

Druid Software : Two Decades of Experience in making Private Networks Simpler

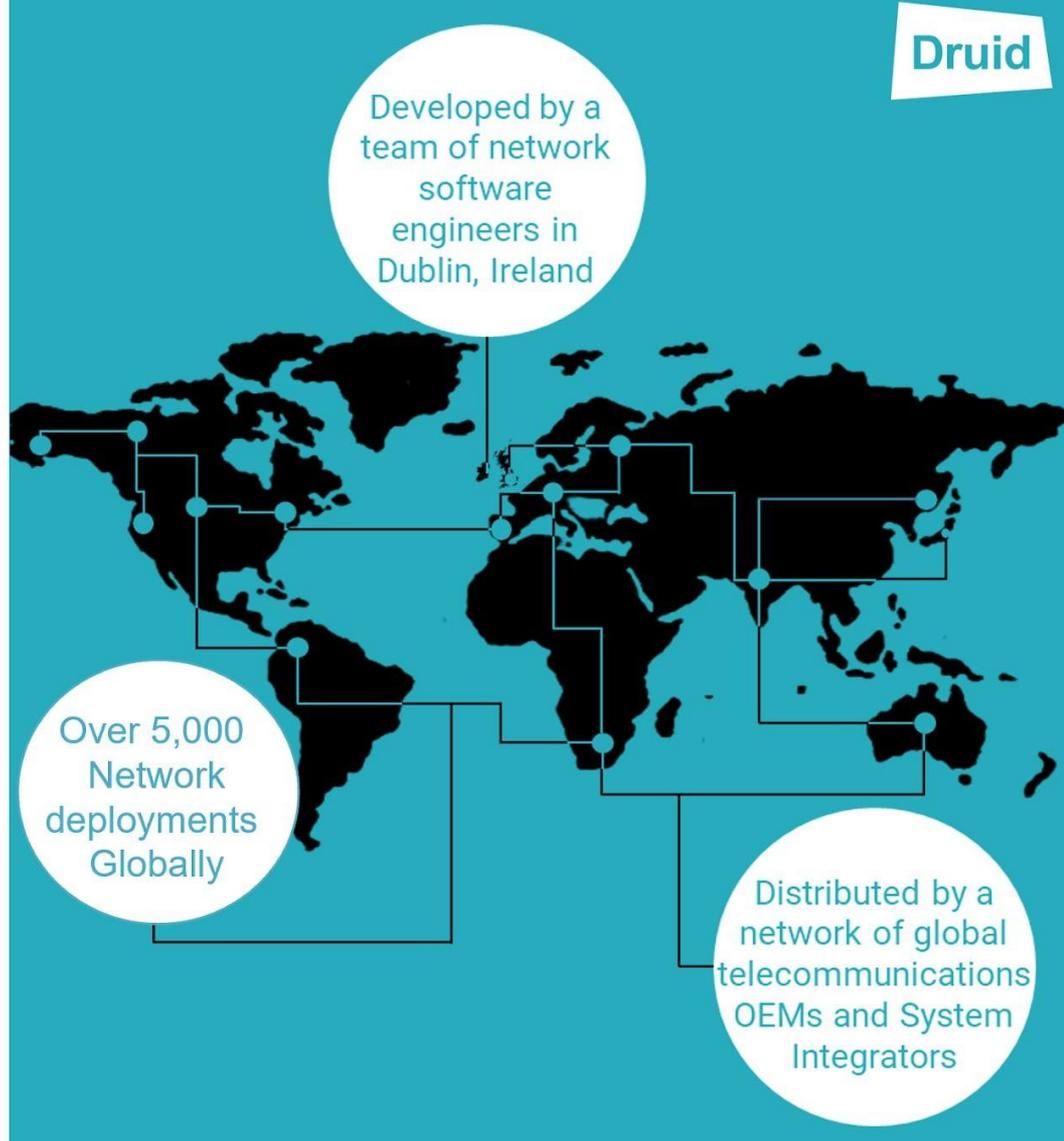
About Druid Software

Druid is the global leader of specialised core network software.

Cellular Technology Platform **Raemis™**

Solutions for Enterprise, Mobile Edge Computing, FWA, Neutral Host, Public Safety and IoT.

Customization and Technology Consultancy Services.



Milestones from

Consultancy to

Product Leadership

Future

Product-based company
with flagship platform
Raemis™

Inflight cellular
network

2003

First hospital system
NL market

2011

First global mobile
operator sale

2015

4G patrol communications
solution

2017

2018
US CBRS market
fixed wireless access

2023
5G Private Network
liberalisation in UK,
Germany & France

2000
Company creation
consultancy services

2008
Raemis™ platform
launch

2014
Japanese market,
Phillipines, Singapore

2016
IoT reach –
container tracking NIB

Druid

5 Regions and 30+ Countries of Focus

North America (NA)

1. Canada
2. United States

LATAM

1. Argentina
2. Brazil
3. Chile
4. Columbia

Middle East/Africa (MEA)

1. Israel
2. Saudi Arabia
3. UAE
4. South Africa

Europe

1. Austria
2. Belgium
3. France
4. Germany
5. Ireland
6. Netherlands
7. Poland
8. Portugal
9. Slovenia
10. Spain
11. Switzerland
12. UK
13. Other Eastern European Countries

Nordics

1. Denmark
2. Finland
3. Norway
4. Sweden

Asia PAC (APAC)

1. Australia
2. India
3. Japan
4. Malaysia
5. New Zealand
6. S Korea
7. Singapore
8. Taiwan

About Druid



Over 25 years active in the market

Over 100+ Druids work together on Raemis Core Solutions

Main Offices at Civic Centre, Bray, Co Wicklow, Rep of Ireland

Support hubs in Ireland, US, India, Taiwan and Japan

Over 5,000 Raemis Network deployments Globally

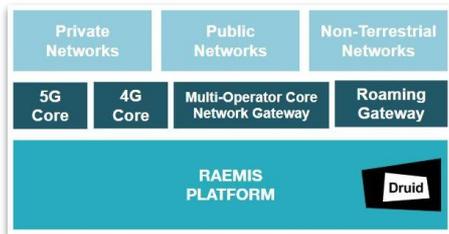
Over 210 customers (routes to market), many blue-chip names

The Challenges facing Businesses

Private Networks
Dedicated Spectrum

Public Cellular Networks
Unlicensed Data Technologies

What is a Private Network?



Enterprise Applications



Private Cellular Network:

- **Network Core (5GC)**
- Small Cells (gNB)
 - o Antennas
- SIMs



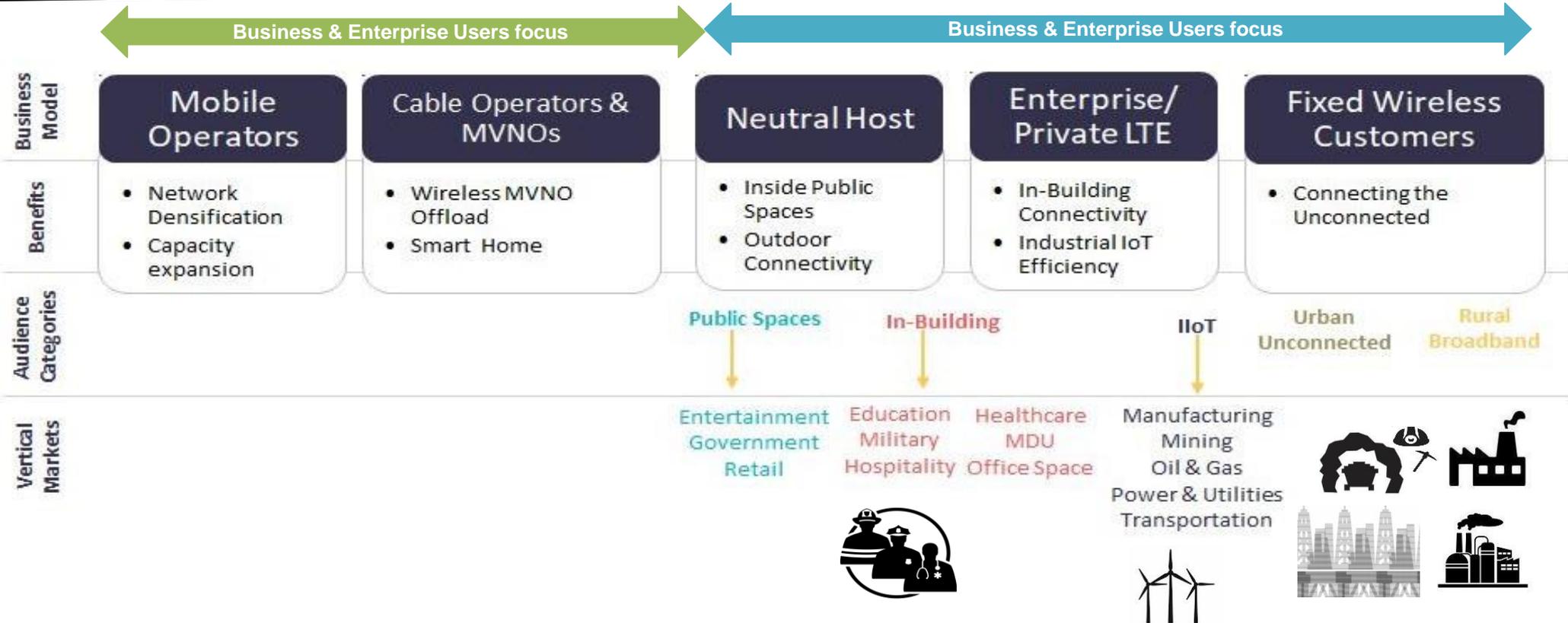
Network Provider or System Integrator



Modules, Gateways & Devices



Who uses/needs Private Networks?



What Enterprises invest in private networks?

Businesses with:

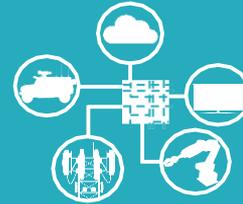
- Critical Communication needs
- No tolerance for operational outages or interruptions
- Requirements for low latency and high resilience.

Mission Critical - Life or Death

Business Critical - Financial impact

Business Critical

Druid



IoT



FWA



Hospitality



Industry

Mission Critical



Public Safety



Healthcare

Go to Market - Private Network Partner Ecosystem

RAN Vendors
Small Cell
OpenRAN
Indoor DAS +
FWA Specialists
Intrinsically safe

Spectrum Access
MNOs
SAS
Wholesale Operators
PAL licensees
WISP / FWA Operator

Neutral Host
Tower Companies
In building
Wifi Offload
Digital Signage

Service Providers
MNOs
MVNEs
Small MNOs
IPX

UE Vendors
FWA CPE
IoT gateways
Industrial Modems
Public Safety Handsets

HW Platform Vendors
COTS Servers
Intrinsically safe
Telecoms platforms
Private / Edge cloud

Systems Integrators
Public Safety – patrol
Intelligence
Tactical
Utilities / Mining

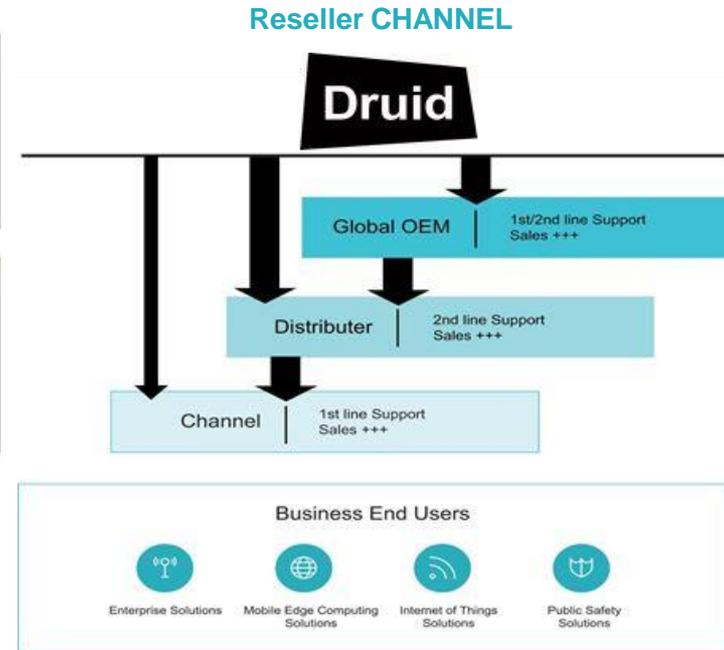
Applications Vendors
Push to Talk
Lone Worker / Man down
IoT tracking

Government
Spectrum Regulators
Funding bodies

Professional Services
Consultants
Analysts

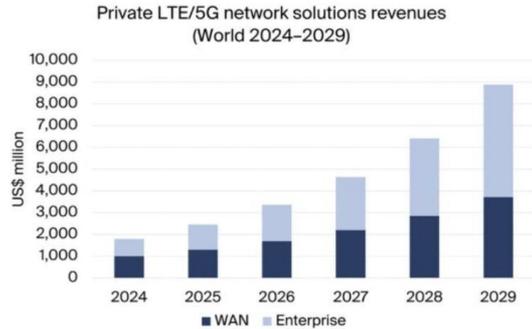
Channel
Distributors
VARs

- Resellers
- Referral Partners & Recommenders
- Enablers & Influencers



Why now?

