion	Katia Rojas
V.P., Fundraising	Bob Paulin
V.P., Infrastructure	David Nalley
V.P., Marketing and Publicity	Joe Brockmeier
V.P., Travel Assistance	Gavin McDonald
Infrastructure Administrator	Greg Stein

VP, Fundraising has appointed the following corporate officers of the ASF:

Office	Individual
V.P., Sponsor Relations	Sally Khudairi

ASF Sponsors

Platinum

Gold

Silver

Targeted Sponsors

Platinum

Gold

Silver

Treasurer's Report

by Craig McClanahan

The Treasurer, Craig McClanahan, and the Assistant Treasurer, Myrle Krantz, with the help of our accounting firm IgniteSpot, continued to provide The Foundation with:

- Accounting services;
- Financial tooling;
- Budgeting and policy advice; and
- Financial reports.

We maintained and tracked the financial means that enable ASF communities to provide software for the public good.

In addition, we provided sponsorship "soft collections" for the Foundation, which consisted of invoicing sponsors, interfacing with sponsor PO systems, late payment follow-up, and providing regular officer reports.

We continued to work closely with the President, Infrastructure Administrator, and Fundraising Officers to improve the use of available tools, particularly in the following areas:

- Accounting software, which includes both financial reports and invoicing sponsors (QuickBooks Online);
- Automated bill payment software, for both recurring and one time expenses paid by the Foundation (Bill.com);
- Virtual and physical credit cards for employees or volunteers that are authorized to purchase goods and services authorized by the Foundation, without having to file expense reports (Ramp.com); and
- Payroll services (ADP TotalSource).

Completing Tax and Audit

WernerCPA, with support from IgniteSpot, created The Foundation's latest public filings for the fiscal year ending on April 30, 2022.

Accounting Practices

We have completed our conversion to accrual basis accounting rather than cash basis. This is reflected in last year's and this year's reports below. Nearly all of our primary banking activities are now at TD Bank, with some leftover cleanup at Citizens Bank still to be completed.

The CDARS program, previously offered by Boston Private, is no longer available. As a result, the Board approved an Investment Policy Statement in December 2021, which directs the Treasurer to utilize a financial advisor and invest funds not currently needed for operations so that they may earn interest and/or dividends. The ASF has a TD Private Client Wealth account for this purpose, recording these investments as the Operating Reserve. These funds are currently invested in various high-quality bonds.

FY2022 Financial Statement
by Craig McClanahan

Profit and Loss

Revenue	2020/2021	2021/2022
ACA Event Sponsorship	$21,993	$17,440
Event Revenue	$57,595	$53,540
Programs	$11,000	$11,200
Public Donations	$994,975	$122,213
Sponsorship Program	$1,949,992	$967,105
Interest Income	$12,308	$57
Total Revenue	**$3,047,862**	**$1,171,555**

Expenses	2020/2021	2021/2022
Unapplied Cash Bill Payments	$9,091	$0
General & Admin	$30,737	$62,814
Taxes (Business)	$20	$0
Brand Management	$93,564	$53,752
Conferences	$39,348	$35,131
Fundraising	$192,239	$108,296
Infrastructure	$908,504	$1,236,817
Publicity	$240,362	$243,369
Programs Expense	$90	$0
Treasury Services	$52,953	$22,931
Travel Assistance Committee	$17,412	$0
Diversity and Inclusion	$15,000	$0
Uncategorized Expense	$0	$6,000
Total Expenses	**$1,599,320**	**$1,544,252.70**
Net Operating Profit	**$1,448,543**	**$1,648,319.72**

Other Revenue	2020/2021	2021/2022
Interest Income/Foreign Exchange	$(39)	$(129)
Operating Reserve Interest and Dividends	$0	$7,046.07
Total Other Revenue	**$(39)**	**$6,917**

Other Expenditures	2020/2021	2021/2022
Operating Reserve Fees	$0	$3,533
Operating Reserve Unrealized Loss	$0	$58,746
Total Other Expenditures	**$0**	**$62,280**
Net Other Revenue and Expenditures	**$(39)**	**$(55,363)**
Net Income	**$1,448,504**	**$(652,917)**

Balance Sheet

Assets	2020/2021	2021/2022
Cash and Equivalents	$4,095,397	$2,334,305
Other Current Assets	$95,224	$74,416
Total Current Assets	**$4,190,621**	**$2,334,305**
Total Accounts Receivable	**$237,810**	**$218,000**
Operating Reserve Basis	$0	$2,000,100
Unrealized Gains/Losses	$0	$(55,334)
Total Operating Reserve	**$0**	**$1,944,766**
Total Other Assets	**$24,900**	**$0**
Total Assets	**$4,453,331**	**$4,571,484**

