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Nephio Project Induction

Sept. 13, 2023

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LF NETWORKING

Nephio is seeking induction at the “Graduated” level

- We believe in good faith there is adequate justification for the request based upon
  - The lifecycle criteria for Sandbox and Incubation levels already being fully met
  - Most Graduated criteria already fully met and work in progress for the few exceptions

- Factors we ask you to consider during this review
  - Project TSC operational for > a year
  - Over 1,400 commits post seed-code drop
  - Processes mature and stable
  - Large & Diverse ecosystem of participation
  - 3 in-person events (2X summits + 1 meet-up) have drawn significant attendees
  - 1st major release recently delivered

The framework used for our submission

- LFN has never had an incoming Project request a “skip-tier” induction
- Without prior examples to look at, a framework was necessary
- Partnered with LFN Staff on the creation of a wiki page which describes our thought process
- The framework we used is here: https://wiki.lfnetworking.org/x/yoAKBg

Nephio's Mission

The mission of the Project is to deliver carrier-grade, simple, open, Kubernetes-based cloud-native intent automation, and common automation templates that materially simplify the deployment and management of multi-vendor cloud infrastructure and network functions across large scale edge deployments. The project seeks to enable faster onboarding of network functions to production including provisioning of underlying cloud infrastructure with a true cloud-native approach, and reduces costs of adoption of cloud and network infrastructure.

Nephio's Vitals

- **Project Creation Date:** April 12, 2022
- **TSC Established:** May 2022 *(top-level technical decision-making body)*
- **Technical Charter Adopted:** June 22, 2022
- **Project License:** Apache 2.0
- **Community size:** 500 Members (*based on "Main" mailing list*)
- **Contributors:** ~90 past 12 months

Nephio Timeline

70+
organizations

14K
social media reach

500
event attendees

2
major in-person events

2022
April — Nephio **moves to the Linux Foundation**
May — **Technical Steering Committee** Established
June — **Developer Summit I** Sunnyvale, CA
August — **Special Interest Groups** Established
November — **Developer Summit II** Seattle, WA
December — **Nephio Meetup** India
2023
Feb — **Nephio LFN D&TF Sessions**
June — **Nephio LFN D&TF Sessions**
Aug — **Nephio R1 release**

NEPHIO

Project Overview

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Lack of right technology: Challenges

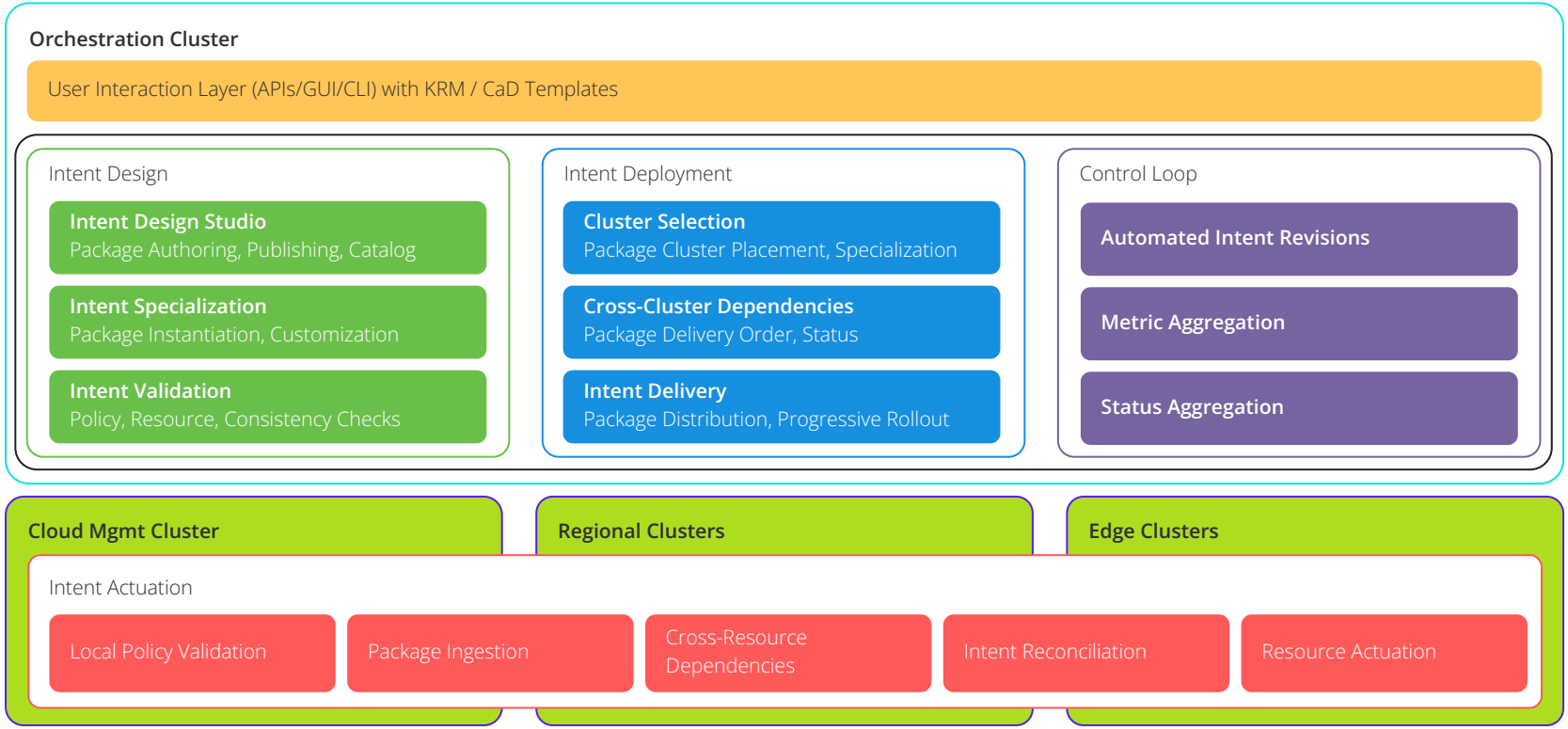
Kubernetes is not enhanced enough to support Network Function automation:

- **Kubernetes only manages basic compute/network/storage whereas NFs have demands beyond standard Kubernetes** such as existing Pod extensions: Multus, SR-IOV support, DPDK, etc.
- In addition NFs and cloud-infra have more complex lifecycle management requirements.
- **Enterprises rely on Kubernetes based automation for workload but Telcos rely on traditional management functions** (e.g NFVO) outside of Kubernetes to manage workloads, which is not optimal for workload reconciliation.

Infrastructure-as-Code falls short at many ends:

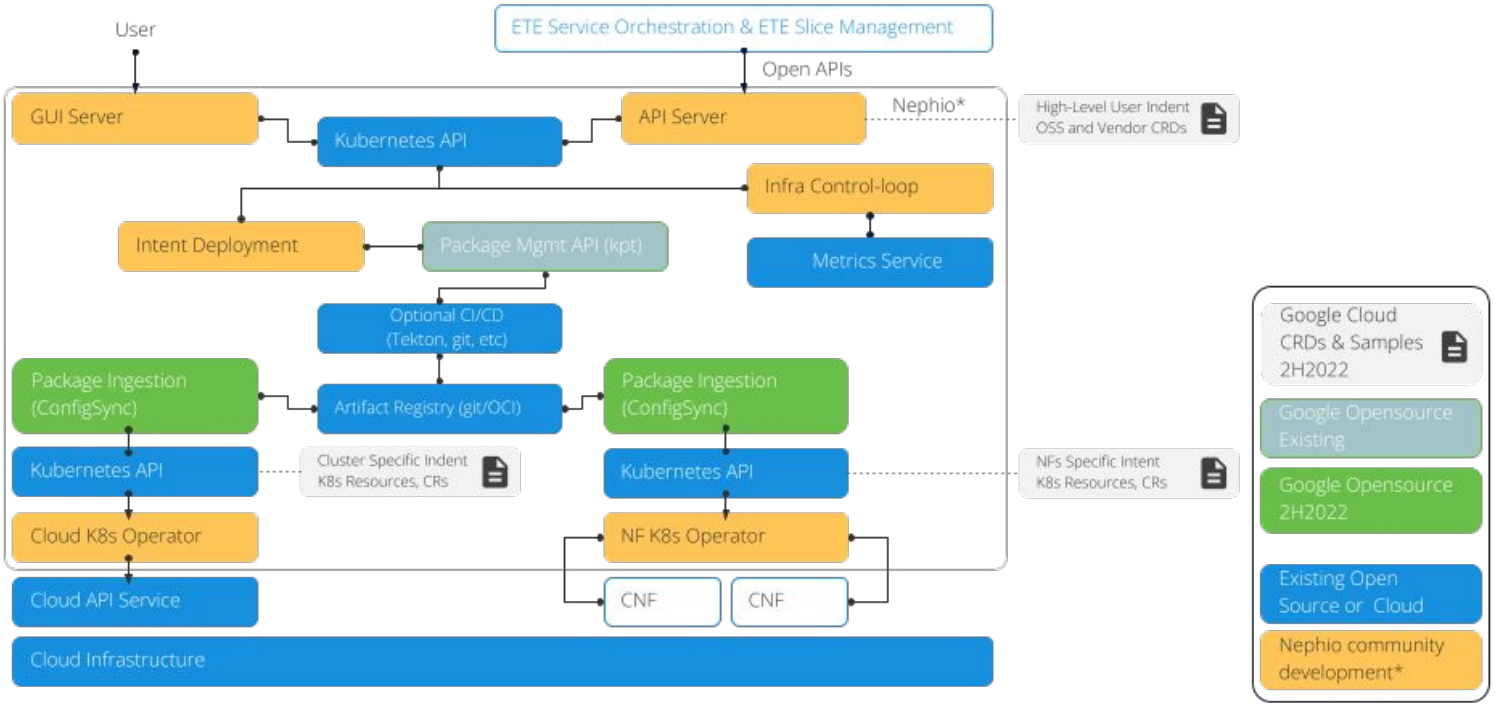
- The existing automation to deploy network functions on top of K8s mostly uses **Infrastructure-as-Code (e.g Helm), which has many limitations**, e.g.
  - Complex templates
  - Difficult to read and test
  - Limited re-use, end up with huge lists of values that need setting
  - Not composeable - cannot handle complex sets of applications built from reusable components
  - **Non-declarative and lacking vendor neutral templates**