Berg estimates private LTE/5G market will reach \$8.9bn in 2029



Source: Berg Insight, The Private LTE/5G Network Market

There were 4,700 such network deployments, and a market value of \$1.8 billion, in 2024; a 38% CAGR is expected over the next five years

Market Segment Demographics (number of sites, global)

Transport Venues & Ports:
50,000

Military Bases:
10,000

Warehouses:
3,300,000

Industrial & Manufacturing:
10,710,000

Oil & Gas:
8,000

Power Generation:
47,600

Water Utility Plants:
140,000

Mining:
54,000

Hospitals & Labs:
263,000

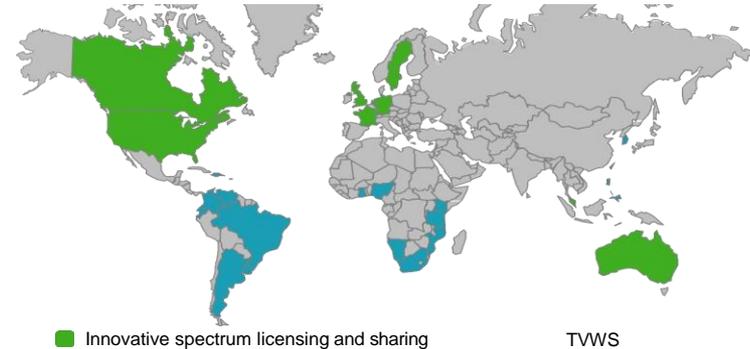
Total: 14,582,600

The Challenges facing Enterprise



Source: Mobile Experts & ip.access
White Paper: Private LTE - Why Enterprises are Switching

Countries Actively Exploring New Licensing Models



■ Innovative spectrum licensing and sharing

TWVS

Why **Druid** ?

Ranked #1 for Product & Market Positioning

Juniper Research Private Networks Competitive LeaderBoard

[READ MORE](#)

[Market & Company Situation Analysis](#)

[Use Cases](#)

[Why Druid?](#)

Raemis™

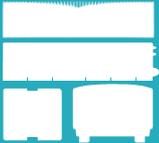
Raemis is **Druid's** core platform for 4G and 5G.

A 3GPP compliant 4G/5G core network.

Unique features designed specifically for Enterprise Critical Communications.



Device
Prioritisation



Radio
Agnostic



Scale up and
down



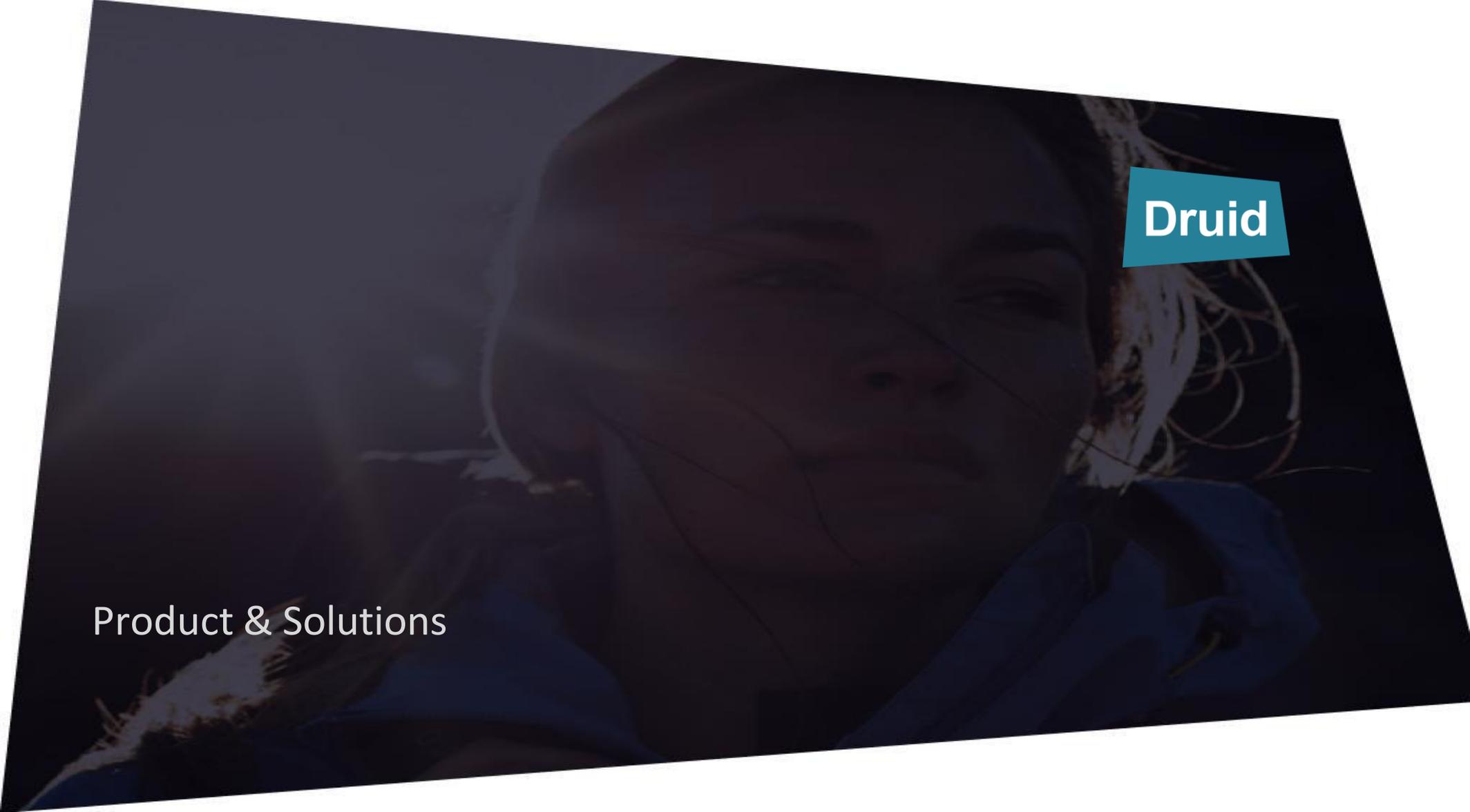
Flexible Deployment
& Security



Easy to
Integrate



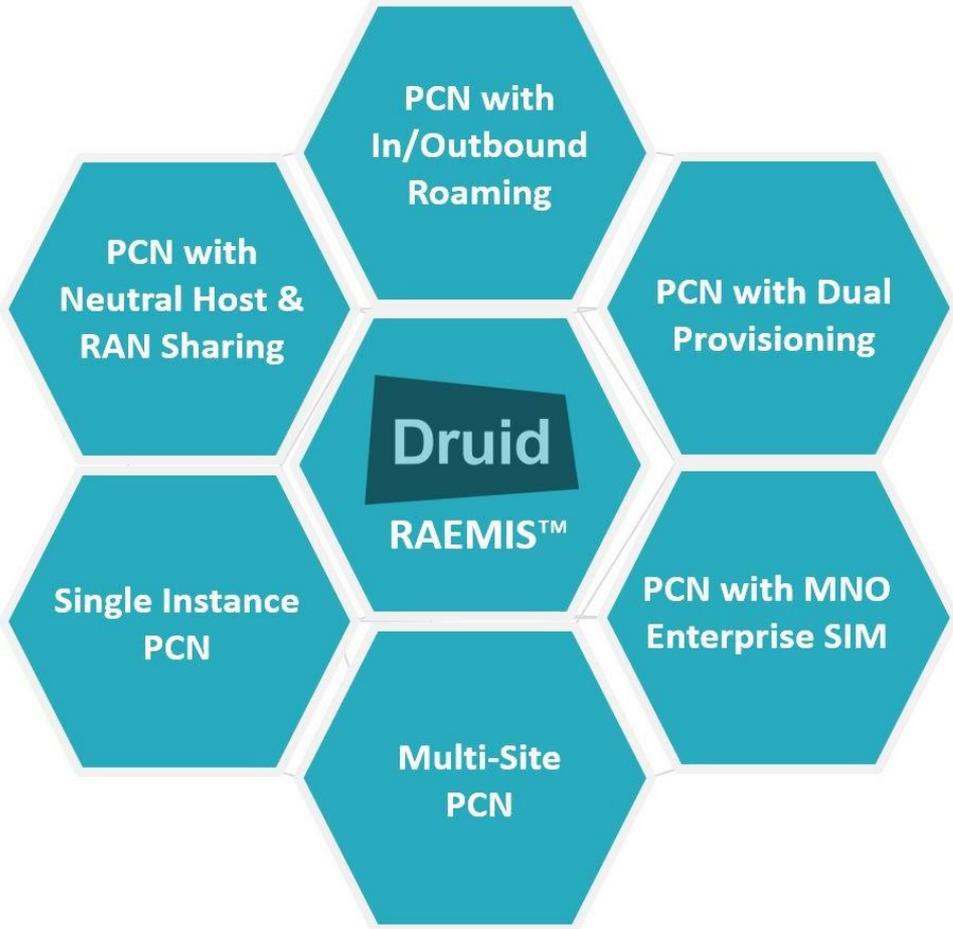
Simple
to use



Druid

Product & Solutions

Raemis Platform



Raemis Platform delivers a multiple of solutions for private networks. In our Roadmap plans we describe the features in relation to

- Private Core (2G, 3G,4G,5G and Wifi)
- Roaming
- MOCN Gateway
- Innovation

Druid's Raemis platform can be deployed in different configurations to deliver unique business value for your customers.

Product Team “Markets Served by Druid”

Druid

- 3 Primary Markets Served by Druid
- We also offer specialized Gateways to permit roaming between private & public network domains



Private cellular networking
infrastructure deployed by end customers in a variety of sectors including **Industry, Healthcare, Sports & Entertainment, Utilities, Defense, Government, Ports & Transportation.**



Public cellular networking
infrastructure used by **Non-Terrestrial Networks, Mobile Operators and Mobile Virtual Network Operators** to service subscribers.



Shared Access infrastructure to enable extended cellular coverage for mobile subscribers at congested or poorly served locations

Druid's Strategy to Address Market Needs

Private Networks

- Enhance product to ensure it can be easily deployed and operated by large numbers of new customers expected to adopt the technology
- Grow our ecosystem of RAN and application partners to meet needs of different use cases
- Increase the ability of our SI partners to service multiple customer

Public Networks

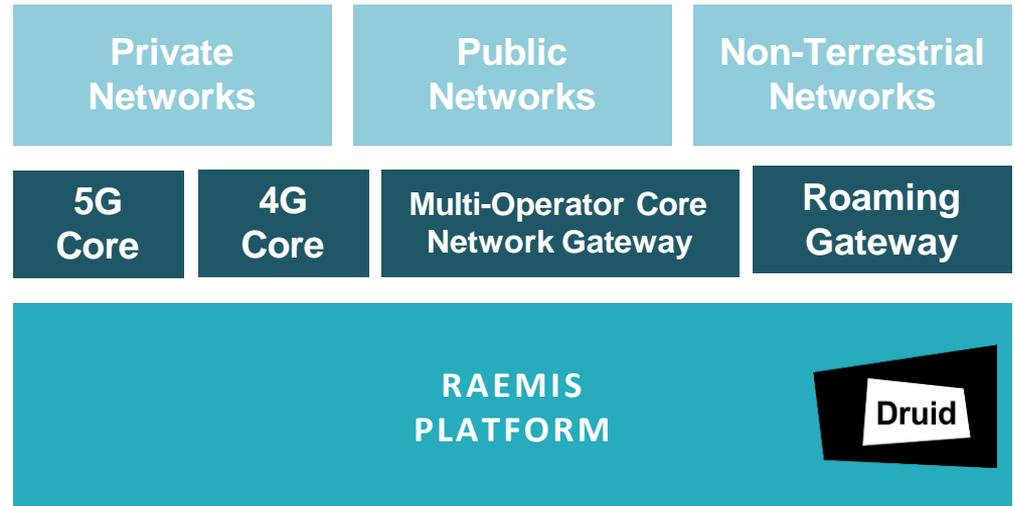
- Meet demands of emerging NTN, MNO and MVNOs for a scalable, sustainable 5G network core
- Provide an alternative to the large NEPs for core network functions suitable for specialized use cases
- Provide scalable roaming solutions to support subscribers moving between home and visited networks, both private and public, NTN and mobile.