THE APACHE
SOFTWARE FOUNDATION

Liabilities	2020/2021	2021/2022
Accounts Payable	$53,001	$48,181
Short Term Debt	$2,064	$3,310
Deferred Revenue	$0	$801,242
Conditional Gift	$500,000	$500,000
Restricted Donations	$32,979	$78,048
Total Liabilities	**$659,710**	**$1,430,780**
Equity	2020/2021	2021/2022
Opening Balance Equity	$1,570,838	$1,570,838
Retained Earnings	$574,502	$2,222,783
Net Revenue	$1,648,281	$(652,917)
Total Equity	**$3,793,621**	**$3,140,704**
Total Liabilities & Equity	**$4,453,331**	**$4,571,484**

Fundraising

by Robert Paulin

Change is the word that comes to mind upon reflection of The Foundation's 2022 fundraising efforts. Daniel Ruggeri asked me to take the fundraising reins as VP of Fundraising in October. Daniel's fundraising leadership helped The Foundation navigate several challenges, including the COVID-19 pandemic and the refinement of our Targeted Sponsorship program. I'd like to thank Daniel for his contributions to the fundraising team, and I look forward to continuing the smooth operation of the department.

The ASF also moved to accrual accounting. It's essential to keep this in mind when comparing our fundraising draws from the prior year. We now recognize sponsor contributions over the life of the sponsorship rather than all at once. Therefore, there is a noticeable drop in ASF fundraising totals. I expect this will balance out after another year of accounting on an accrual basis.

Last, security incidents like Apache Log4j CVE required the ASF to make staffing and process changes. As the Logging PMC stepped up to address code issues, our sponsors also stepped up to offer financial support. Due to our generous sponsors, the ASF could better respond and take steps to prepare for future security events. One of those critical steps included hiring a full-time resource to assist with security notifications throughout all ASF projects.

Change – commits, releases, processes, or people – is constant in healthy software projects. But one thing that does *not* change is The Foundation's gratitude for our sponsors. Sponsors help The ASF realize its vision and mission year after year. We appreciate all of the sponsors that have stuck by us as well as those who have recently joined us. We look forward to another dynamic year at The ASF!

Legal Affairs

by Roman Shaposhnik

The Apache Software Foundation (ASF) Legal Affairs committee is chartered directly by the Apache Board of Directors. We work with pro-bono legal counsel to answer legal questions and address policy issues regarding license compatibility and intellectual property concerns within the Apache Software Foundation communities.

Another part of our mission is to help guide the Foundation through an evolving legal landscape and be the first point of contact for any third-party individuals or organizations seeking to engage with us in a more formalized legal manner.

Over the past year, the team worked through several issues and took the following actions:

- Updated release and distribution policies by clarifying the use of Category B licensed items and jars containing compiled code in source releases;
- Reviewed and simplified The Foundation's approach to ECCN filings;

- Expanded the pool of pro-bono legal options available to The Foundation to include Matau Legal Group;
- Collaborated with members of the ASF Security team to address inquiries and prepare for meetings with The White House and other government agencies in the wake of the Log4j security vulnerability; and
- Reviewed and began updating outdated by-laws.

The Legal Affairs committee makes policy decisions based on the advice of legal counsel and the interests of the Foundation. To provide legal support to Apache projects, we must consider the inclusion of a product's dependencies on other software and understand how those dependencies are or are not compatible with the Apache License.

Over the years, we've maintained a record of our policy decisions at apache.org/legal/resolved.html. These decisions are listed as "resolved" licensing questions and serve as our Frequently Asked Questions (FAQs)

resource. We frequently cite and inform others of this page, and infrequently, we update our policy based on the needs of our projects.

Additionally, the Legal Affairs Committee encourages customers to use our JIRA instance at http://issues.apache.org/jira/browse/LEGAL for discussions that may lead to a policy decision. This work is even more critical as vendors experiment with COSS Commercial Open Source Software (COSS) licenses derived from the Apache License v2.

The Legal Affairs committee would like to thank the DLA Piper team and Matau Legal Group for their counsel and willingness to work with us.

Security

by Mark Cox

FY2022 was a busy year for the security team. Log4J vulnerabilities required significant attention, including The Foundation's collaboration with various government bodies and other organizations.

In total, we received 566 vulnerability reports across all projects, leading to the publishing of 191 CVE.

The Security committee of The Apache Software Foundation (ASF) performed the following functions:

- Identified and triaged incoming security reports across ASF projects;

- Coordinated closely with ASF project teams and communities to ensure issues were handled quickly and correctly;

- Maintained a consistent process for ASF projects to follow when addressing vulnerabilities;

- Provided advice and support to ASF projects for complex or critical issues; and

- Served as CVE Project Candidate Naming Authority, allocating CVE names.