Nephio Functional Building blocks



KRM - Kubernetes Resource model
CaD - Configuration as Data

Nephio Architecture



*Reference architecture to evolve in the community

Project Governance (1 of 2)

- **Nephio currently operates under its original "Start-Up Period" governance as defined in the Charter**
  - The TSC has the ability to evolve the Project's governance model at this time
  - The community's primary focus thus far has been the delivery of the 1st release
  - 3 additional companies have been inducted into the TSC post release - contribution based
  - Securing LFN membership is the TSC's active priority
  - Establishing the TSC's "Steady-State" composition will be next

- **Project Roles**
  - TSC members, SIG members, Committers & Contributors

- **How Project Roles are filled**
  - Defined in the Charter, and CONTRIBUTORS.md file on GitHub
  - SIG Chair/V-Chair selection and Contributor -> Committer promotion are handled via meritocratic votes

Project Governance (2 of 2)

- **How people are removed from Project Roles**
  - Under the Start-Up Period the TSC Chair and Vice Chair serve until their resignation or replacement by the TSC
  - Establishing the lifecycle(s) of other Project Roles is provided for in the Charter, but none are currently defined
- **Who currently fills all project roles**
  - CONTRIBUTORS.md
- **How disputes are definitively resolved**
  - Nephio's Charter contains the LF's standard language in Section 3: *Consensus -> TSC Vote -> Series Manager*
- **Community Meetings**
  - **TSC** https://wiki.nephio.org/x/wONKAQ
  - **SIGs** https://wiki.nephio.org/display/HOME/calendars