Shared Access

- Exploit our core network expertise to deliver a Multi-Operator Core Network Gateway that allows mobile subscribers to access extended coverage provided at a visited locations
- Develop ecosystem of RAN and Service Provider partners certified to work with the platform
- 4G & 5G Access

Solutions for Market Needs

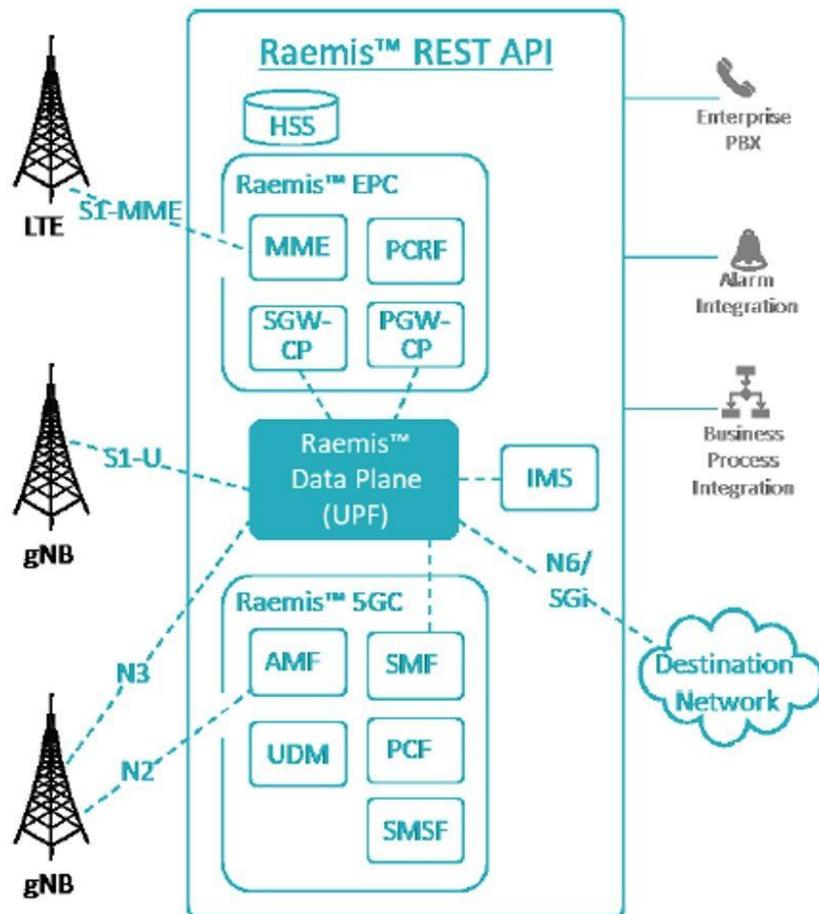
- Highly scalable **Raemis** platform for hosting cellular network functions
- Core network Platform for Private Cellular Network deployment
- Core Platform for Public Mobile & NTN networks
- Multi-Operator Core Network (MOCN) Gateway for shared RAN access for extended coverage
- Roaming Gateway to service inbound and outbound roaming subscribers



Raemis 4G/5G Gateway architecture overview

Combined 5G & 4G software platform.
Both 5G and 4G NFs with a common data plane.

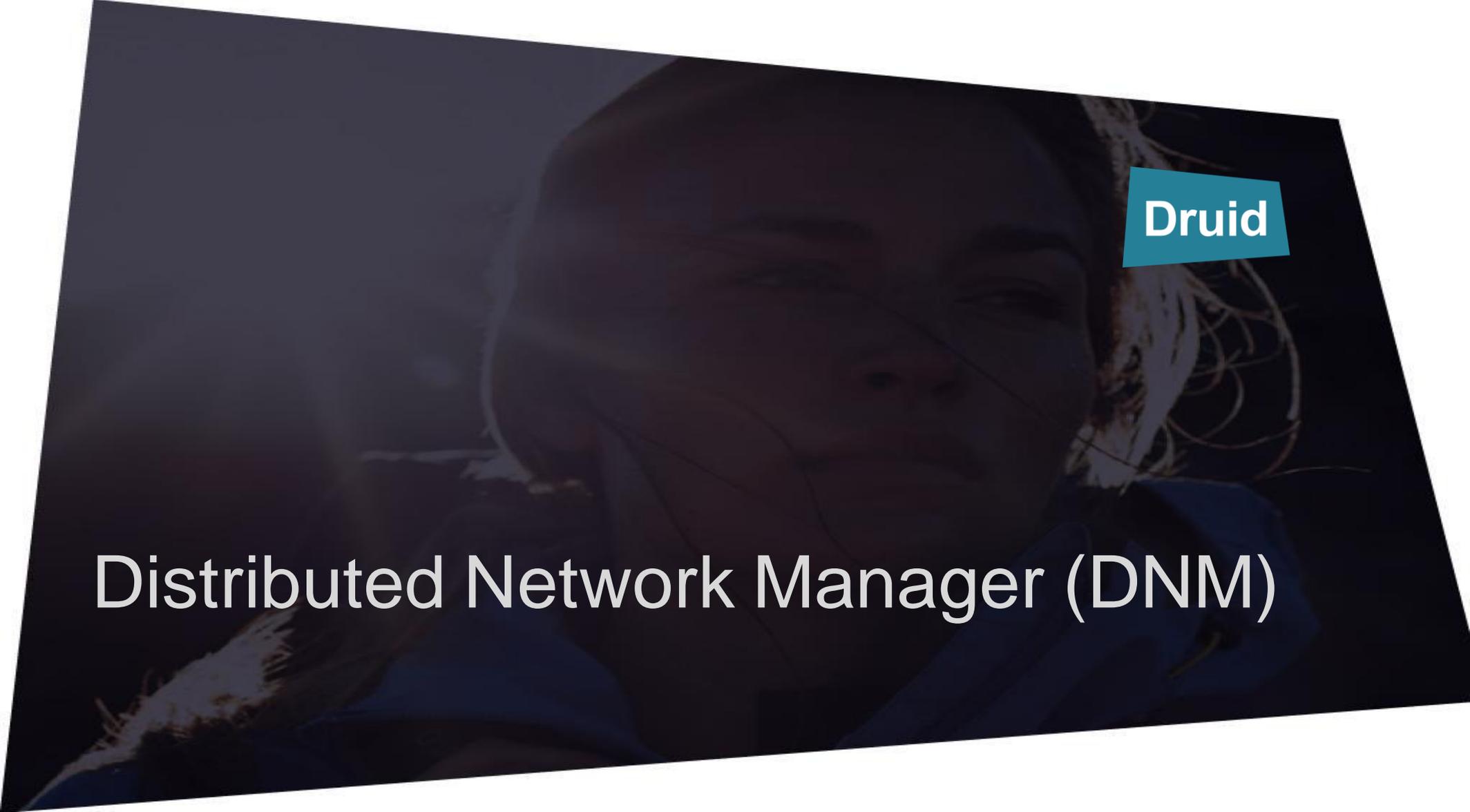
Platform is capable of SA & NSA support,
Operating both 5G and 4G RAN simultaneously.



Raemis - Distributed Network Architecture

- Designed for Flexible Deployment Models
 - Short Term - Long Term Deployments
 - Centralised and Flexible Licensing
 - Centralised Device Management
 - Scale - 1 Radio to 1000 Radios
- Private Network over multiple sites
 - Multi Tenant Capability
- Central management of licenses, subscribers, Billing, Assurance and Fulfilment functions
- Ideal for
 - Multi-site customers - equipment from each site can work on other / all sites as determined by Administrator
 - On Site Management Possible





Druid

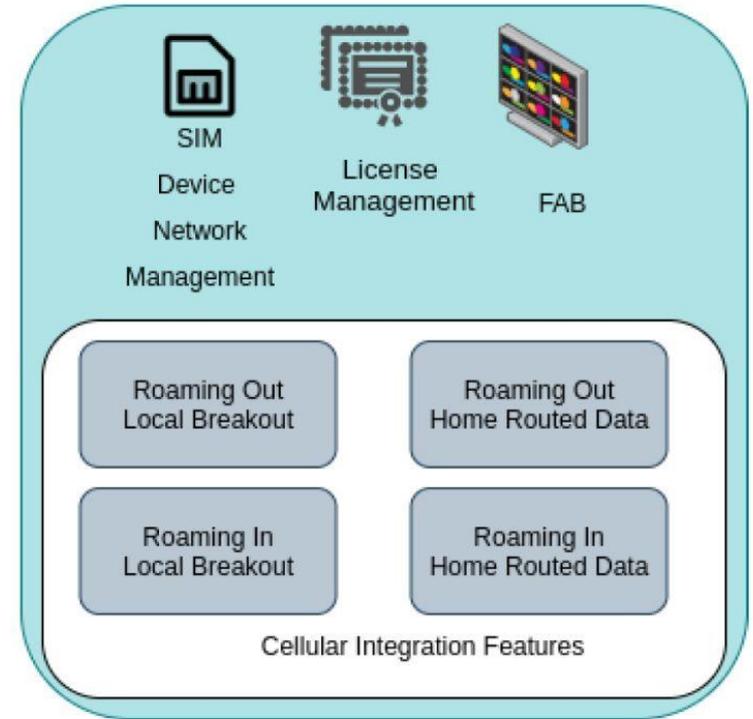
Distributed Network Manager (DNM)

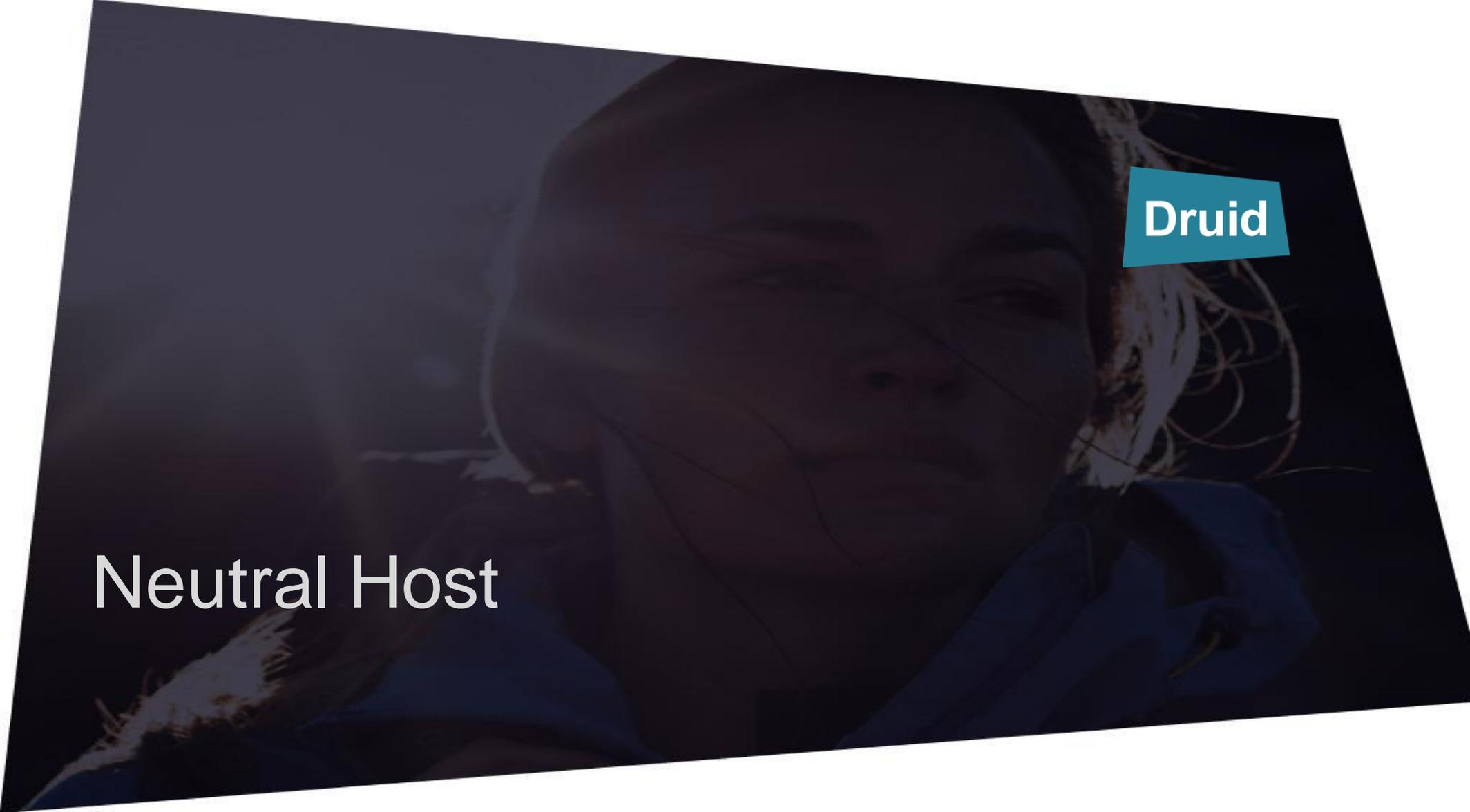
Distributed Network Management Platform

- Centralized Subscriber Management
 - SIM / Device Management
 - Policy/Network/VLAN Management
- Centralized License Management
- Bootstrap Configuration
- Cellular Integration – Roaming
- Centralised Monitoring



Distributed Network Management Platform





Druid

Neutral Host

Venue owners improve visitors cellular coverage with Raemis Neutral Host Gateway

Druid

Sports stadiums



Casinos



Theme Parks



Hotels

Neutral Host Gateway

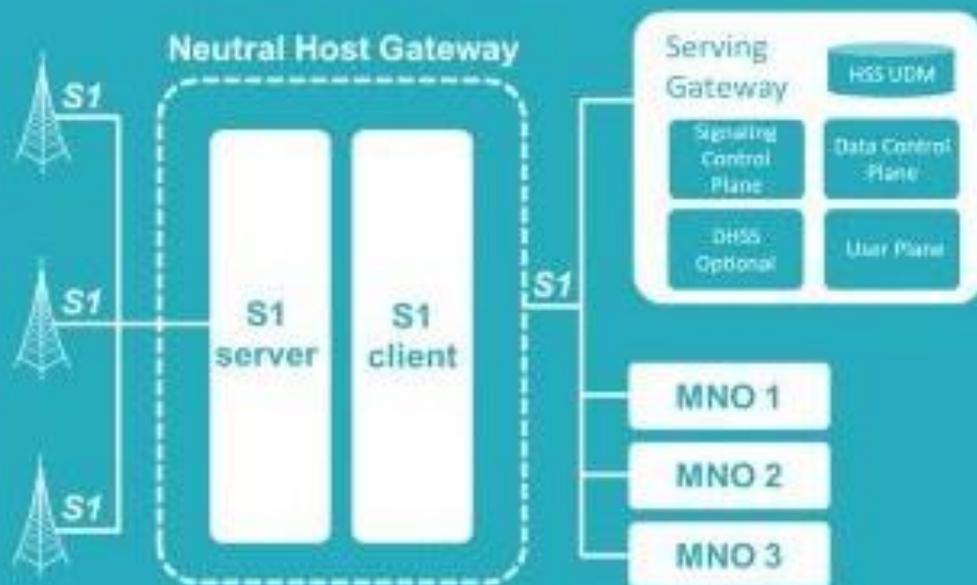
Enables customers of all MNOs to benefit from improved in-building coverage

Cheaper and easier than DAS

Private network can run in parallel for staff communications, safety and security equipment

Ideal for

- Conference Venues
- Hotels
- Stadiums
- Theme parks
- Retail, Healthcare



Industry Recognition (Over 10x Industry Awards so far)



Elderly Care - Care Homes & Assisted living

[Back to Use Cases](#)

Customer Need:

Park Stanislaus is in a unique location in Moergestel, Netherlands with the residential care center located at the edge of the care campus. They required a dedicated private 4G network to enable the use of the latest smart devices to enhance the care for residents.