Volume

Over the course of the fiscal year, ASF security received over 20,000 emails. After spam filtering and thread grouping, this became 1,422 non-spam threads, representing a 43% increase since the FY2021 report.

The breakdown of the 1,422 incoming security email threads is as follows:

- **Support Questions:** 386 (27%) were support-type questions or inquires about the way in which old, public vulnerabilities were handled. This number increased from last year, primarily due to the number of requests about the published Log4j vulnerabilities.

- **Apache License Confusion:** 355 (25%) were from people confused by seeing the Apache License

on their devices. We continue to get many of these reports, mostly due to software released under the Apache License but not created by the ASF (like the majority of the Android OS).

- **Websites:** 155 (8%) covered issues affecting our infrastructure, such as websites. Nearly all of these were rejected as they were invalid reports of us having open directory listings, public source code, SPF email issues, and so on.

- **Vulnerability reports**: 566 reported possible vulnerabilities spanning 107 top-level ASF projects. The Security committee oversaw the lifecycle of these reports. triaging and investigating them with each project's security team or PMC. When we confirmed the issues were valid, we addressed them with updates. This process led to 191 CVE names being issued in FY22 (up 23% from FY21).

Noteworthy Events

We consider an event noteworthy if it is severe and high risk; has readily available exploits; spans multiple projects; or surfaces due to media attention.

Noteworthy events in FY22 include:

- June 2021: The Airflow PMC published a blog post about how they handle security issues and how users are sometimes slow to deploy updates (CVE-2020-17526).

- July 2021: A third-party blog post explained how threat actors exploit misconfigured Apache Hadoop YARN services.

- August 2021: A researcher discovered a number of issues in HTTP/2 implementations. The Apache HTTP Server was affected by a moderate issue (CVE-2021-33193).

- September 2021: A keynote presentation at ApacheCon 2021 discussed the security committee, a US Executive Order, and OpenSSF.

- September 2021: A flaw in Apache OpenOffice could allow a malicious document to run arbitrary code if opened (CVE-2021-33035).

- October 2021: A critical issue was found in the Apache HTTP Server. Custom (non-default) configurations could lead to remote code execution (CVE-2021-41773, CVE-2021-42013).

- October 2021: The Internet Bug Bounty from HackerOne extended their program to include Apache Airflow, the Apache HTTP Server, and Apache Commons.

- December 2021: A vulnerability in Log4J 2 (CVE-2021-44228, "Log4Shell"), a popular and common Java logging library, allowed remote code execution in a default and likely installation. The issue was widely exploited, starting the day before a release with a fix was published. A few subsequent Log4J vulnerabilities were also fixed, but none had the same impact or default conditions.

- January 2022: The ASF was invited to a forum: White House Extends Invitation to Improve Open-Source Security. We produced a position paper. We also spoke about Log4J at a Senate hearing, a CERT/CC vendor meeting, and in several meetings with the newly-formed Cyber Safety Review Board (CSRB).

- January 2022: A flaw in Apache ShenYu could allow access without authentication (CVE-2022-23944).

- April 2022: The Cybersecurity and Infrastructure Security Agency (CISA) included Log4Shell on their list of Top 15 Routinely Exploited Vulnerabilities.

- April 2022: A flaw in Apache APISIX can allow an attacker to access via a leaked secret (CVE-2022-29266).

- Other RCE exploits were also released in for FY21 vulnerabilities fixed in Apache OFBiz (CVE-2020-9496, CVE-2021-26295), Apache Airflow (CVE-2020-11978), Apache Tapestry (CVE-2021-27850), Apache Storm (CVE-2021-38294), and Apache APISIX (CVE-2022-24112).

We welcome reports from anyone finding Apache project security issues to the private list security@apache.org. You can also send comments on this report to the public list security-discuss@community.apache.org.

Read more about our security process at https://apache.org/security/.

Data Privacy

by Christian Grobmeier

This was a year of progress and research for the ASF Data Privacy office. We have just proposed a new privacy policy for our websites, which protects the rights of our users and aligns with the new laws and regulations including GDPR and California privacy law. Much research has been done to understand our systems and their impact on our visitors. ASF vendors are now required to sign DPAs to ensure they comply with the latest laws.

The new privacy resolution was also influenced by "Schrems II," which made using Google Analytics very difficult, if not impossible for The ASF. We disabled Google Analytics and implemented Matomo Analytics in its place. Given the success of that service, the Infra team decided to support us and took over the ongoing maintenance of Matomo Analytics for ASF sites.

As of this writing, 32 ASF projects are using Matomo with ~300,000 total page views per month.

