

NOI Response to DoD and NTIA 5G Challenge Date: February 10, 2021

February 10, 2021

Submitted via email to 5GChallengeNOI@ntia.gov

Rebecca Dorch
National Telecommunications and Information Administration
U.S. Department of Commerce
325 Broadway
Boulder, CO 80305

Re: Open RAN Policy Coalition Comments on 5G Challenge Notice of Inquiry, Docket No. 210105–0001, RIN 0660–XC04

Dear Ms. Dorch:

Fujitsu Network Communications, Inc. (Fujitsu) is pleased to respond to the Department of Defense (DoD) and Department of Commerce's National Telecommunications and Information Administration (NTIA) Notice of Inquiry (NOI) on the 5G Challenge. **Fujitsu has reviewed the 5G Challenge aims, and with this response, Fujitsu will present how it would implement technologies, capabilities and services that would accelerate a path to develop open 5G ecosystem based on its extensive experience in multivendor network rollouts.** Fujitsu has key attributes the DoD and NTIA should be looking for from vendors who are participating in the 5G Challenge, because these attributes will help ensure success. They should be viewed comprehensively. These attributes are:

- Strong **Trusted Vendors** headquartered in the US with strict Code of Business Conduct policies and Global Business Standards;
- Strong **Cybersecurity Risk Mitigation** encompassing technology, people, and processes;
- Strong **Open RAN Solution Portfolio** including open source and open standards based 5G Radios, virtualized RAN software (vDU/vCU), Network Automation Software, and Packet Transport portfolio for front-haul, mid-haul and backhaul;
- Strong **Service Portfolio** including Deployment, Network Operations and Monitoring, Support Services, Systems Integration, and Lab Testing and verification;
- Strong **Open RAN Experience** and participation in the Open RAN Policy Coalition (ORPC);
- Strong **Secure Supply Chain**.

Fujitsu is a proven strategic partner delivering large-scale technology solutions to multiple operators. Building upon its partnership success, Fujitsu's 5G solution greatly expands support and supply chain infrastructure, utilizes proven reliable 5G RAN, transport and software products. It also is fully integrated with best-in-class and disruptive technology. Further, Fujitsu's 5G solution is built on open-source and with open standards, as well as with a secure and clean product foundation. In this submission, Fujitsu will outline these attributes through brief overviews of its Core Capabilities. Additional details of Fujitsu's 5G open, integrated 5G solutions are accessible at <https://www.fujitsu.com/us/products/network/solutions/wireless.html>.

1.0 Trusted Vendor

Headquartered in Richardson, Texas, Fujitsu is an innovator and strategic partner with over 35 years of experience as a leading provider of wireline and wireless networking solution and services. Fujitsu is experienced in solving critical business issues and enabling new services. With the support of Fujitsu Limited, a global company with approximately 132,000 professionals in 100 countries, Fujitsu allows customers to build or seamlessly migrate to fully converged networks, improving network performance, reliability, and agility.

In 2020, Fujitsu successfully applied for and was accepted to the U.S. Department of State's 5G Clean Path approval. This initiative requires a clean path for all 5G network traffic coming into and out of U.S. diplomatic facilities at home and overseas to ensure data does not travel through untrustworthy vendors such as Huawei or ZTE. Fujitsu's equipment and practices meet all the requirements of the 5G Clean Path initiative by providing:

- An end-to-end communication path that does not use any 5G transmission, control, computing, or storage equipment from an untrusted vendor.
- Fujitsu practices and equipment embodies the highest standards of security against untrusted, high-risk vendors' ability to disrupt or deny services to private citizens, financial institutions, or critical infrastructure.

Fujitsu has a robust support infrastructure in the U.S. to support this network initiative. Fujitsu have a local Technical Assistance Center front-line staff in Richardson, TX and Open RAN lab. Fujitsu can also populate its spares depots with the right amount of equipment to ensure it meets service-level agreements.