The Solution:

Dutch healthcare specialist Avics B.V. delivered the latest Druid and Corning private 4G network technology to enhance the lives of the residents and provide dedicated, secure data for their Connect and Care IoT devices.

The SOS is always tailor-made to the resident. They can adjust based on their needs. For example, if a resident leaves their bed, is restless or leaves the room, the Smart Optical Sensor automatically gives a signal to the carer's smartphone.

Key benefits for Park Stanislaus:

The 4G network enhances the lives of the residents and provide dedicated, secure data for their Connect and Care IoT devices. This new technology ensures a better night's sleep for residents, less false alarms and more job satisfaction for healthcare workers

Proprietary & Confidential



Neutral Host

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Customer Need

The Caribe Royale Resort in Orlando, which has more than 1,300 suites and 220,000 square feet of meeting and convention space for hosting large numbers of visitors and events, is piloting a private Citizens Broadband Radio Service (CBRS)-based neutral-host network provided by Geoverse to enhance connectivity across the expansive hotel. The network will not only serve guests and staff, but will also introduce new use cases.

The Solution:

A neutral-host solution is a single wireless network that can support or 'host' users from multiple wireless carriers so that any carrier customer can have reliable connectivity and a quality online experience at that venue. The hotel currently has an in-house WiFi network to provide guest connectivity, as well as an indoor DAS supporting a single carrier for cellular coverage in select areas. Geoverse, as part of the trial, will first provide indoor coverage at the resort's expansive convention center and will work to augment and complement the existing Wi-Fi footprint. Eventually, the two networks will operate as one hybrid wireless network.

Key benefits of CBRS/OnGo for this Hotel & Resort

Today, such solutions are used at large-capacity venues like hotels, sports arenas, commercial office spaces, hospitals, transportation hubs and universities. A CBRS-based neutral host model allows the cellular industry to go from being exclusively carrier-led to becoming more enterprise-driven. This enables the resort to securely serve staff operations, and even connect large numbers of wireless devices and sensors to automate their in-house building management systems and operations.

Proprietary & Confidential



Proprietary & Confidential

[Market & Company Situation Analysis](#)

[Use Cases](#)

[Why Druid?](#)

Druid

5G Industry 4.0 Institute in the US

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Customer Need:

MdI, the Digital Manufacturing Institute and the National Center for Cyber-security in Manufacturing, has deployed Druid's industry leading Raemis 5G SA core platform with Druid's partner Betacom to provide the organization's Chicago headquarters and Factory Floor Lab with a private 5G network. The network, one of the first in the US of its kind for indoor private 5G, will serve as the foundation to develop and enable technologies that power Industry 4.0 across the United States.

The Solution:

The MdI 5G network is being deployed by Druid's partners Betacom in combination with Arispan Networks Inc., a subsidiary of Arispan Networks Holdings Inc. (NYSE American: MIMO), which is providing the new 5G radio access network. Druid Software, provides the 5G core software, which is like the brain in the network. Betacom has provided the network design, with network management delivered via its modern cloud-based Security and Service Operations Center (SSOC) built on Zero Trust security design principles.

Key benefits for the Industry:

MdI, the Digital Manufacturing Institute and the National Center for Cyber-security in Manufacturing for the United States, is where innovative manufacturers go to forge their futures. In partnership with the Department of Defense, MdI equips U.S. factories with the digital tools, cyber security and workforce expertise they need to begin building every part better than the last. As a result of this Druid & Betacom private 5G network, approximately 300 partners now get to use their 5G can increase their productivity, with more business, and strengthen U.S. manufacturing. [Read more](#)

[Visit the Factory Floor](#)

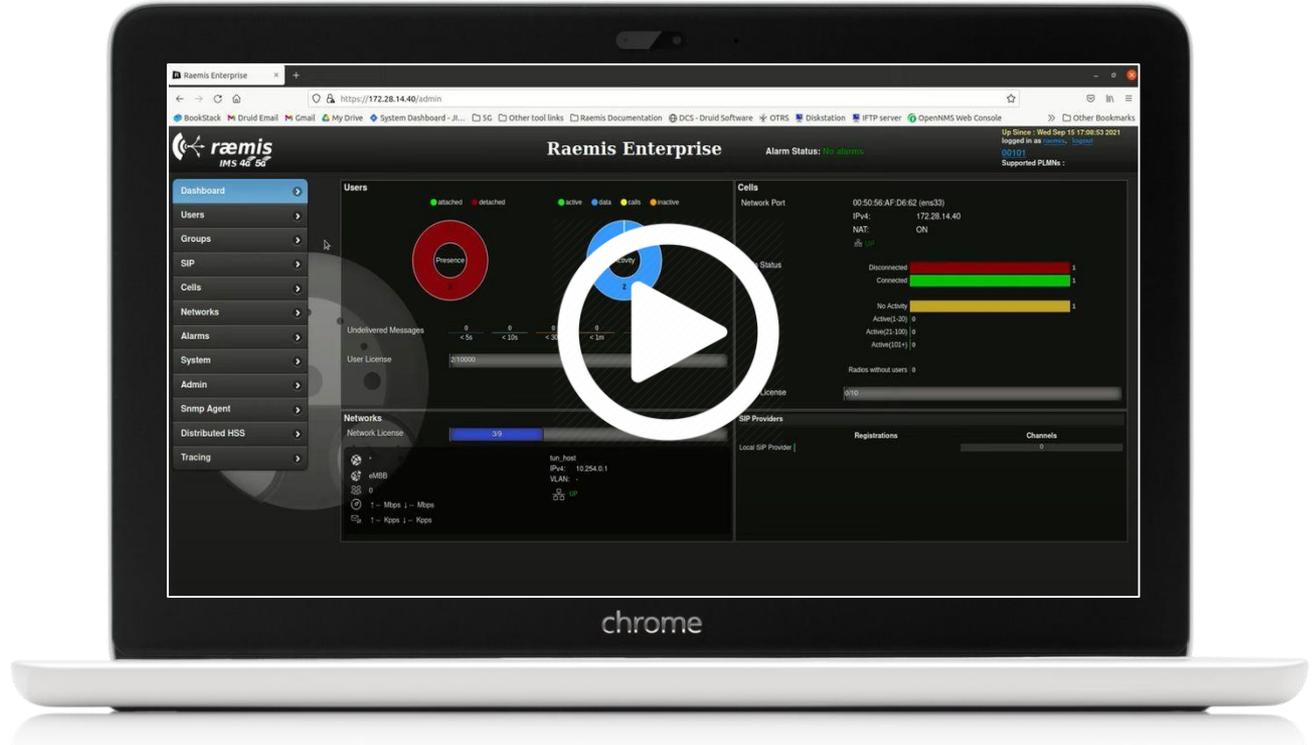
Proprietary & Confidential

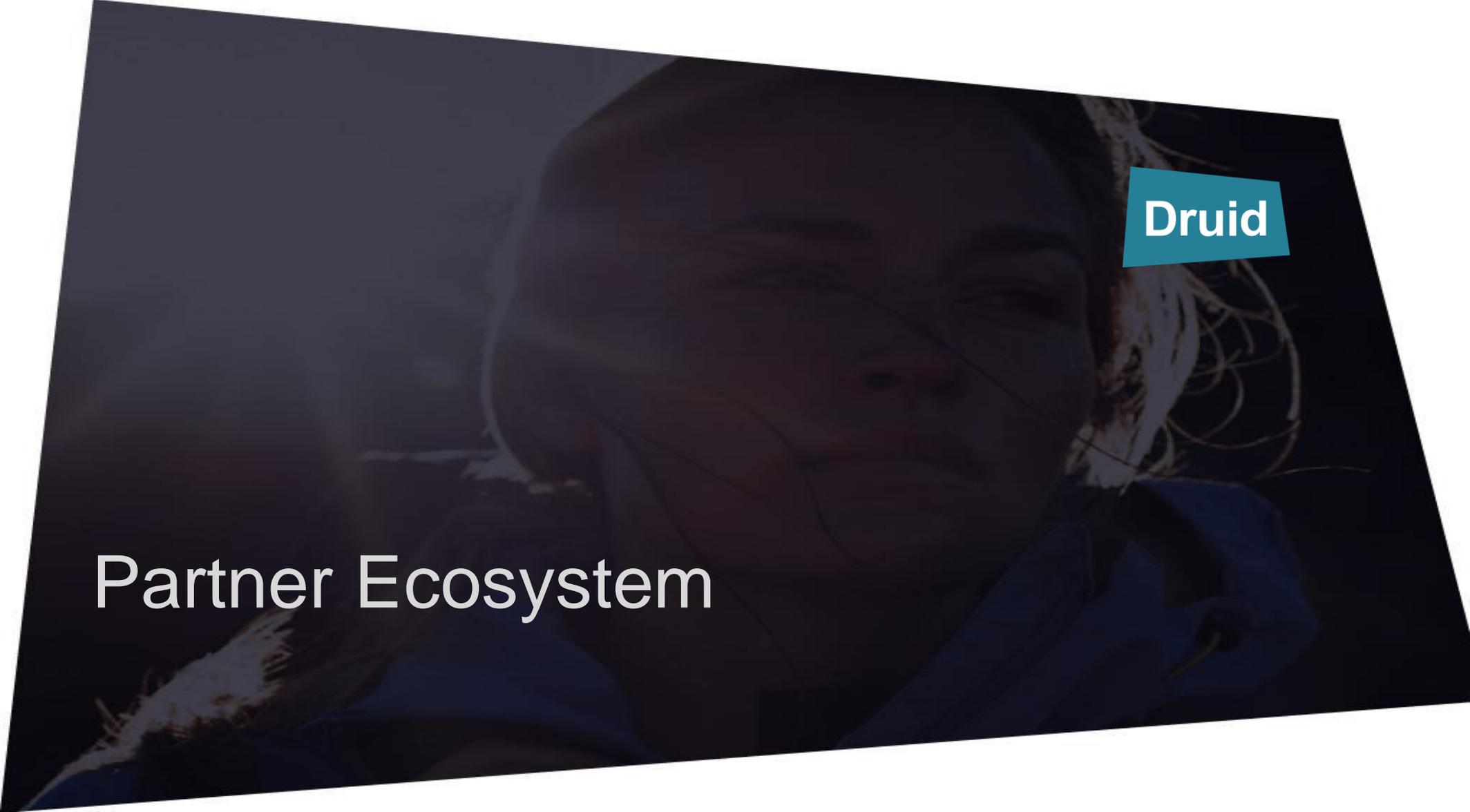


Druid

Designed for Simplicity - Local and Centralised Management

	Easy to Install, Designed for Enterprise critical communications
	Installing and provisioning Raemis takes minutes
Web Based Management Systems allows the Channel partner & Enterprise to:	
	Manage devices
	Assign Radio Bandwidth
	Priority to Groups of devices (QoS)
	Assign IP addresses to devices from a pool of the ISPs DHCP server
	Modify in real time service levels





Druid

Partner Ecosystem

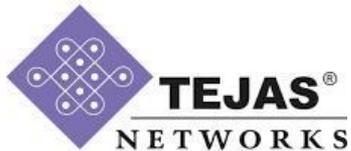
India : Driving the opportunities through the Go To Market RAN Partners (both MII and Global RAN Partners

Airspan



Tidalwave

PEGATRON



Druid

5G RAN Interoperability with Raemis™ 5GC (42 vendors so far)