With the help of the ASF Secretary, we worked on a privacy policy for our contributors as well. We expect to complete this policy in 1H23.

In general, we look back at 2022 as a successful year, with many tasks completed thanks to a substantial volunteer effort.

Conferences

by Rich Bowen

During FY2022, we ran two major events and began planning for the CY2022 event schedule.

ApacheCon@Home was held online, September 21-24, 2021. We had 3,552 registrations, with 61% turnout on the days of the event. We ran approximately 250 sessions across 20 different tracks, including Search, Big Data, Tomcat, Incubator, Community, and many other topics. Attendance was primarily from North America and Europe.

ApacheCon Asia was also held online on August 6-9, 2021. Attendance details are unclear due to the event being split across several online platforms, one of which was free, anonymous, and unmetered, but we estimate approximately 10,000 attendees, primarily from China.

For CY2022, ApacheCon Asia was held online July 29-31, 2022. This conference had 192 sessions with 256 speakers, 18 keynotes, and 17 tracks. We had 2,566 registrations, but over 91,000 people watched the event across all its broadcast channels. ApacheCon Asia 2022 included three new tracks, "Culture," "RPC," and "AI," which helped attract more developers to the event.

In-person events returned in 2022 with ApacheCon North America 2022, held in New Orleans on October 3-6, 2022. The event's call for papers (CFP) yielded three times the submissions that the schedule could accommodate, and nearly all were high-quality submissions. This underscores the excitement and relevance of ApacheCon events. We had 450 registrations, of which 345 actually checked in on site. While there were visa issues for some speakers and attendees, overall, the event was well attended and positively received.

Community Development

by Swapnil M Mane

The main focus of Q1 FY2022 was to help promote and support ApacheCon Asia 2021. The Apache Local Community (ALC) Beijing team played a vital role in the execution of ApacheCon Asia 2021. We had 14 community tracks in ApacheCon Asia—seven in English and seven in Mandarin. Sharan Foga from ComDev PMC also delivered the keynote on "Welcoming Diversity."

We spent August and September preparing for and participating in ApacheCon@Home 2021. Our Community track at ApacheCon@Home included 15 sessions over three days. Many sessions were well attended, with plenty of positive interaction and participation.

The ASF was once again chosen as a Google Summer of Code (GSoC) mentor organization. GSoC is a mentorship program focused on welcoming new contributors into the community and helping them learn best practices with the hope that they will become long-term OSS contributors. A key factor is having plenty of mentors excited about teaching

newcomers about open source. A key responsibility for the Community Development team is to help oversee the involvement of any participating Apache projects.

Our Apache Local Community (ALC) initiative is happy to report that we have established two new ALC chapters in Lagos, Nigeria, and Shenzhen, China.

Diversity & Inclusion

by Katia Rojas

The D&I committee was established in 2019 to build equity in our ASF communities by developing tools and frameworks to foster inclusion and increase diversity in all phases of Apache projects. The committee selected the following values as the foundation of their work: respect, empathy, openness, patience, candor, and dependability.

FY2022 Goals

- Improve current work structure to ensure continuity of the Outreachy program. Boost the entry point for underrepresented groups in our community;

- Set a two-year cycle process for the survey to keep track of the influential factors on the contributor experience;

- Act on the findings and recommendations from the research done in FY2021. Deal with some of the most common barriers to contribution previously identified from underrepresented groups; and

- Centralize D&I efforts in Confluence to maximize community outputs.

Noteworthy Achievements

- Enhanced our position as an Outreachy community

  - Participated in 3 Outreachy rounds.

  - Hosted eight new Outreachy interns in eight projects.

- Research on the current status of Diversity and Inclusion at the ASF

  - We partnered with Bitergia to execute a second iteration of the project "Community Survey and User Experience Research."

  - The second iteration of the ASF Community Survey was launched in August 2022 and closed in September 2022 with 697 responses.

- We are scientifically analyzing the new data from the last survey and will compare it to the 2020 survey data. Our goal is to produce a report with D&I trends and updated recommendations. We plan to share our first draft in 1Q 2023.

- As a follow-up to the project's first iteration, "Community Survey and User Experience Research," we have worked on an improvement initiative. We plan to create a dashboard that can be used by any PCM in the community to create awareness of D&I. We are currently working on the design with the proactive and valuable support and feedback of the Apache Beam PMC.

Future Goals

- Ensure the continuity of our participation in the Outreachy program and overcome the current financial situation affecting the tech industry.

- Finalize the second round of the "Community Survey and User Experience Research" project with the following outcomes:

- Better understand the influential factors of the contributor experience and identify D&I barriers.

- Create awareness for our PMCs by giving them a dashboard tool to analyze influential factors on the contribution experience.