1.1 Business Practices

Fujitsu follows a strict Code of Business Conduct policy. It affirms Fujitsu's commitment to integrity as the cornerstone of the behavior of employees and all others who act on its behalf. All employees at Fujitsu are responsible for acting in accordance with high ethical standards. Fujitsu's ethical standards are based on respect for the dignity of each individual and a commitment to honesty and fairness. Fujitsu's dedication to operate within the law is just the beginning of its ethical commitment. Fujitsu is required to always strive for fairness in its dealings and relationships.

The company adheres to the Fujitsu Way and the Fujitsu Global Business Standards, which are accessible at <http://www.fujitsu.com/global/about/philosophy>.

2.0 Cybersecurity Risk Management

Fujitsu recognizes the importance of Information Security – not only for protecting its own assets but also to earn the trust of its customers and business partners. Therefore, Fujitsu operates a mature Information Security Program that oversees an ecosystem of technology, people, and processes in four key practice areas:

- **Risk and Compliance Management:** Fujitsu mitigates risk and meets expectations defined by its internal policies, industry standards (ISO 27001, NIST 800-53), and customer requirements. Fujitsu's Security Program is proactive and intentional about the controls the company adopts to protect its information and systems.
- **Secure Infrastructure:** Fujitsu provides a network and computing foundation that enables the secure delivery of IT services. Fujitsu has adopted a robust technical architecture to provide a secure physical and computing environment.
- **People and Data:** Fujitsu enables its people to support the security mission and protect data in transit and in storage. Proper handling of data in its various forms is central to Fujitsu's information protection strategy. Fujitsu enforces strict access controls using strong authentication and authorization procedures for system access. Fujitsu recognizes that users play a critical role in protecting information, and leverages technology and training to enable them to make effective security decisions.
- **Monitoring and Incident Response:** Fujitsu monitors the IT environment for security events and respond quickly to minimize business disruption. To minimize the business impact by detecting and recovering from security incidents in a timely manner, Fujitsu operates a monitoring and incident response program featuring continuous log collection and event correlation as well as a 24/7 alert monitoring system. It also has a formal incident response process with target metrics for responsiveness.

3.0 Open RAN Solution Portfolio

Fujitsu's Open RAN solution utilizes core strengths combined with third party products. These are located in an open ecosystem to provide a complete multi-domain, multi-layer and end-to-end solution for wireless, wireline and data centers. These core strengths include Fujitsu's high standards for reliability, multi-vendor integration capabilities, support for **open standards** and implementation and industry-leading technology. Combined with a disruptive **partner ecosystem** and Fujitsu's Tier 1 vendor capabilities, Fujitsu can provide a best-in-class solution ecosystem.

3.1 Fujitsu Radios

Fujitsu has world-class radio technology, allowing it to build high performance, power-efficient and compact RUs. Fujitsu has led the global RF marketplace since 1995 and continues to improve on its technology.

Fujitsu has a wide range of LTE/5G radios to meet the unique spectrum holding requirements. Fujitsu will provide both Macro and Micro RUs in both mmWave and sub-6GHz ranges. Fujitsu organic hardware components are designed and manufactured by the company, allowing control the entire development life cycle of its products. As a result, Fujitsu's radio products have a mean time between failures that is greater than 25 Years with a five times lower return rate than industry standard based on the global deployment of over 500,000 remote radio heads since 2004.

3.2 Virtualized RAN Software Partnerships

Fujitsu provides 4G and 5G-ready virtualized RAN software solution that supports open interfaces and disaggregates the hardware from the software to build an open multi-vendor web-scale network. Fujitsu can provide either its own virtualized CU/DU or can utilize vendors from Fujitsu's strategic partnership program.