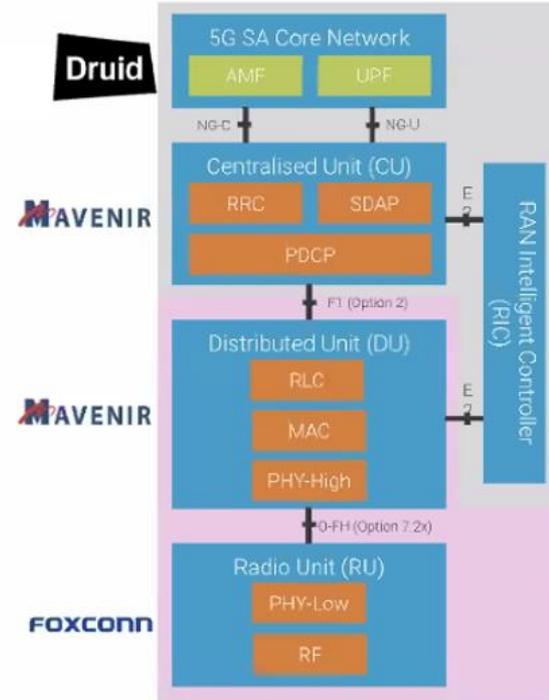
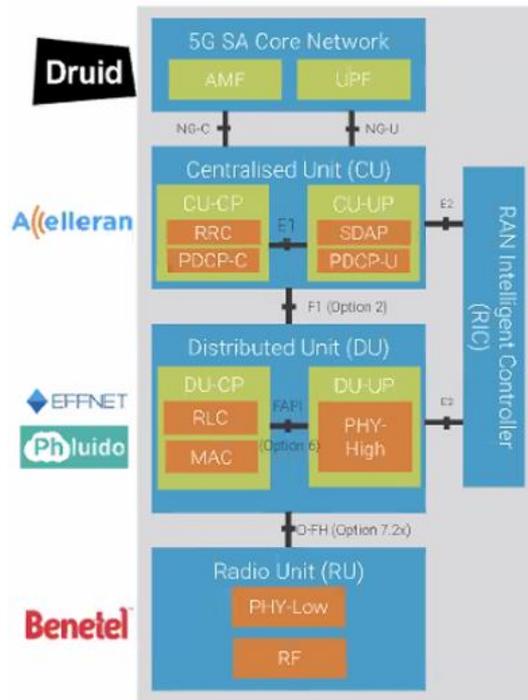
4G/LTE RAN Interoperability with Raemis™ EPC (29 vendors)

<p>In Building</p>	
<p>Outdoor</p>	
<p>Network in a box (NIB), Patrol Vehicle Solutions (COW)</p>	
<p>Fixed Wireless Access (FWA)</p>	



SONIC 5G O-RAN Labs Update - July '21

The SmartRAN Open Network Interoperability Centre (SONIC) is joint programme between Digital Catapult and Ofcom to test interoperability and integration of open networking solutions, vendors and system integrators. Funded by the UK government and Ofcom (UK Communications Regulator). SONIC aims to help achieve a vision of a more open, competitive and diverse telecoms supply chain.



SONIC Labs will provide key learnings through hand-on experience with Open RAN

India : Driving the opportunities through the Global System Integrators



- Druid actively involved with the GSIs
- The P5G practice teams of these GSIs have been investing by implementing the various use cases in their labs

PTT, MCX, FRMCS Partner Applications



Mission Critical Communications



Tactilon Agnet



Druid

SIMs & eSIM Ecosystem



Giesecke+Devrient



Use Cases

Druid



Hospitality



Energy



5G



Industry 4.0



Healthcare



FWA



Mobility



Education

A hand is shown holding a yellow cord, with a blurred background of yellow chairs. The text is overlaid on a white rectangular box.

Emerging Applications for Hospitality

**Enhancing Guest Experience, Increased Security
Marketing & Software integration**

Customer Need

7 Cedars Casino and Hotel premises in Olympic Peninsula, Washington suffers from weak cellular signal.

The Solution:

They turned to neutral host mobile network operator Geoverse and Druid Software their 4G/LTE core network technology partners.

As members of the CBRS Alliance, Geoverse and Druid has provided 7 Cedars with OnGo – a private LTE network built to run on the 3.5 GHz CBRS band – that would allow the casino to offer patrons and staff access to 5G service on the property.

Key benefits of CBRS/OnGo for 7 Cedars Casino & Hotel

- Greater security for staff communications
- Enabling mobility & Enhancing the guest experience
- Marketing & Software implementation
- Improved cellular mobile signal improves customer retention



Neutral Host

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Key benefits of CBRS/OnGo for this Hotel & Resort

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A blurred background image of an industrial facility, likely a power plant or refinery, featuring tall chimneys and complex piping. The image is out of focus, emphasizing the text overlay.

Emerging Applications for Energy

Smart Maintenance, MCPTT, Man down & Lone worker

Customer Need:

Due to the highly critical nature of Oil & Gas exploration and production, there is an essential need for dedicated data networks off/on shore to provide live video streaming from fixed point & body worn cameras, MCPTT, AR/VR, man down, lone worker emergency alarms.

The Solution:

With NB-IoT (LPWA) technology already being rolled out in several countries in 2017, cellular coverage is best placed to support the highest number of IoT devices per single cell, with greater power efficiencies for longer life single charge per IoT device and lowest cost hardware.

Key benefits for Industry

Druid have deployed cutting edge private networks for two of the world's top four energy providers thus far. In each case there was a clear need to improve health and safety and deliver efficiencies through the latest mobile technology innovations.



Renewable Energy Providers

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Customer Need:

Due to the highly critical nature of offshore wind farms, there is an essential need for dedicated data networks off/on shore to provide 24/7, guaranteed quality of service for safety and productivity.

The Solution:

eBO enable their customers to perform in these harsh environments, where the latest 4G/LTE capable ruggedized equipment is used. They provide 24/7 operation & management of the Druid private network.

Key benefits for Industry

- Managed communications offshore and onshore
- MCPTT (Mission Critical Push To Talk) radio and phone communication
- Internet access and data transfer for chat, messaging, voice & video
- Integrated Apps with Operations Platforms
- Data Intelligence & Management with IoT Smart wind farm
- Central Management & Reporting



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Mining and Tunneling

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Customer Need:

Mining and tunneling requires specialised technology that empowers mining companies to unearth safely and productively, while meeting unique logistical, technical and environmental requirements.

The Solution:

MST are piloting one of the worlds first mining 4G/LTE private network deployments in 5G spectrum. They have partnered with the latest Spidercloud (a Corning Company) carrier grade 4G small cells and Druid Software's Evolved Packet Core.

Key benefits for Industry:

The private network provides guaranteed connectivity underground which is key to accessing data from multiple field sensors and other IoT devices. The private network has also been a key enabler of remote control and automation of mining and tunneling processes.

- Dedicated communications above & below ground
- MCPTT Mission Critical Push To Talk Communication
- Collaboration (Chat, Messaging, Voice & HD Video)
- Strata Movement - Wireless sensors gathers data from strata and rock strain gauges that monitors strata movement. Personnel and asset safety through capture of strata movement data. Surface strata movements, specifically during blasting are measured to access impact.
- Vehicle Telemetry - Vehicle diagnostics & Integrated location tracking

CORNING

SpiderCloud
Wireless

MST



Druid

12:02

Role of Private Networks in Healthcare

Security, Dedicated data, O & M, Resilience, Business Process Integration (i.e. Nurse call)



Memorial Healthcare Systems - Covid'19 Response Teams

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Customer Need:

Like many hospitals and clinics, Memorial Health System set up triage tents and testing facilities to support a surge in patients as a result of Covid-19. To enable this, they required private networks to be quickly set up with the highest mobile security measures required for health care networks.

The Solution:

RF Connect, a national leader of cellular-based wireless solutions, deployed a CBRS-enabled OnGo Private LTE wireless network at Memorial Healthcare Systems to provide temporary connectivity to support doctors and nursing staff who are delivering emergency patient care during the COVID-19 response.

Key benefits for Memorial Healthcare Systems:

This cellular based wireless network delivers the highest data performance and secure capacity to connect healthcare devices that are ordinarily enabled by the existing indoor network.

"This OnGo network empowers us to appropriately focus our attention and resources on providing patient care,"

- Jerry Miller, Vice President Information Services at Memorial Health System.



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Elderly Care - Care Homes & Assisted living

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Winner



Wijkverpleging en wonen met zorg



Druid

Hospitals - Private 4G/LTE

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Customer Need:

WIFI is an excellent technology for many enterprise use cases, but it has drawbacks in comparison to 4G/LTE when trying to carrying secure business critical mobile communications and scaling to accommodate hundreds of devices.

Interference makes high quality mobility a challenge for shorter range technologies like Wifi to deliver solely, as virtually any smart phone device is capable of acting as a Wifi access point and interfering with the enterprise's business critical communications.

The Solution:

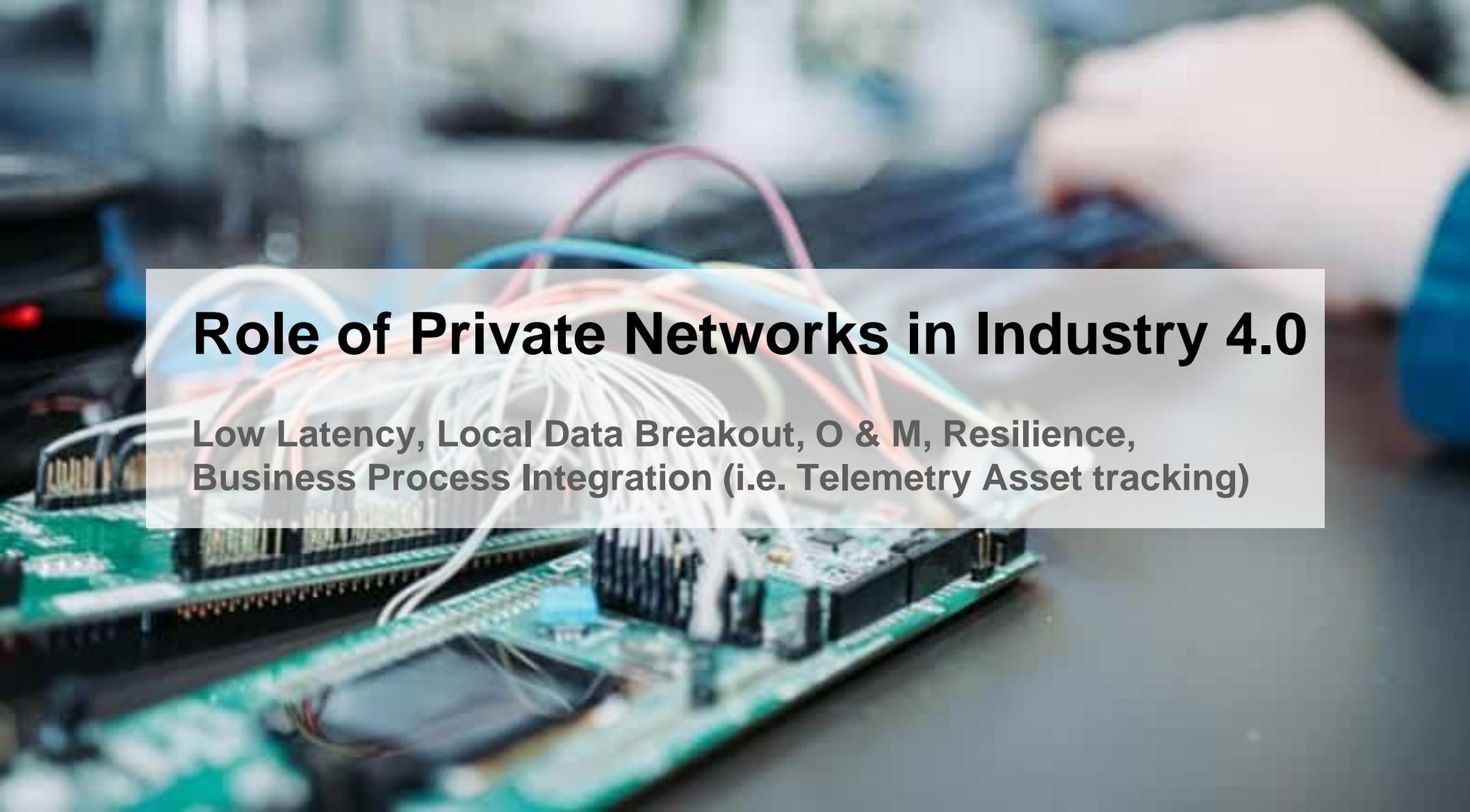
Koning and Hartman introduced the Druid 4G technology to the Bravis Hospital in Roosendaal, in 2018. Several hundred doctors and nurses are provided with a resilient private 4G network across the hospital campus for mobile voice, messaging and data services.

Key benefits for Industry:

Reliable, dedicated wireless connectivity enables healthcare staff to communicate quickly and reliable. It also opens the door for thousands of new technologies and applications to help medical care providers drive greater efficiencies and improve patient outcomes.



Druid



Role of Private Networks in Industry 4.0

**Low Latency, Local Data Breakout, O & M, Resilience,
Business Process Integration (i.e. Telemetry Asset tracking)**

Industrial IoT & Port Automation

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Customer Need:

Cargo handling is an information intensive business and is fiercely competitive. Shipping companies, like those in the Port of Rotterdam, are quick to embrace new technologies to gain competitive advantage. Real time positioning application and control of unmanned vehicles are a must have for modern ports.