- A report with comparative data from both program iterations, 2020 and 2022.
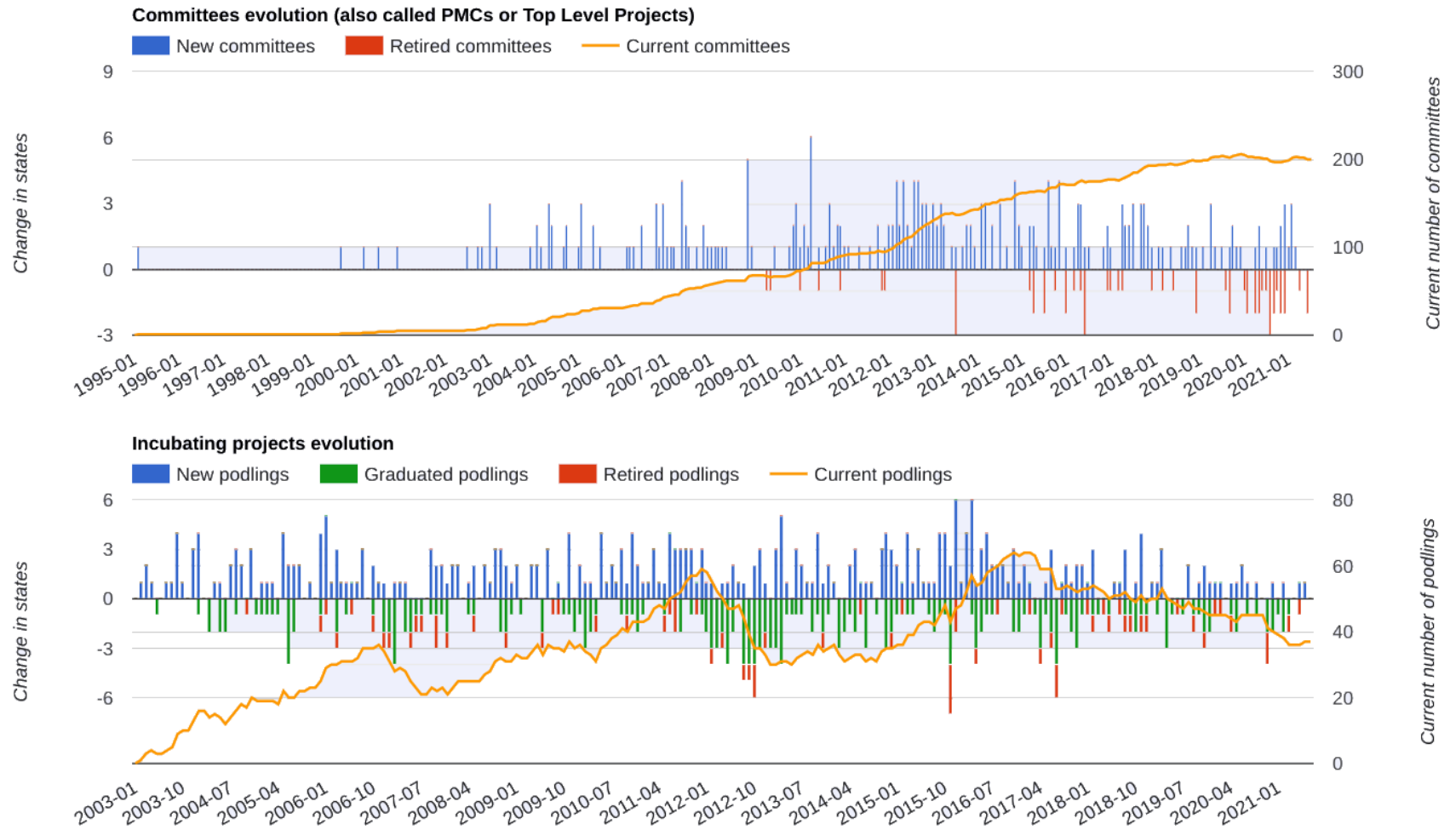
Statistics

Projects and Code

The ASF stewards 227M+ lines of code in 2,254 Apache repositories across 350+ projects. The ASF served ~2 Petabytes in source code downloads over the past year from Apache mirrors (excludes convenience binaries), 35M+ apache.org page views weekly, and Web requests from every Internet-connected country in the world.