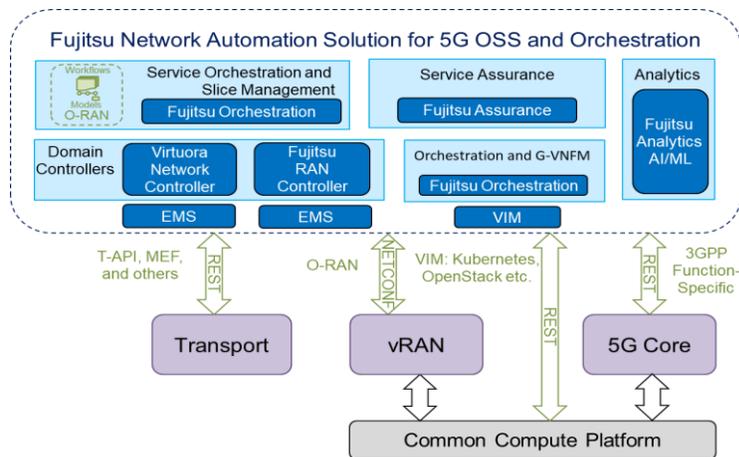
Key Advantages:

- Fujitsu has a field-proven, carrier-grade, and commercially deployed virtualized RAN (vRAN) solution utilizing CoTS hardware leveraging multi-vendor R&D and eco-system.
- Fujitsu has complete SW adaptability and agility to develop customer-specific features, outside of standard roadmaps, to further enhance wireless network requirements.

The **Quortus** Core is part of the EdgeCentrix cellular software solution. It is a multi-standard, highly flexible and scalable core network solution for GSM, 3G, 4G LTE, 5G NR, and IMS functionality. Architected for multiple platforms, X86, MIPS, ARM platforms (COTS), Linux OS, and embedded or virtual (VM or container) environments. It supports centralized, distributed and hybrid architectures.

3.3 Network Automation Software

Fujitsu wishes to highlight to the DoD/NTIA its combination of existing and new solutions to fully manage and orchestrate the 5G vRAN and RAN Transport environment. The solution is built around the Fujitsu's Virtuora software eco-system for multi-vendor OSS, Orchestration, Control and Management. Fujitsu's strategy is to remain open to vRAN vendors and to take advantage of O-RAN, 3GPP, ETSI and other standards, as well as open source approaches to design and build accessibility. Across the portfolio open REST APIs are included and attention has been paid to 5G, OSS, and transport standards.



3.4 Packet Transport

Fujitsu is providing an end-to-end transport solution is built to support hierarchical network slicing, ideal for 5G. Fujitsu's transport provides 5G optimized products for front-haul, mid-haul and back-haul. As a transport provider, Fujitsu is agnostic to various RAN and Core configurations. Its solution can be tailored to optimize for different configurations – whether it is monolithic gNB, integrated RU+DU, separate RU, DU, and CU, or integrated DU+CU. Fujitsu can provide optimized xHaul solutions whether it is EPC/vEPC, CUPS, or 5GC with UPFs pushed towards edge with MEC workload optimization. Fujitsu's front haul flexiHaul platforms offer time-sensitive networking (TSN) & WDM capabilities. Fujitsu's 1FINITIY products also provide mid-haul and back-haul programmable switches with cloud-based routing.

4.0 Services Portfolio

4.1 Deployment Services

Fujitsu's North American professional services group provides a suite of inside and outside plant services. Its skills, tools, and practices are ready to support 5G wireless deployments. Combined with Fujitsu's in-house wireless capabilities and its subsidiary company, TrueNet, Fujitsu can provide end-to-end deployment services. This includes project planning, design, deployment, and validation.

Fujitsu is also building an Open RAN lab to test, certify, and support future RAN networks. Fujitsu provides one contract, one scope of work, and one support infrastructure.

4.2 Network Operations and Monitoring

Fujitsu provides a full suite of network operations and monitoring services to support the 5G network solution. Providing a single source for troubleshooting, on-site support and spares dispatch, Fujitsu's 5,200-square-foot network operations center is located in its Richardson facility.