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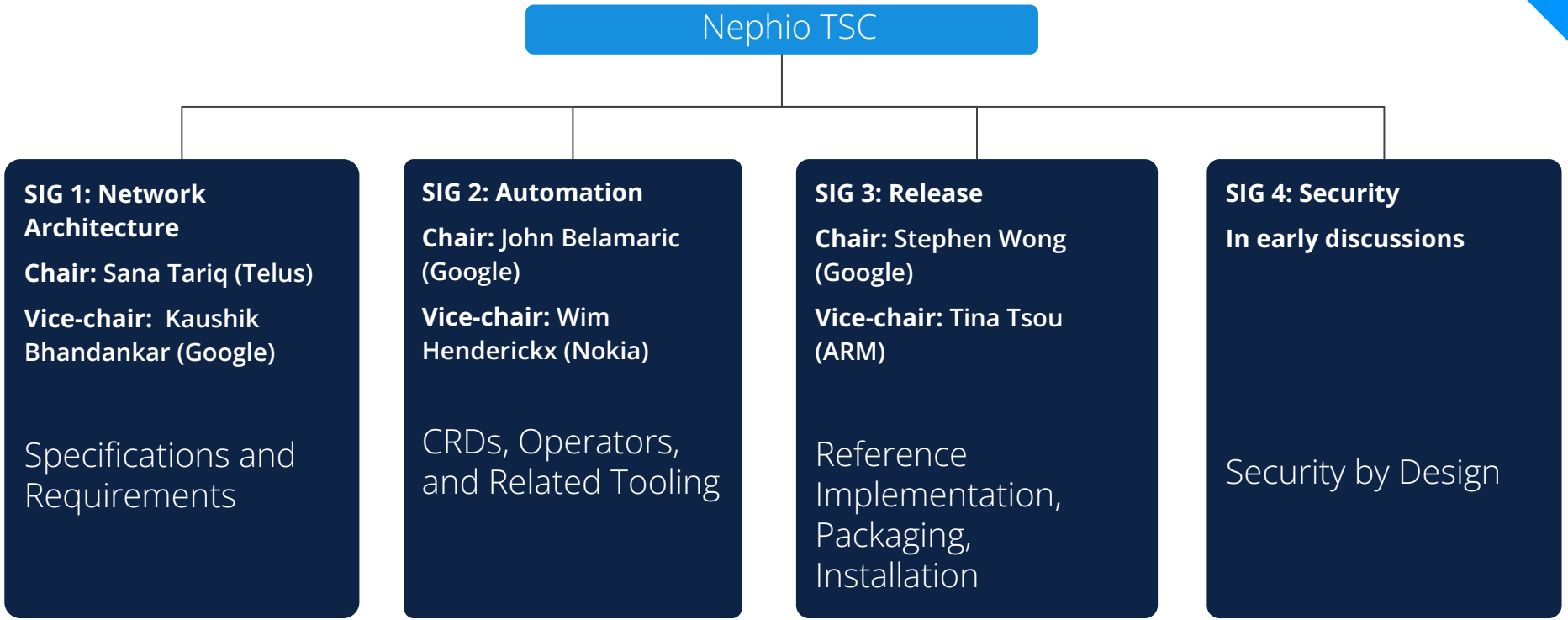
TSC MEMBERS

Sandeep Sharma	Bernard Tsai	Sebastian Scheele	Sana Tariq
Raj Panchapakesan	Oleg Berzin	Jane Shen	Fabrizio Moggio
Erhan Lokman	Ciaran Johnston	Timo Perala	Gene Bagwell
Daniel Bernier	Sanju Abraham	Eric Debeau	Hunor Demeter
Sandip Sarkar	Kandan Kathirvel	Balaji Varadaraju	Iain Wilkinson
Eric Gaudet	Sundar Nadathur	Victor Morales	Seshu Kumar

Nephio Special Interest Groups



Nephio Infrastructure Tooling

Functional Area	Link
Website	https://nephio.org/
Wiki	wiki.nephio.org
Code Repos	https://github.com/nephio-project
Bug Tracking	https://github.com/nephio-project/nephio/issues
Code Review	
Documentation	https://github.com/nephio-project/docs
CI/CD	https://github.com/nephio-project/nephio/actions
Mailing Lists	https://lists.nephio.org/g/main
Collaboration tool	nephio.slack.com

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Release Resources

- **Release Plan:**
  - Seed Code Availability <Release Date>
    - https://github.com/nephio-project
  - Release Schedule:
    - R1- June 29, 2023
    - R2 - TBD
- Release Overview
- Release Notes
- Source Code
- Docker hub artifacts
- User guide
- Install Guide
- Code scans
  - Gosec report
  - Scancode report for licenses
  - Fossology report

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Watch Nephio R1 demo:

Nephio Aspirational Roadmap

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Nephio: Looking beyond R1

User Stories

- Multi-cloud
- Multi-vendor NFs
- Multi-domain (RAN, Wireline, Transport)
- Day 0 focus
- Higher-level constructs (e.g. LCM for slices)
- Scalability (large scale deployments)

CRD/Operators

- Establish CRD schema
- Operators SDK
- Helm & YANG/TOSCA support
- Compliance and certification program

Control-Plane

- UI: GUI & APIs
- UI: Design Studio
- Integration APIs to MSO, Inventory systems, BSS

Nephio as a Graduated tier Project

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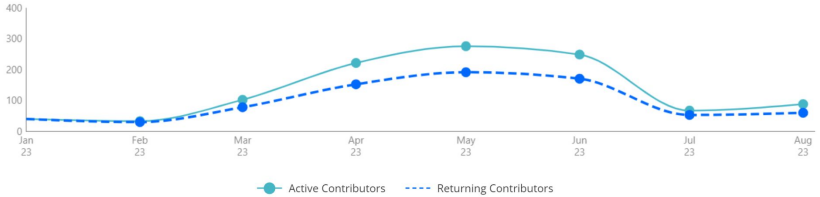
Our assessment