Each Apache Project is overseen by a Project Management Committee (PMC) that guides its day-to-day operations, including community development and product releases.
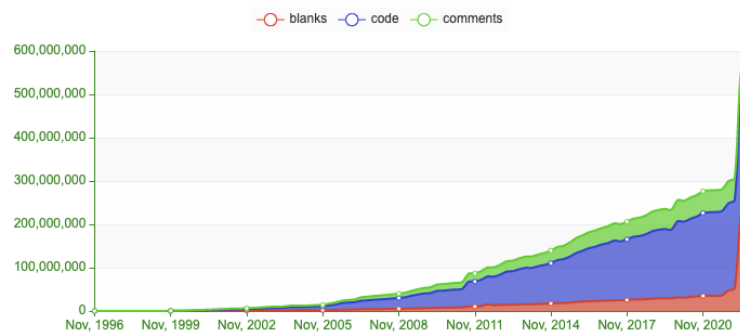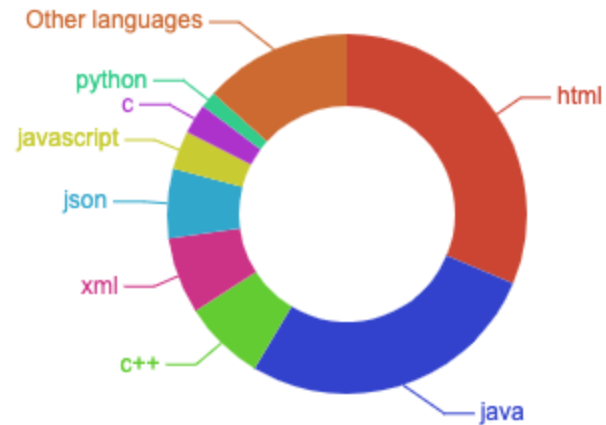
- **Apache Top-Level Projects:** 200 PMCs manage 351 projects and sub-projects, 14 of which are newly-graduated Top-Level Projects. 13 projects retired to the Apache Attic.

- **Incubating podlings:** 35 projects are currently developing in the Apache Incubator; 8 projects were new entrants, and 2 were retired.

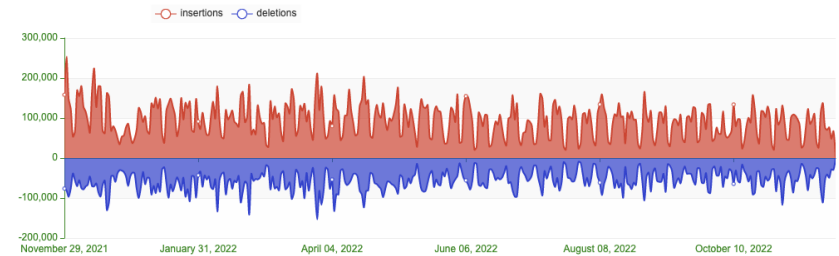**There are currently 350+ open source initiatives at the ASF:**

- **204 committees managing 360 projects**
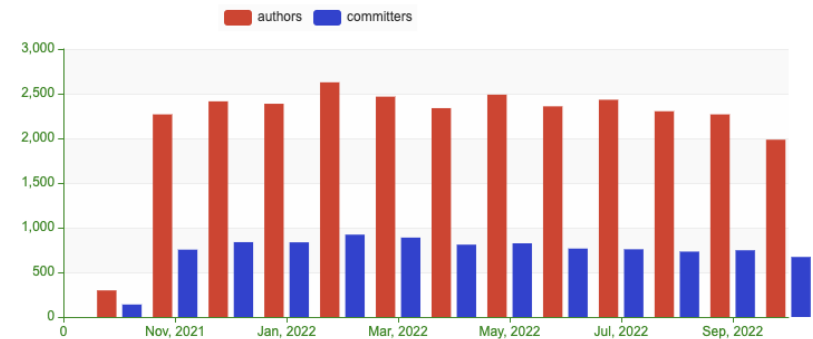- **5 special committees***
- **35 incubating podlings**

Committees evolution (also called PMCs or Top Level Projects)

Legend: New committees, Retired committees, Current committees

Incubating projects evolution

Legend: New podlings, Graduated podlings, Retired podlings, Current podlings

Codebase Statistics

Commits and Changes

Committers and Authors

Most Prolific Committers

Issues and Emails

Most prolific committers:

GitHub
83,965 commits during this period.
118,666,259 lines changed (81,753,008 insertions, 36,913,251 deletions).

jenkins
4,366 commits during this period.
508,816,533 lines changed (452,594,483 insertions, 56,222,050 deletions).

Andrea Cosentino
4,278 commits during this period.
582,654 lines changed (346,760 insertions, 235,894 deletions).

