5G Super Blueprint Library

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Welcome to the 5G Super Blueprint Library! The 5G Super Blueprint Library is the central reference point for completed 5G Super Blueprint integration projects. Similar to a public or school library; content of the 5G Super Blueprint library vary in topic/technology, project scope, and, type and breathe of collateral. 5G Super Blueprint integration projects range from complete end-to-end solutions to technology building blocks that can be consumed, evolved, and expanded upon.

Use the Library Index below to browse completed projects. Each entry also contains contact information for a project lead. You may contact the project lead with any questions, or request additional information if available.

A short decription of how 5G Super Blueprint projects evolve from concept to completion- a 5G Super Blueprint project starts as a concept or idea from our partner ecosystem and begins its life as a 5G Super Blueprint use case submission using this link: 5G Super Blueprint Use Cases & Submission Template. The initial use case submission can be as little as a title and short description, or can include more detail depending on how far along in development the concept is. From there the project is discussed and developed within the 5G Super Blueprint community on 5G Super blueprint community meetings. The use case submission wiki page serves as the "work plan" for the project and evolves as the project evolves. It is the single point of reference for the project.

Some concepts gain traction within the community and grow, while others do not. A key ingredient for a project to gain traction and grow is to have a project champion who is dedicated to seeing the project through to completion.

As projects are completed they are added to the 5G Super Blueprint Library Index below for easy reference and consumption.

A complete list of 5G Super Blueprint projects that are in various stages of development can be found on the 5G Super Blueprint Use Cases & Submission Template wiki page.

For questions about the 5G Super Blueprint: superblueprint@linuxfoundation.org

Join a *5G Super blueprint community meeting* and come collaborate with us!

Library Index:

Index is in chronological order from newest to oldest project completion

Title & Link	Description	Additional Collateral (if available)	Technical or Project Lead and Contact Information
SEDIMENT for IoT Device Security and Authentication Using Remote Attestation	This Use Case demonstrates how SEDIMENT can be used to authenticate lightweight resource constrained IoT devices, in this case environmental sensors. SEDIMENT is used to control network access of lightweight resource constrained environmental sensors.	ONE Summit Video: SEDIMENT for IoT Device Security and Authentication Using Remote Attestation Presentation: SEDIMENT IoT Device Authenication Using RA.pdf GitHub repo: https://github.com/sediment-lfproject/remote-attestation	Zahir Patni: zahir.1.patni@peratonlabs.com
SEDIMENT +KubeArmor	What is SEDIMENT? SEDIMENT (SEcure DIstributed IoT ManagemENT) uses a combination of software root of trust, remote attestation, and resource-efficient cryptography, to build a system that scales across heterogeneous computing platforms. The aim is to provide secure remote attestation framework that can be leveraged for lightweight devices. What is KubeArmor? KubeArmor is a runtime security enforcement system that restricts the behavior (such as process execution, file access, and networking operations) of pods, containers, and nodes (VMs) at the system level. KubeArmor leverages Linux security modules (LSMs) such as AppArmor, SELinux, or BPF-LSM to enforce user-specified policies. KubeArmor generates rich alerts/telemetry events with container/pod /namespace identities by leveraging eBPF. This Proof-of-Concept demonstrates the 5G SBP Use Case - Remote Attestation Use Case 1- IoT Device Security and Authentication, where SEDIMENT RA Verifier and Relying Party are containerized and deployed with KubeArmor providing visibility and protection policies. Initially the result of attestation is used to control access to an example application. In the future, this may be replaced by a different application, or the attestation may be used to control network access through integration with the 5G ONAP AMF. The onboarding of the device to be attested is outside the purview of this use case, and a separate use case will address that concern.	https://github.com/5G-Super-Blue-Print/KubeArmor-SEDIMENT-Demo 5G SBP Use Case - Remote Attestation Use Case 1- IoT Device Security and Authentication	Zahir Patni: zahir.1.patni@peratonlabs.com Ankur Kothiwal: ankur.kothiwal@accuknox.com