The Solution:

Real time data transfer requires dedicated data and very low latency. Druids Private LTE application, in combination with Airspan's carrier grade base stations, provides very low latency and reliable quality of service. It also gives easy control and management of the network to the network managers.

Key benefits for the Port of Rotterdam:

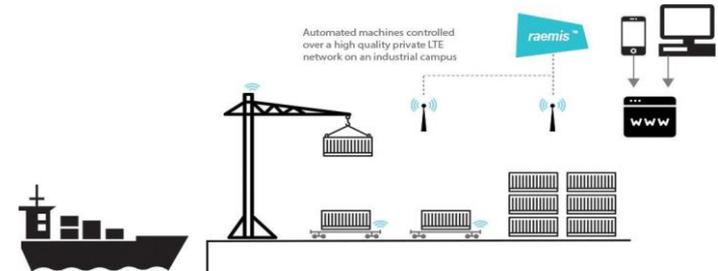
These private networks help logistic companies achieve greater efficiencies. At the same time delivering a safer working environment for their employees.

axians

Koning & Hartman

VINCI ENERGIES

Airspan



Druid

Industrial IoT & Port Automation

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Customer Need:

Druids partners [Geoverse](#) are providing an LTE network in the CBRS band for Oakland Maritime Support Services (OMSS) at the Port of Oakland in the US. The new LTE deployment will enable various management applications for 'intermodal' transportation in the container yard in the first phase and new smart port applications in follow-on phases.

The Solution:

The private LTE deployment will be one of the first smart port solutions rolled out with CBRS in the US, said Geoverse. OMSS is deploying the Washington firm's GeoCore evolved packet core (EPC) solution to manage the CBRS infrastructure and connected endpoints across the port site. Geoverse SIMs will go into a number of mobile devices and endpoints, to securely connect to the private LTE network, and roam outside on public cellular networks.

Key benefits for the Port:

OMSS plans to accelerate its digital transformation by using the Geoverse platform to enable wireless coverage across the port facilities, and to spur industrial IoT, and advanced analytics to drive productivity and efficiency at its container yard. OMSS is looking to better manage increasing container traffic, growing handling volumes, and tighter demands on the supply chain.



Intel Israel - (IOPS)

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Customer Need:

In 3GPP Release 13, the Isolated E-UTRAN Operation for Public Safety (IOPS) concept was introduced. IOPS aims at maintaining a level of communication between public safety users, offering them local mission critical services even when the backhaul connectivity to the core network is not fully functional.

The Solution:

At Intel Tel Aviv, the Druid core is set-up as a fully redundant hot back-up private 4G core to Cellcom's public core. Both cores share the same RAN which is Cellcom's public network RAN.

Key benefits for Intel:

In the event of a public core failure or back-haul failure the eNodeBs/4G radios are configured to direct all user and control plane traffic to the Druid private core (redundant configuration), this is achieved using the S.1 Flex feature of the eNodeB.



Druid

Customer Need:

Cargo handling is an information intensive business and is fiercely competitive. Shipping companies are quick to embrace new technologies to gain competitive advantage. Real time positioning application and control of environments through IoT are a must have for shipping companies.

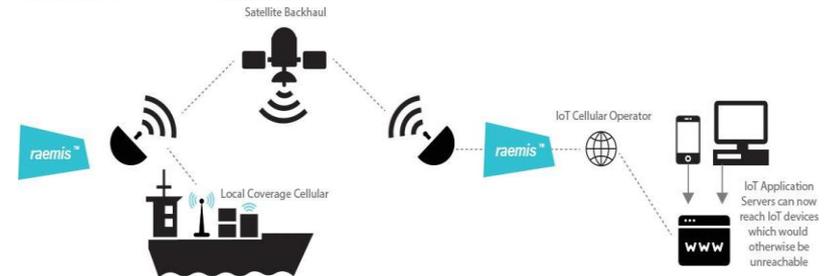
The Solution:

Druid's private network provides vital coverage on ships for container tracking and telemetry monitoring of refrigerated containers for example for our partners (WMS) Wireless Maritime Services.

Key benefits for WMS:

Druid's IoT Reach solution:

- lights offshore black spots with coverage for IoT devices,
- Can operate in licensed or unlicensed spectrum depending on the specific use case,
- act as an inbound roaming network for IoT devices and
- provides a real time management interface to identify the IoT devices present on its radio resources.



Entertainment & Retail

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Customer Need:

The American Dream Entertainment & Retail Complex in East Rutherford, NJ needed a network solution that supported their current data demands while being flexible enough to give capacity for change as the complex increases their technological footprint, with an evolution path to 5G.

The Solution:

ANS provided selection, installation, integration and operation of the OnGo Service, working with device partners to complete the private network solution including Federated Wireless (Spectrum Access System controller), Druid's LTE/4G EPC private platform deployed by Geoverse and Cradlepoint's NetCloud Service and Gigabit-Class LTE edge router with CBRS support.

Key benefits for American Dream Entertainment & Retail Complex:

The private network in the complex offers:

- network flexibility to support high data usage like 4k video, down to the most basic of IoT sensors,
- network control, so the network managers can choose what goes to the carriers, what stays internal, what gets shared with tenants and how the bandwidth is used across all applications and,

All of these benefits leads to a better guest experience in the complex.



Druid



Role of Private Networks in Supporting Fixed Wireless Access

Cost effective rapid rollout for last mile broadband, Local Data Breakout, O & M, Resilience, Business Process Integration (i.e. CRM Azotel, FreeRadius, Sonar etc.,)

Addressing the Digital Divide - FWA for US Public Schools

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Customer Need:

With only 56% of US households (below income threshold) with broadband access, there is a real urgency now for students to have connectivity at home. This has been exacerbated by the Covid19 pandemic.

The Solution:

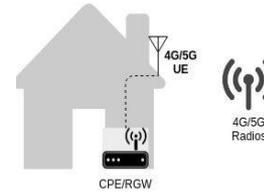
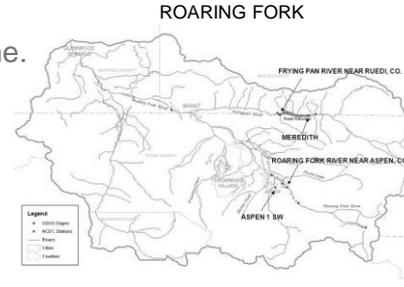
Using CBRS and OnGo spectrum for FWA deployments provides a rapid broadband connectivity roll out to address this critical need.

Multiple school districts in Texas and Florida already deploying this CBRS/OnGo FWA solution with Druid's Raemis EPC with Airspan, Nokia and Ericsson CBSDs.

Key benefits for the Industry:

Druid's Raemis FWA ePC platform is a 3GPP compliant 4G/5G core network, with unique features designed specifically for the easy management of the Public Schools data broadband:

- Simple Management Interface
- Dedicated secure coverage
- Integration with existing CRM systems
- Layer 2 Networking Capability
- 100 Users to 100,000 and more
- 5G Capable

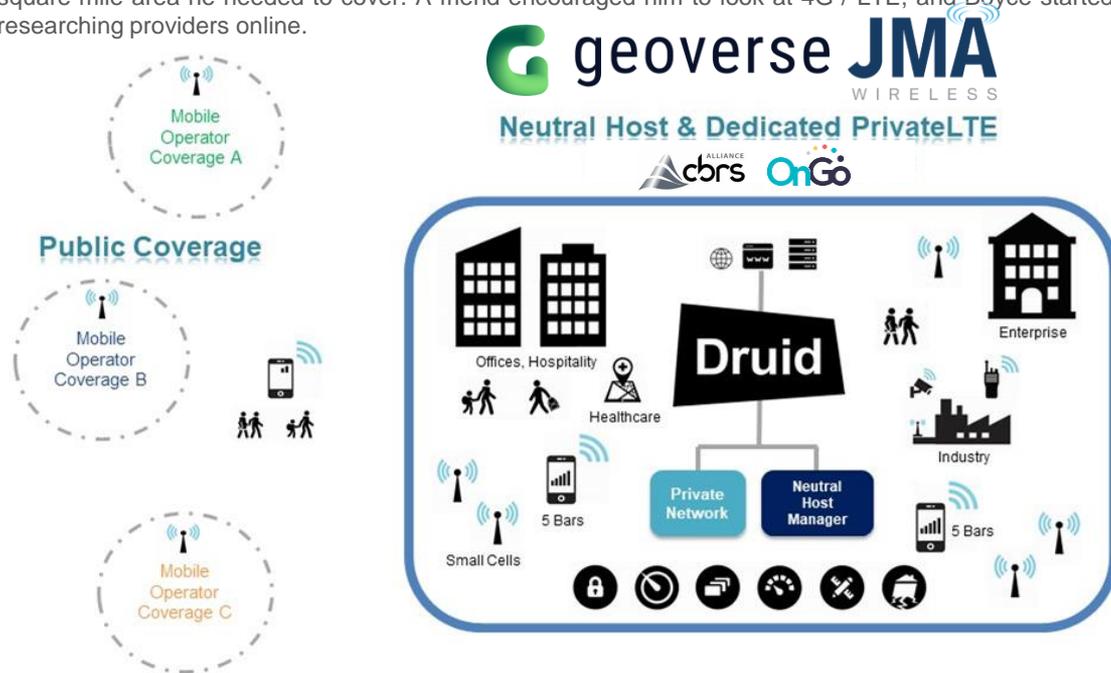


City of Tucson - Smart City & Digital Divide Use Case

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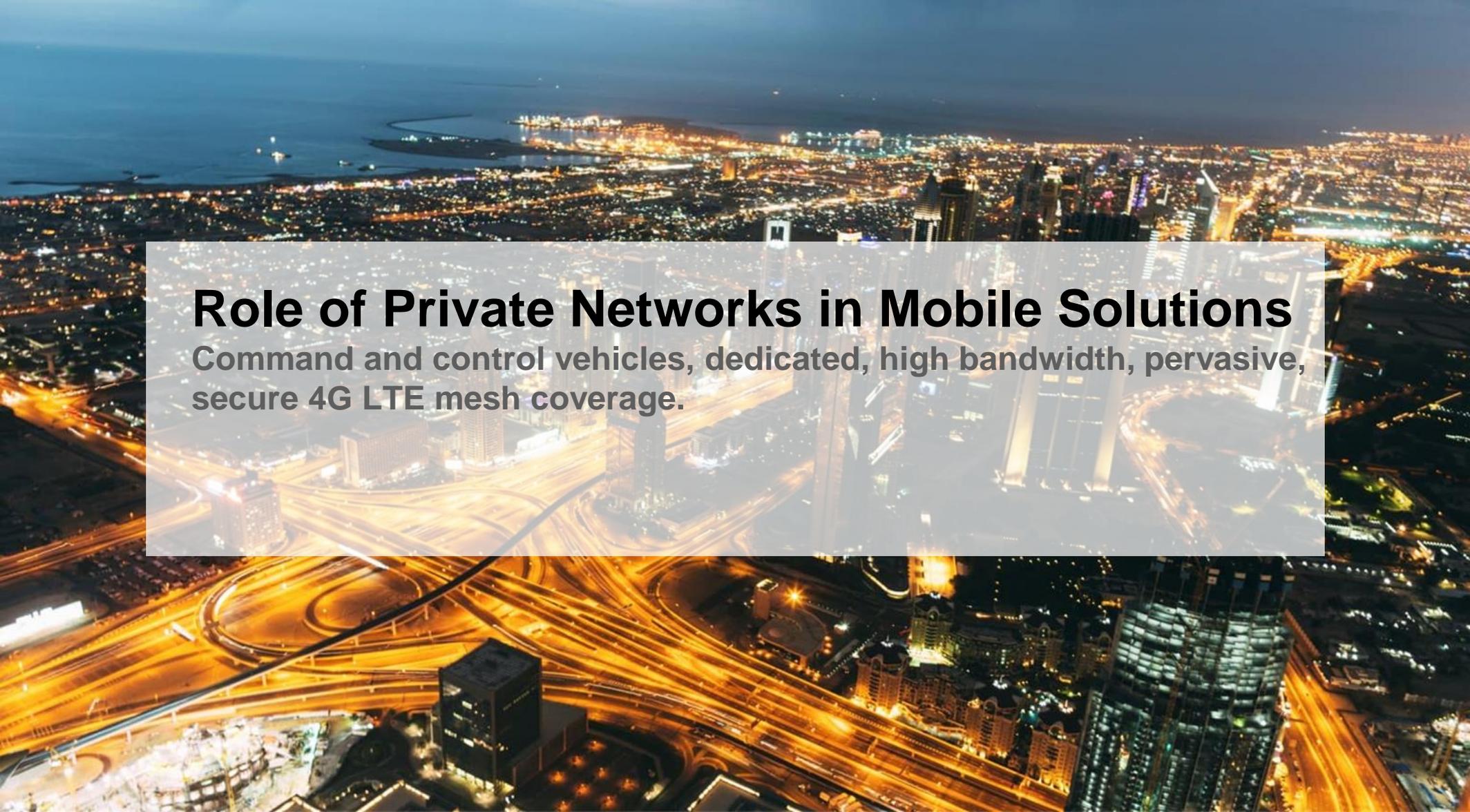
Background: Tucson CIO Collin Boyce realized about a year ago that his city was not ready for the online lifestyle that was coming with COVID. “32% of Tucsonians did not have high-speed internet connectivity,” Boyce said. “I approached the assistant city manager, and we had this conversation about doing wireless.”