Gary Gregory
3,522 commits during this period.
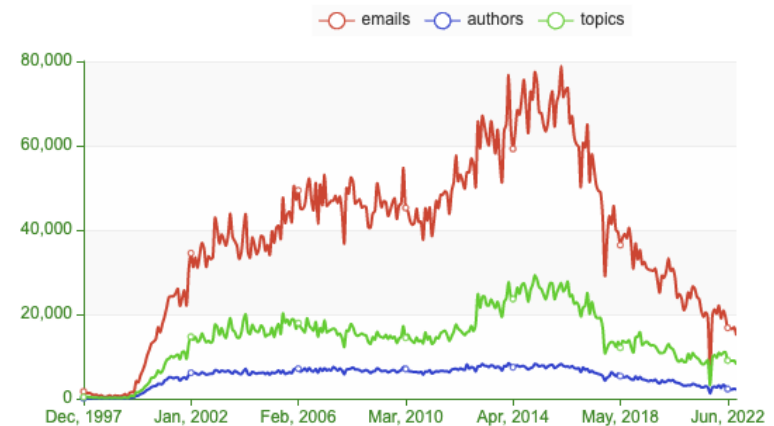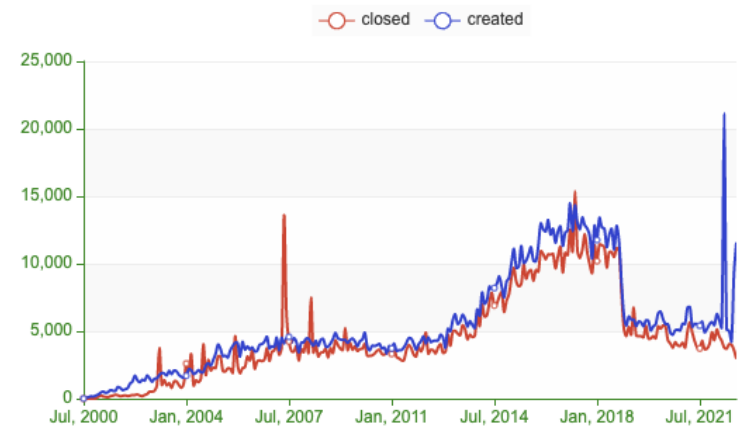2,946,354 lines changed (2,775,197 insertions, 171,157 deletions).
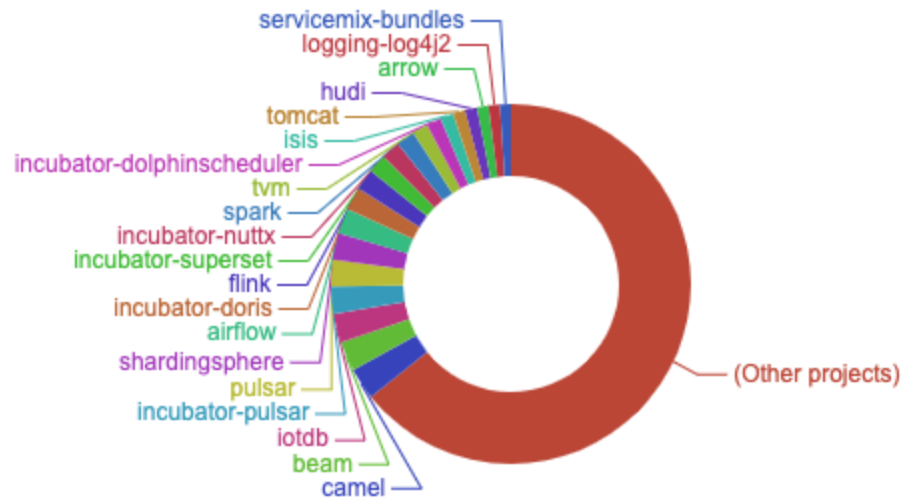
Claus Ibsen
3,174 commits during this period.
600,147 lines changed (365,728 insertions, 234,419 deletions).
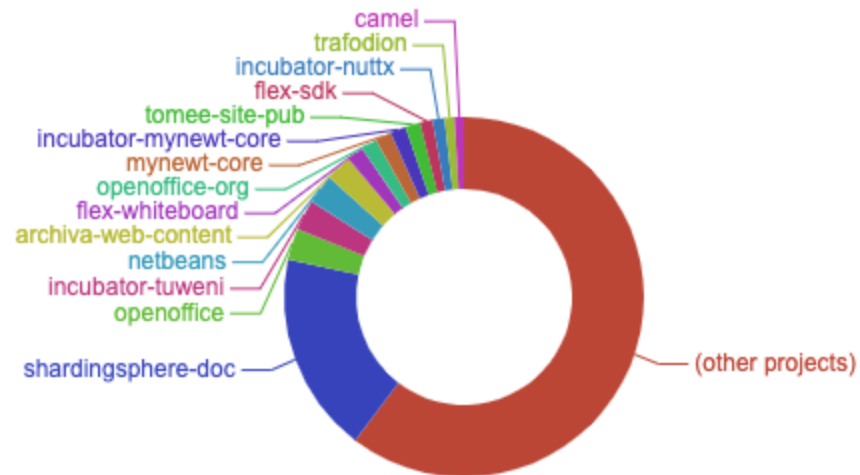
Data courtesy of Snoot.io