- Recapping: We believe in good faith there is adequate justification for the request based upon
  - The lifecycle criteria for Sandbox and Incubation levels already being fully met
  - Most of the Graduated criteria is also fully met with work in progress on the exceptions
- We benchmarked Nephio's current state against the lifecycle criteria, not against other Graduated tier Projects in LFN - but feel that we may be ahead in
- Framework used: https://wiki.lfnetworking.org/x/yoAKBg

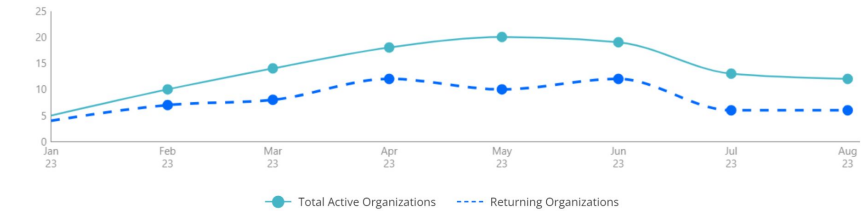
LFX Insights (V3) 2023 YTD - Code Contributions

MONTHLY **ACTIVE CONTRIBUTORS**

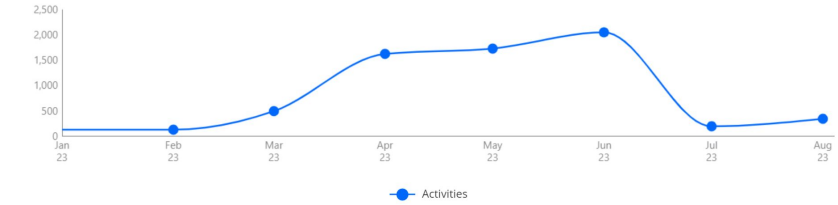


United States	3218 Activities - 57.51%
Belgium	1182 Activities - 21.12%
India	436 Activities - 7.79%
Hungary	265 Activities - 4.74%
Ireland	134 Activities - 2.39%
United Kingdom	133 Activities - 2.38%
Netherlands	92 Activities - 1.64%
France	57 Activities - 1.02%
Canada	55 Activities - 0.98%
Poland	17 Activities - 0.3%
Germany	3 Activities - 0.05%
Taiwan, Province Of China	2 Activities - 0.04%
Greece	1 Activities - 0.02%
Israel	1 Activities - 0.02%

MONTHLY **ACTIVE ORGANIZATIONS**



MONTHLY **ACTIVITIES**



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Framework used: https://wiki.lfnetworking.org/x/yoAKBg

Sandbox → Incubation → Graduated

	Sandbox	Incubation	**Graduated**	Notes
Code scanning	Intake	Ad-Hoc	**Regular**	
Coding standards	Loose	Moderate	**Strong**	
PTL lifecycle	None	Required	**Required**	
Sub Project Lifecycle	None	Partial	**Full**	Archiving model not yet set - low priority - will be a release 2 consideration
TSC Membership	Appointed	Mixed	**Meritocracy**	Intent is to move to a fully elected meritocracy by year's end
Tech-Doc	Build	+ Deploy	**+debug & upgrade**	1st release - therefore no upgrade docs needed until 2nd release
Contrib. onboarding Doc	None	Simple	**Detailed**	
Release Mgmt	None	Defined	**Followed**	
Ci/Cd automation	Manual	Some aspects	**Most aspects**	
Adoption	None	None	**1 or more implementations**	
Security	No focus	Vulnerability reporting	**80% to OpenSSF Passing**	PSIRT group in place, Security SIG under consideration. OpenSSF badge process is WIP. See no blockers to meeting the 80% threshold by EoY

In Summary:

- Significant interest expressed by LFN members in having Nephio as an LFN Project
  - 2/3 of the TSC seats represent current LFN members
  - 30% of theTSC seats represent LFN Platinum members
- Project has been operational for well over a year
- Still some organizational tuning to do, but most processes mature and stable
- Robust number of contributors
- Large & Diverse ecosystem
- 1st major release delivered
- Already pursuing security best practices

Thank You! - Q&A

Open & Follow-up Items

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