Boyce wanted to invest in wireless because he knew the city couldn’t afford to connect everyone with fiber. But Wi-Fi also seemed too costly. Boyce figured he would need 7,000 access points for the 20-square-mile area he needed to cover. A friend encouraged him to look at 4G / LTE, and Boyce started researching providers online.



Use Cases Tucson’s CBRS network was built to help bridge the digital divide, but Boyce wants to also leverage it for smart city initiatives. Two possible projects are connected traffic signals and onboard Wi-Fi for city buses. Boyce said he has been approached by Intel and by the utility that handles Tucson’s water service.

According to Boyce, the network is delivering 50 Mbps downstream at his house, which isn’t even in the prescribed coverage area, and people who live closer to the towers are getting faster speeds. Boyce added that network policies block Netflix, Hulu, and content that is not considered appropriate for minors. [Read more](#)

An aerial night view of a city, likely Dubai, showing a complex multi-level highway interchange with glowing orange and yellow light trails from traffic. In the background, a dense urban landscape is illuminated with various lights, and a body of water is visible on the left side under a dark blue sky.

Role of Private Networks in Mobile Solutions

Command and control vehicles, dedicated, high bandwidth, pervasive, secure 4G LTE mesh coverage.

Emergency Services

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Customer Need:

The UK Fire and Rescue Services are responsible for protecting communities and reducing the impact of large-scale incidents, which requires reliable, remote communication to complete their missions.

The Solution:

Druid and Bence partnered with radio technology partners IP.Access and control systems specialists Cell Antenna Corp International, to deliver a command and control vehicle with more than 8 kms/5 miles of dedicated, high bandwidth, pervasive, secure 4G LTE mesh coverage with the latest high powered 4GLTE base station hardware.

Key benefits for Industry:

This innovative instant 4G network, makes firefighting much safer for first responders, by providing dedicated 4G LTE coverage for drones and the latest body worn camera, vital sign and mobile devices technology at the incident site.

The command and control vehicle is equipped with Simplified User Management System (SUMS), making the private LTE network and communication systems fast to deploy and easy to use.



Druid

Customer Need:

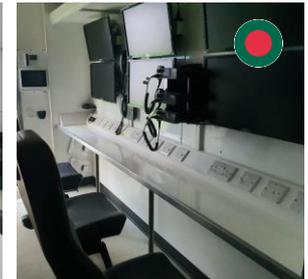
Bangladesh Special Security Forces are responsible for protecting communities and reducing the impact of large-scale incidents, which requires reliable, remote communication to complete their missions.

The Solution:

Bence Command delivered the latest in mission critical cellular network solutions for the Bangladesh Special Security Forces with this state of the art Command Vehicle. This innovative mobile instant 4G network provides dedicated 4G LTE coverage for drones and the latest body worn camera, vital sign and mobile devices technology at the incident site.

Key benefits for Industry:

This innovative instant 4G network, makes security much safer for first responders, by providing dedicated 4G LTE coverage the latest body worn camera, vital sign and mobile devices technology at the incident site.



Mobile Solution for Public Safety & Mining

[Back to Use Cases](#)

Customer Need:

Being remote is no longer a disadvantage as advanced solutions can now be utilised using the latest in satellite technology. To support businesses with remote connectivity needs, Aqura has developed a range of solutions which have been designed to provide reliable, high-performance connectivity, regardless of where the business is located. It calls these Autonomous Rapid Communications or ARC.

The Solution:

Aqura's ARC LTE Trailer was used to support Cubic Defence Australia & New Zealand as they undertook a range of evaluations in remote Queensland. Cubic leveraged LTE as part of their blended live and synthetic training environments. Aqura's ARC solution solves the problem of accessing reliable communications in remote areas where comms doesn't exist, with their high capacity, integrated communications platform that is transportable, rapidly deployable and engineered to withstand the rigours of harsh, remote environments.

Key benefits for Industry:

The ARC platform provides coverage of up to 5km to staff, devices and equipment users in locations that have no existing communications infrastructure. This provides clients with real time access to remote data, consistency in data acquisition from sensors and field devices, whilst enabling field workers to access business applications and communications. The ability to stream data from a remote site back to head office for processing and analysis allows for prompt feedback to the remote team, helping to avoid costly back tracking to locations that have been identified as worthy of further exploration.

AQURA
Technologies

CUBIC



Druid

4G Mobile Solution for Race Track

[Back to Use Cases](#)

Customer Need:

MotoGP circuit in Austin Texas is the location of a project developed by Tata, which equips the circuit with the necessary infrastructure and technology to allow users and customers to develop new products and services in the field of smart mobility and vehicle connectivity.

The Solution:

Tata has deployed a vehicle based OnGo LTE solution for the MotoGP circuit in Austin, Texas which provides the circuit with broadband connectivity and has deployed a wireless network, offering coverage for the entire site, which allows connectivity between vehicles. The entire track has high-definition cameras to monitor vehicles around the circuit and units fitted on the vehicles themselves to transmit telemetry, video and voice data. In addition, it has an IoT (Internet of Things) network which allows data to be managed and analysed.

Key benefits for the Industry:

The new wireless network installed, allows images and information along the racetrack to be transmitted to the control centre for viewing and analysis, making it possible to improve vehicle performance and safety while they are driven. The new Internet of Things (IoT) network provides constant information on the state of the track and vehicles on the track.



Role of Private Networks in Education

Campus in building & Outdoor networks, Connecting students, staff and helping to bridging the “digital divide.”

University Campus

[Back to Use Cases](#)

Customer Need:

Carnegie Mellon University (CMU) upgraded their existing network infrastructure using Amazon Web Services, Inc. (AWS) to power ongoing research and innovation in CMU's Living Edge Labs, in collaboration with System Integrators JMA and cellular network providers Druid Software.

The Solution:

This new network replaces legacy infrastructure with JMA's 4G/5G X-RAN virtualized RAN software and Raemis core operating on AWS Snowball Edge.

JMA and AWS collaborated to define and build the solution for CMU, which uses AWS Snowball Edge as a compute engine for cloud core and an environment to deploy edge applications research as part of the Living Edge Lab.

Key benefits for Industry:

The private 4G and 5G architecture enables technology research in 5G and for better connectivity on their campus.

The newly installed network covers much of the CMU campus, a public park area known as Schenley Plaza, and an urban shopping district on Walnut Street. The system immediately hit its performance goals and allowed the team to begin innovating new wireless edge applications and solutions.



Druid

The background features a dark blue gradient with numerous out-of-focus light blue and cyan circular bokeh spots scattered across the frame. Overlaid on this are several thin, dark blue lines that resemble fiber optic cables or data paths, extending from the bottom left towards the top right.

Role of 5G across Industries

Smart factories, Vehicle Autonomy, Public Infrastructure and Ports.

5G Smart Factory

[Back to Use Cases](#)

Customer Need:

5G-ENCODE is part of the UK government's 5G Testbeds and Trials Program, and is one of its biggest investments in 5G for manufacturing to date. The goal of the project is to prove the performance and business case for private industrial-grade 5G, against a variety of manufacturing use cases.

The Solution:

Our partners Zeetta Networks and the University of Bristol have switched on a Druid private LTE testbed at the UK's National Composites Centre as part of Phase One of the government-backed 5G-ENCODE project, which seeks to investigate private 5G as a springboard for Industry 4.0 and new economic growth in the country.

Specifically, it will test 5G for augmented and virtual reality (AR and VR) in design, manufacturing and training, as well as monitoring and tracking of time sensitive assets, and real-time in-process monitoring and analytics.

Key benefits for the Industry:

A network of this kind will empower manufacturers of all sizes to operate more productively, increasing output streamlining operations, thereby helping to safeguard the manufacturing sector against the fallout of this rapidly changing landscape.



Druid

5G OpenRAN for Automation

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Customer Need:

The Technical University of Kaiserslautern and the DFKI jointly launched the “5G OpenRAN for Automation” project. The aim is to create a powerful network that can draw on years of theoretical and practical experience to expand the fundamental basis with regard to 5G OpenRAN Technology.

The Solution:

The implementation of a 5G infrastructure will play a decisive role in the development of competencies and the adequate execution of tests for practical testing of the suitability of 5G technology. Interoperability and flexibility for the integration of specific functionalities are the main area of interest of Open RAN-based 5G networks.

Key benefits for Industry

Augmented Reality (AR) can support use cases such as commissioning, maintenance and assembly of complex machines in the industrial sector.

According to TUK and DFKI, the experience with 5G, OpenRAN Technology and the transfer to applied research will help to address the challenges facing industry, especially medium-sized companies... .. [read more](#)



Druid

5G Campus and Vehicle-to-bike communication

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Customer Need:

The project called “Car2Bike.5G” will establish and test these 5G use cases to highlight the benefits of 5G for application developers and transport users. It aims to increase safety for cyclists in road traffic through vehicle-to-bicycle communication using 5G, therefore dangerous situations can be predicted and anticipated through C2X/V2X communication. However, this requires all the sensors of the vehicle and the bike to send data in real time, where the real time capabilities of 5Gs will be ideal for hazard analysis.

The Solution:

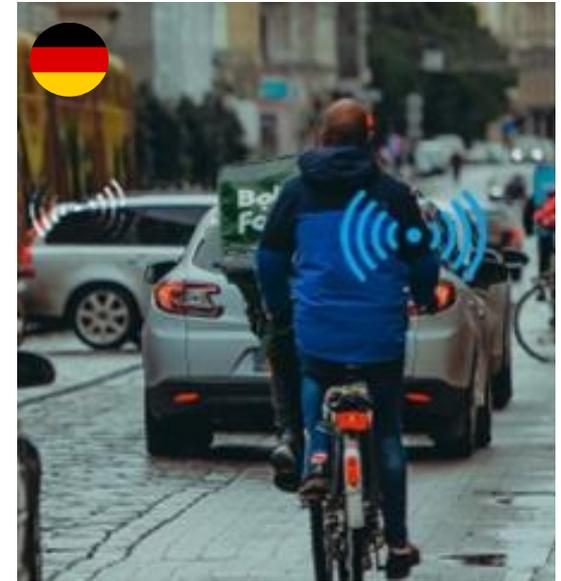
The test facility will combine indoor and outdoor 5G SA coverage and provide a foundation for the project in order to support the configuration of the onboard units and the alignment of the simulated radio wave propagation with measurements.

Key benefits for Industry

The use cases being explored will be essential to accelerating Industry 4.0. Triopt sees great potential in Campus 5G networks in Germany. They plan to leverage the experience gained in building this network for 5G.NRW, along with their years of experience in network and project management, to supply campus Networks for academia and industries across Germany in the near future.



ZTE



Customer Need:

The EU is gearing up to integrate European road and rail transport with 5G technologies that will function seamlessly across borders, enabling connected and automated mobility (CAM). The EU-funded 5GMED project is addressing this goal along the Mediterranean core network corridor, specifically the cross-border connection between Barcelona, Spain and Perpignan, France.

The Solution:

5GMed will demonstrate advanced Cooperative Connected and Automated Mobility (CCAM) and Future Railway Mobile Communications System services (FRMCS) along the 65km “Figueres – Perpignan” cross-border corridor between Spain and France. The project will be enabled by a multi-stakeholder compute and network infrastructure deployed by MNOs, neutral hosts, and road and rail operators, based on 5G and offering support for AI functions.

Key benefits for the Industry:

The High-speed rail track and highway run very close to each other, so the goal is to deploy a single multi-stakeholder infrastructure, remote and autonomous driving enabled by extensive sensor deployment along the roads for AI-powered traffic management. FRMCS services will include real-time analysis of high-speed trains via camera data as well as high-speed internet service to passengers. Both will integrate media services for passengers to ensure the seamless migration of functionality across borders.

cellnex



5G Autonomous track

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Customer Need:

Millbrook UK provides vehicle test and validation services and systems in the automotive, transport, tyre, petrochemical and defence industries. The sites *AutoAir* network is being migrated to commercial grade Open RAN, disaggregated RAN and cloud native 5GC standalone technologies to bring URLLC, Massive Machine Type Communications (mMTC) and network slicing capabilities into a real-world test arena for the first time in the UK.

The Solution:

The network will be one of the first, and the largest standalone 5G neutral host networks in Europe. With standalone 5G, the full capabilities of the latest 3GPP release can be realised in a secure private operating environment with pervasive coverage across Millbrook Proving Ground.

Key benefits for Millbrook UK:

Connected and Autonomous Vehicle (CAV) developers will have access to the latest technology, including low latency connectivity, network slicing and the opportunity to test vehicles in more advanced networks which are available in key export markets.

With URLLC, latency as low as 3ms can be experienced and mMTC brings the potential of connecting massively more devices per km² than previously possible.



Druid

5G Connected Circuit

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Customer Need:

Mobility Lab, a project developed by Cellnex Telecom, has equipped the Circuit Parcmotor with the necessary infrastructure and technology to allow users and customers to develop new products and services in the field of smart mobility and vehicle connectivity.