Repositories by Number of Commits

servicemix-bundles
logging-log4j2
arrow
hudi
tomcat
isis
incubator-dolphinscheduler
tvm
spark
incubator-nuttx
incubator-superset
flink
incubator-doris
airflow
shardingsphere
pulsar
incubator-pulsar
iotdb
beam
camel
(Other projects)

Repositories by Lines of Code

camel
trafodion
incubator-nuttx
flex-sdk
tomee-site-pub
incubator-mynewt-core
mynewt-core
openoffice-org
flex-whiteboard
archiva-web-content
netbeans
incubator-tuweni
openoffice
shardingsphere-doc
(other projects)

Apache Top-Level Projects

.NET Ant Library
Accumolo
ActiveMQ
AGE
Airvata
Airflow
Allura
Anakia
Ant
AntUnit
Any23
APISIX
Archiva
Aries
Arrow
AsterixDB
Atlas
Avro
Axiom
Axis2
Bahir
Batik
Beam
Bigtop
Bloodhound
BookKeeper
Brpc
Brooklyn
Buildr
BVal
Calcite
Camel
CarbonData
Cassandra
Cayenne
Celix
Chainsaw
Clerezza

CloudStack
Cocoon
COMMONS
Community Development
Cordova
CouchDB
cTAKES
Curator
CXF
Daffodil
DataSketches
DeltaSpike
Derby
Directory
Directory Server
Directory Studio
DolphinScheduler
Drill
Druid
Dubbo
ECharts
Empire-db
Felix
Finteract
Flex
Flink
Flume
Fluo
Fluo Recipes
Fluo YARN
FOP
Fortress
FtpServer
Geode
Geronimo
Giraph
Gobblin
Gora
Griffin
Groovy
Guacamole
Gump
Hadoop

HAWQ
HBase
Helix
Hive
Hop
HTTP Server
HttpComponents Client
HttpComponents Core
Hudi
Iceberg
Ignite
Impala
IoTDB
Isis
Ivy
IvyDE
Jackrabbit
JAMES
jclouds
Jena
JMeter
Johnzon
JSPWiki
Juneau
Kafka
Karaf
Kerby
Kibble
Knox
Kudu
Kylin
Kyuubi
Libcloud
Linkis
log4cxx
Log4j 2
log4php
Lucene Core
Lucene.Net
MADlib
Mahout
ManifoldCF

Maven
Maven Doxie
Mesos
MINA
Mnemonic
mod_ftp
MyFaces
Mynewt
NetBeans
NiFi
Nutch
NuttX
OFBiz
Olingo
OODT
Oozie
OpenJPA
OpenMeetings
OpenNLP
OpenOffice
OpenWebBeans
OpenWhisk
ORC
Ozone
Parquet
PDFBox
Petri
Phoenix
Pig
Pinot
Pivot
PLC4X
POI
Portable Runtime
Portals
Props Ant Library
Pulsar
PyLucene
Qpid
Ranger

Rat
Ratis
REEF
rivet
RocketMQ
Roller
Royale
Rya
Samza
Sandesha2
Santuario
Scout
Sedona
Serf
ServiceComb
ServiceMix
ShardingSphere
Shiro
SINGA
SkyWalking
Sling
Solr
Solr Operator
SpamAssassin
Spark
Spatial Information System
SSHD
Steve
Storm
Streams
Struts
Submarine
Subversion
Superset
Synapse
Syncope
SystemDS
Tapestry
Tentacles
Texen

Tez
Thrift
Tika
TinkerPop
Tobago
Tomcat
TomEE
Torque
Traffic Control
Traffic Server
Turbine
TVM
UIMA
Unomi
VCL
Velocity
Velocity DVSL
Velocity Tools
VSS Ant Library
Vysper
Websh
Whimsy
Whisker
Wicket
Woden
Xalan for C++ XSLT Processor
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Xerces for C++ XML Parser
Xerces for Java XML Parser
Xerces for Perl XML Parser
XML Commons External
XML Commons Resolver
XML Graphics Commons
XMLBeans
Yetus
YuniKorn
Zeppelin
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DataLab
DevLake
Doris
EventMesh
Flagon
FreeMarker

Heron
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HugeGraph
InLong
Kvrocks
Liminal
Livy
Marvin-AI
Milagro
MXNet
Nemo
NLPCraft
PageSpeed
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