Simplified End-to-End Network Slicing	Led by Aarna Networks, this project is demonstrates end-to-end network slicing of the core network and RAN using open source components. It realizes network deployment with cloud native network functions (CNFs) using EMCO, the End-to-End network slice creation wherein the Core Network (CN) is open source Free5GC (v3.2.1), and the RAN is open source UERANSIM (v3.2.6) as an integrated gNB.	YouTube: 5G SBP: Simplified E2E Network Slicing Repo: https://github.com/5G-Super-Blue-Print/SimplifiedNetworkSlicing	Yogendra Pal yogendra@aarnanetworks.com
5G End-to-End deployment of eBPF based UPF with free5gc Core, UE & Radio	Demonstrates an end-to-end deployment of an eBPF-based Free5GC Core, with a specific focus on eBPF in the UPF segment, fondly refer to as "eUPF." This PoC also uses OAI RAN with software-defined radio. This development represents a significant milestone in our journey toward enhancing User Plane Packet Processing in 5G Core.	YouTube: 5G End-to-End deployment of eBPF based UPF with free5gc Core, UE & Radio eUPF Repository: https://github.com/edgecomllc/eupf	Shankar Malik shankarmalik21062003@gmail.com
L3AF Integration with 5G-UPF (User Plane Function)	L3AF introduces a comprehensive UPF architecture with support for hooks through AF_XDP. This allows developers to integrate custom multiple eBPF programs to enhance packet processing capabilities, offering greater control and flexibility in handling network traffic. The L3AF approach brings several advantages; it enables developers to create multiple eBPF programs to enhance UPF functionality, resulting in efficient packet processing and improved network performance. Additionally, L3AF provides horizontal and vertical scaling options, allowing the deployment of multiple UPFs with multiple eBPF programs. This Proof of Concept, lead by NgKore, demonstrates the Integration of L3AF with 5G-UPF (User Plane Function)	YouTube: L3AF Deployment and Integration with UPF Technical Presentation: L3AF Integration with 5G UPF.pdf Blog: https://docs.ngkore.com/l3af/l3af.html#l3af-integration-with-5g-upf LFN Developer & Testing Forum Presentation: 2023-06-07 - L3AF Integration with 5G-UPF.mp4 LFN Developer & Testing Forum Reference Page: 2023-06 - L3AF: Integration with 5G-UPF(User Plane Function)	Shankar Malik shankarmalik21062003@gmail.com
Factory Floor Safety	This Proof of Concept (PoC) uses AI from IBM that detects if factory floor workers are wearing the correct hard hat. This PoC is a benchmark example of melding open source 5G networking with enterprise applications.	Supporting material: 5G Super Blueprint Reference Architecture Seattle 2022 Behind the Scenes Video: https://drive.google.com/file/d/1RRIa76f_67ZSEaRe9ZKAmWdZ3HqofudZ/view	Louis Illuzzi lilluzzi@linuxfouudation.org
ORAN SMO Package - Combining multiple open sources into an E2E package	The ORAN SC community has created an E2E package that spans across multiple community projects (ORAN, ONAP,...) in order to create a workable environment to deploy the ORAN SMO using ONAP components, and evolution as a 5G SuperBlue Print reference deployment	LFN Developer & Testing Forum Presentation: 5G SBP ORAN-SMO Package v5	Christophe Closset christophe.closset@intl.att.com Gervais-Martial Ngueko gervais-martial.ngueko@intl.att.com Sébastien Determe sebastien.determe@intl.att.com

5G Public Cloud Edge Interface	This blueprint, developed by Intel, Aarna Networks, Equinix, shows end-to-end Private 5G functionality by using Free5GC to showcase the flexibility of 5G Core deployment options. Highlights Include: • 5G Core and UPF deployment orchestration to PCEI using EMCO • G Network Slicing orchestration to PCEI using EMCO • Develop multi-domain architecture for Network Slicing • Demonstrates Network Slicing .	Equinix/EMCO case study: https://lfnetworking.org/wp-content/uploads/sites/7/2022/08/Equinix_EMCO_Case_Study_081122.pdf PCEI Akraino Blueprint blog page: https://wiki.akraino.org/display/AK/PCEI+Blog PCEI page on Akraino project site: https://www.lfedge.org/projects/akraino/release-4-2/public-cloud-edge-interface-pcei/ Hackathon win: https://www.lfedge.org/2022/11/11/congratulations-to-team-domino-winner-of-the-2022-etsi-lf-edge-hackathon/ PCEI in Akraion R5: https://www.lfedge.org/2021/12/14/where-the-edges-meet-apps-land-and-infra-forms-akraino-release-5-public-cloud-edge-interface/ PCEI in Arrkaino R4: https://www.lfedge.org/2021/06/17/where-the-edges-meet-and-apps-land-akraino-release-4-public-cloud-edge-interface/	Amar Kapadia akapadia@aarnanetworks.com Oleg Berzin oberzin@equinix.com Srinivasa Addepalli addepalli.srinivasa@gmail.com
5G Cloud Native Network	This Proof-of-Concept, first shown at ONE Summit 2021, demonstrates the value of network slicing by showing the impact using a video delivery use case, and tackles the challenge of provisioning a network slice from the back-office through the core to the edge and radio. The project further shows the interfaces necessary for orchestrating slicing, and sets the stage for full private mobile networking.		Louis Illuzzi lilluzzi@linuxfouudation.org