

# Why Private 5G Services are Needed for Implementing Industry 4.0

*5G has arrived! Manufacturers would do well to avail the high bandwidth it brings with it to ensure smoother operations as they embrace Industry 4.0.*

BANGALORE, KARNATAKA, INDIA, February 14, 2023 /EINPresswire.com/ -- With manufacturers opting for Industry 4.0 in order to increase productivity, there is a critical need for reliable connectivity that supports high bandwidth and low latency at the same time.

Industry 4.0 use cases Logistics

Warehouses tend to be extremely huge; hence, there is a need to digitise them. Real-time tracking of products across the warehouse is extremely important. Drones can be used for tracking while robotic automation can assist with moving goods from one place to another. AR/VR based applications can be used to assist the training of employees in real time.

Mining

Mining in India is of two kinds. The first is called open pit mining. This kind of mining does not require you to get into a tunnel. The other kind of mining is called closed pit mining. This requires you to go underground inside a tunnel. There can be around 10 to 22 tunnels, and each may be about one or two kilometres long. In places like Australia a lot of automation has been done already while in India things are still done manually. Miners have to enter closed pits and use a USB stick to take the data out from the sensors installed in that area. Only then can they connect it to their office systems and servers in order to use it. This only creates an opportunity to digitise everything. By using automated unmanned vehicles the problem of data extraction can be solved, as no human will need to enter these mines thus significantly reducing the risk of any kind of disaster.

Oil and gas



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This is divided into three parts, namely, upstream – offshore/onshore, midstream – pipeline, downstream – refinery. Oil exploration is done both offshore and onshore. This exploration requires a lot of systematic data collection. Heavy analytics is required in order to find out the right places to conduct these explorations. [Private 5G](#) can play an important role here, helping increase productivity.

## Manufacturing

The Japanese company Fujitsu is making use of the private 5G network as well as edge computing for autonomous vehicles where 4K cameras are being used to ensure that these vehicles are moving properly. Data collected from these 4K cameras as well as sensors allows an analysis of their real-time movement. Similarly, cameras are installed in the manufacturing assembly lines to ensure work is being done the right way. The company uses artificial intelligence (AI) analytics tools to monitor everything. If someone is not doing the work correctly, these AI tools give a proper feedback about it. Training is also being done on the go with the help of AI in real-time.

The important components of 5G are the radio network and the transport network; the latter sends radio signals to the centralised core. The cores, too, have got disaggregated. There is a transport network between the 5G network and the centralised cloud using a router, which is also getting disaggregated.

At Niral Networks, we have done some indigenous end-to-end integration with a radio company in India, so that we can provide an end-to-end 5G system. Here's a description of our open and disaggregated network operating system called NiralOS.

## NiralOS network operating system (NOS)

- Private 5G core cloud: Native private 5G core software for mobility, authentication, security, session and policy management. Niral 5G core also has a compact user plane function (UPF) to provide local breakout within an enterprise when integrated with TSP's centralised 5G core.
- Mobile edge cloud: Kubernetes and virtualised edge cloud infrastructure to create a mobile edge cloud (MEC) within an enterprise with open APIs to host third-party applications like AR/VR, robotics, drones, AI/ML, video analytics for low latency and privacy.
- Centralised controller: Provides centralised management, orchestration, zero touch provisioning and monitoring of multiple private 5G networks and MEC at various sites. The controller can be hosted in the public cloud to centrally manage and monitor multiple private 5G networks.

## NiralOS specifications

- Release16-compliant 5G core for private 5G deployment
- 5G network functions–UPF, AMF, SMF, AUSF, UDM, NRF
- Kubernetes based cloud-native network function
- DPDK+VPP based UPF acceleration-linear scaling per CPU core
- UPF local breakout feature for easy integration to TSP's centralised 5G core

- Support of N1, N2, N3, N4 and service based interfaces for 5G SBA
- 5G core deployed on COTS hardware of various form factors and integrated with 5G radio
- Kubernetes and virtualised, cloud agnostic edge cloud to host third-party applications
- Open APIs for integration of third-party application to Niral 5G core and edge platforms
- Web based dashboard for subscriber provisioning configuration and management

Niral Networks has also been awarded for innovation in 5G. We look forward to achieving more such feats.

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Abhijit Chaudhary is founder and CEO of Niral Networks. This article is put together from a tech talk he gave at Open Source Conference 2022, an event organised by Samsung R&D Institute India – Bangalore, and IEEE ComSoc, Bangalore Chapter.

<https://niralnetworks.com/>

Abhijit Chaudhary

Niral Networks

+91 9886179612

info@niralnetworks.com

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