4.3 Support Services

Fujitsu has been providing the highest level of support, fast restoration, and resolution of critical incidents while providing the best customer experience through its FTAC support center. Year after year, Fujitsu has exceeded its CMOD performance targets. With a thorough understanding of network support requirements and desired outcomes, Fujitsu's on-site Technical Support Engineers (TSE), provide hands-on multi-vendor knowledge and troubleshooting.

4.4 System Integration and Lab Testing Resources

Fujitsu's end-to-end solution is composed of organic and disruptive third party solutions across multiple technologies. With its open approach, Fujitsu ensures that this entire ecosystem is tested and pre-integrated as a complete solution. This provides the customer with the assurance that the vCU/vDU vendor choice and all Fujitsu components work together and meet Fujitsu's quality standards. Fujitsu is the single point of contact, and all support is through Fujitsu.

As a helpful resource for system integration, Fujitsu's Advanced Technology & Solutions Center (ATSC) and co-located Wireless Test and Integration lab will be available as a resource to Fujitsu and its engineers. The Wireless Test and Integration lab can be set up to mirror a customer's 5G network and will have the available testing tools necessary.

5.0 Open RAN Experience

Fujitsu has a long history of supporting open networks with its first commercially available open LTE RRH and 5G RUs, its OpenROADM for AT&T, and its strong support for open standards such as xRAN/ORAN, OAI, 3GPP, and ORI. Fujitsu participates and contributes to the Open RAN Policy Coalition (OPRC) and believes that the DoD/NTIA should verify 5G Challenge vendors are also participating in this coalition.

Openness is the strategic direction for Fujitsu's key technologies. Fujitsu's vision for the ideal architecture is an Open RAN solution with decoupled virtual baseband units. Fujitsu's commitment and experience in ORAN are differentiators that should be considered. Fujitsu leverages its extensive RAN experience, network rollouts with industry leaders such as DoCoMO and Qualcomm, DISH and KDDI global capabilities (R&D, development, engineering, software, partnerships) to build customers a best-in-breed solution that will be unparalleled in North America, and globally. Fujitsu is a Contributing ORAN Member with a team consisting of at least ten development engineers, product managers, and solution engineers. In particular, Fujitsu is a participating and contributing ORAN member of WG1 – WG7 Working Groups.

6.0 Secure Supply Chain

Fujitsu has extensive available capacity to support the open 5G Challenge initiative. Fujitsu has manufacturing facilities in Oyama, Japan and Richardson, TX. We do not subcontract manufacturing for equipment and thus we have better control over supply management and inventories. Maintaining a western friendly supply chain is critical to network and national security infrastructure. Fujitsu Secure Supply Chain offer includes services that customers can mix and match using its secure supply chain to simplify, synchronize, and speed deployments. Customers can select the equipment, site, and date and Fujitsu delivers the fully configured and integrated systems to its secured depots close to customer sites on the date specified for installation. Customers have visibility of their assets and the status of their installations from start to finish and the assurance of a secure chain of custody.

With the Fujitsu Supply Chain team's expertise at the customers' service, they can take materials management security, efficiency, and productivity to a whole new level. Count on Fujitsu for organized, disciplined processes; secure, effective material controls; and the highest levels of inventory accuracy.

7.0 Summary

Fujitsu is excited at the opportunity to participate in the DoD and NTIA NOI for the 5G Challenge. Through its strong 5G experience, Fujitsu has identified attributes the DoD and NTIA should be looking for from vendors who are participating in the 5G Challenge, because these attributes lead to success. Fujitsu's strong integrity and business practices ensure that it continues as a trusted vendor for the 5G ecosystem. With Fujitsu's full 5G product ecosystem and support services, it can offer a trusted and secure solution for operators and private business markets. With demonstrated compliance for the Security and Trust in Telecommunications Networks and Services requirements, Fujitsu hopes to help support the 5G Challenge Initiative.

Fujitsu values this opportunity to provide initial comment and looks forward to continued collaboration with NTIA and DoD on this critical issue going forward.

Sincerely,

DocuSigned by:

Greg Manganello

Gregory J. Manganello

SVP and Head of Solutions and Wireless Business Units