The Solution:

Cellnex Telecom has provided the circuit with broadband connectivity and has deployed a wireless network, offering coverage for the entire site, which allows connectivity between vehicles. The entire track has high-definition cameras to monitor vehicles around the circuit and units fitted on the vehicles themselves to transmit telemetry, video and voice data. In addition, it has an IoT (Internet of Things) network which allows data to be managed and analysed. All deployed infrastructures are energy-sufficient using wind and/or solar power.

Key benefits for Industry

The new wireless network installed, allows images and information along the racetrack – which is over 4,140 metres long – to be transmitted to the control centre for viewing and analysis, making it possible to improve vehicle performance and safety while they are driven. The new Internet of Things (IoT) network provides constant information on the state of the track and.... [read more.](#)



5G Testbed

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Customer Need:

The Smart Wireless Innovation Facility ([SWIFt](#)), will enable users to test and develop 5G-enabled solutions, alongside access to state-of-the-art LoRaWAN® networks. Businesses from across the UK [East Midlands](#), in particular Nottingham, will have a unique opportunity to take advantage of this new cutting edge facility, which will be a state of the art 5G testbed.

The Solution:

The facility covers 6,500 m2, with indoor and outdoor coverage as well as a lab space. This will include workshop equipment, development sensors, data loggers and a rapid printed circuit boards (PCB) prototyping system. It will have capacity to connect up to 1,000 devices and provides cross technology connectivity, opening up the possibilities for rapid development and deployment of advanced digital technology solutions.

Key benefits for Industry

The Nottingham Trent University (NTU) smart campus will become a 'living lab' for researchers, local businesses and policymakers, providing an opportunity to showcase and demonstrate how these technologies can be translated into everyday life. Furthermore it will also examine 5G and other smart technology applications in industry.



Druid

5G Innovation

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Customer Need:

The [5PRING](#) Consortium is the UK's first 5G application accelerator designed to ignite innovative solutions using 5G technology. Led by Digital Catapult and partners, their mission is to engage more than 2,000 businesses, firmly putting the [West Midlands](#) on the map as leaders in 5G innovation.

The Solution:

Participants in the program have the opportunity to develop innovative and ambitious 5G solutions, offering a tailored acceleration curriculum with access to 5G test-beds.

5PRING brings together supply and demand-side businesses to take 5G innovations and work together to turn those into commercially viable propositions through their Engage Series, Exploit and Explore Programmes.

Key benefits for Industry

5PRING will increase the core understanding of 5G, how it works and the benefits it provides to businesses – both in the public and private sectors.

By providing access to private 5G networks, businesses across the region are able to experiment with features that aren't yet commercially available.



Druid

5G SmartRAN Open Network Interoperability

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Customer Need:

The SmartRAN Open Network Interoperability Centre ([SONIC](#)) is joint programme between Digital Catapult and Ofcom to test interoperability and integration of open networking solutions, vendors and system integrators. Funded by the UK government and Ofcommn, SONIC aims to help achieve a vision of a more open, competitive and diverse telecoms supply chain.

The Solution:

Digital Catapult existing testbeds in London and Brighton, will be leveraged rapidly in SONIC and will be operational from May 2021, coupling laboratory capabilities with real world indoor and outdoor deployments. SONIC begins with Open RAN and focuses on open software-centric networking. In addition to telecoms solution providers of all sizes, SONIC will supply insights to network providers – including national operators and smaller private and neutral networks.

Key benefits for Industry

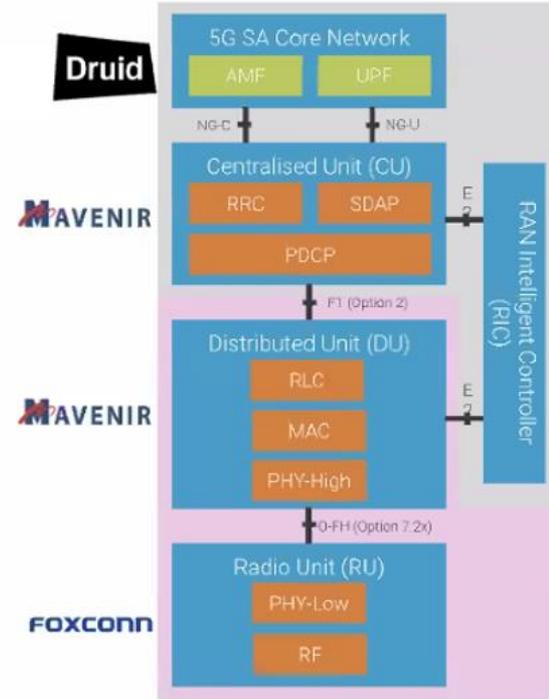
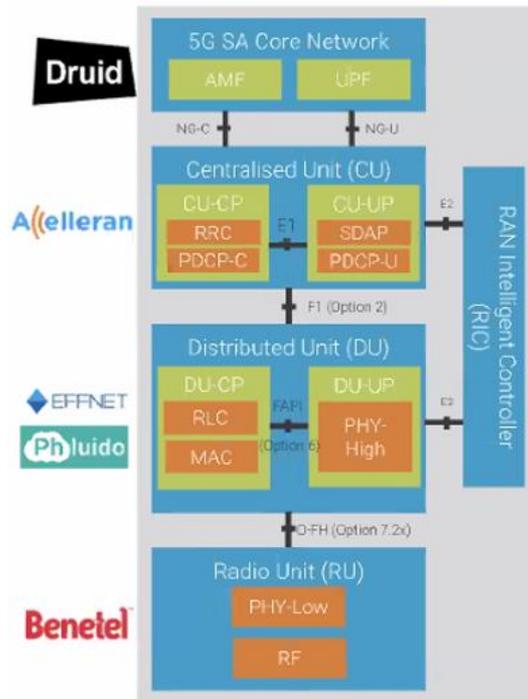
SONIC will foster an ecosystem in the UK, of large and small telecoms suppliers, with multiple providers for each element in the technology stack. Large businesses can explore future deployments such as private and virtual networks, while smaller companies can test the integration potential of their early stage products. Providing a neutral environment for testing and demonstration will surface the opportunities and challenges of interoperability.



SONIC O-RAN Labs Update

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The SmartRAN Open Network Interoperability Centre (SONIC) is joint programme between Digital Catapult and Ofcom to test interoperability and integration of open networking solutions, vendors and system integrators. Funded by the UK government and Ofcom. SONIC aims to help achieve a vision of a more open, competitive and diverse telecoms supply chain.



SONIC Labs will provide key learnings through hand-on experience with Open RAN

Druid

5G Industrial applications

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Customer Need:

Technological innovations such as Wi-Fi and 5G have allowed for ever-growing wireless use in industrial applications, resulting in an explosive increase in data traffic. On the other hand, spectrum (radio frequency) resources are limited, and the strain on these resources is becoming an issue. Sony and Mitsui aim to build a spectrum sharing model for specific business use cases across a broad geographic area, including Japan, other regions of Asia, the U.S. and Europe.

The Solution:

The two companies predict that spectrum sharing technology will be used widely to optimize the use of finite radio frequency resources, replacing the traditional method of managing each frequency band separately.

Sony and Mitsui have achieved the successful operation of Sony's Dynamic Spectrum Access (DSA) technology in a standalone 5G environment using Airspan Networks 5G OpenRAN end-to-end solutions.

Key benefits for Industry

Accompanying this kind of diversification occurring in radio frequency resource assignment methods, new use cases and innovation in various industry applications, as well as automated spectrum management using DSA technology, are also being explored, leading Sony and Mitsui to join forces in looking into the commercial potential.



Network Operators and Roaming

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Customer Need:

Druid has been working with the Belgian network operator Proximus, along with its international roaming business BICS, to test outbound roaming between public 5G SA networks, as well as to enable enterprises to roam between private and public network infrastructure.

The Solution:

Druid is providing the “actual production environment”, via our Raemis core platform, to Proximus for its private 4G and 5G network customers. Their 5G Lab uses a core setup from Massachusetts-based provider VALID8.

They said it has so far tested outbound roaming of data traffic going from BICS to Proximus in Belgium. The lab will test inbound roaming and other scenarios, too. The Raemis core platform was the home network in the BICS testbed, with the private network subscribers roaming onto a simulated network on the BICS/Proximus side.

Key benefits for Industry

Inter-network 5G SA roaming is “critical” for the ecosystem to meet the international needs of enterprise users. It also established connectivity between the visited and home network via secured gateways (SEPP), hosted on BICS’ IPX network. Roaming between private and public network infrastructure, important for tracking shipments in and out of enterprise hubs, as well as for contiguous international connectivity as Covid-19 travel restrictions start to lift, will be included in its global SIM for Things solution.



Druid

5G Supports Augmented Reality on Electric Bikes

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Customer Need:

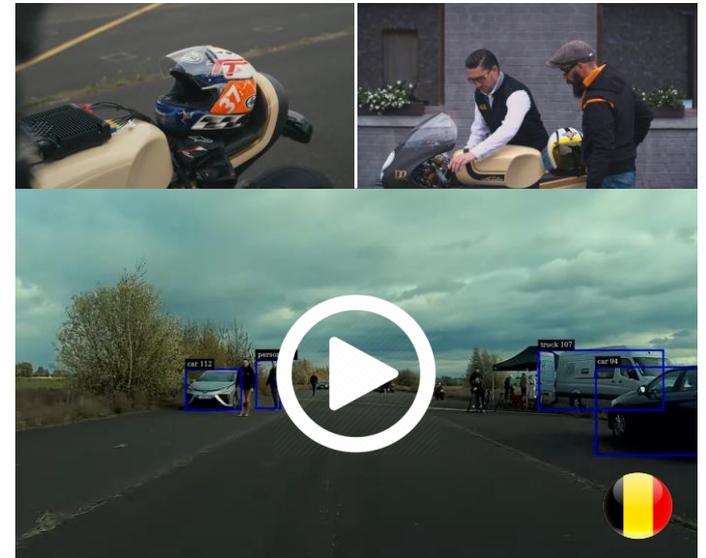
Proximus, in collaboration with Saroléa, a Belgian brand of electric motorbikes, and ML6, a tech firm specialized in AI services, has successfully tested a new 5G application that could eventually contribute to safer traffic. They tested the application using an electric motorcycle, which was equipped with a 5G modem and a camera capable of identifying humans, vehicles or obstacles via artificial intelligence.

The Solution:

The objective of the test sequence at this stage consisted mainly of identifying pedestrians along the route of the motorcycle in "real time" and with high reliability. The 5G connection was tested at different speeds and at different distances from the antenna. With success, as the recognition and identification of obstacles proved to be more than 99% accurate, and the variations in speed and distance from the antenna did not have any impact on the stability of the connection, nor on latency

Key benefits for Industry

Leveraging technology to support drivers and make motorcycles safer can boost the popularity of this mode of transportation; 5G connectivity plays a crucial role in doing so. Sensors and cameras on motorcycles continuously feed the AI models so the data is analyzed in real-time and indicates where dangerous situations arise. By conducting this test, customers can be advised better on whether to choose an edge vs streaming architecture, in terms of performance, scalability and cost.



Druid

5G Tactical Edge Solutions

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Customer Need:

The OSIRIS program will help address the need for test facilities that enable rapid experimentation and dual-use application prototyping. The testbed will identify areas for further compatibility between 5G network and DOD platforms that will enhance customer capabilities.

The Solution:

The infrastructure will allow for the connection of various 5G-ready user devices, sensors, vehicles and endpoints to explore the military utility of commercial 5G technologies and pave the way for onboarding of new technologies from other OUSD investments while addressing cybersecurity requirements. This capability will further enable and advance DOD's Joint All Domain Operations concept.

Key benefits for the Customer:

- OSIRIS will serve as a critical proof point of Lockheed Martin's 5G.MIL® capabilities.
- Integration of the technical capabilities of 5G waveforms, software and hardware with higher bandwidth and low-latency data rates into Lockheed Martin's defense products to enhance their performance for their warfighters.
- Ensures that warfighters operating in communications contested and denied environments have resilient access to data to perform their missions anywhere in the world. [Read more..](#)

Solution Provider	Druid Partner	5G SA Core Platform	5G RAN
			



Druid

Thank You

Any Questions?



Raemis Enterprise

Up Since: Fri Mar 1
logged in as raemis
001 - 33

- Dashboard >
- Users >
- Groups >
- SIP >
- Cells >
- System >
- Video >



Cells	
Cell 1 (site 23)	
CALL	0/22
SIGN	0/8
BANDWIDTH DL: 0/8 kbps UL: 0/9 kbps	
User	0
Call	0
Mesg	0
Data	0
Cell 2 (site 44)	
CALL	0/6
SIGN	0/8

Alarms	
critical	2018-03-16 10:58:57 mgw_#(0) peer unreachable
critical	2018-03-16 14:08:44 hnb(2) HNB deregistered
major	2018-03-17 12:31:53 hnb(1) PROCESSING
major	2018-03-17 14:40:06 hnb(3) PROCESSING
minor	2018-03-20 07:57:00 hnb(3) ENVIRONMENTAL

SIP Providers	
Local SIP Provider	13
IMS Loopback Provider	
HSS	
responderdr...	Clients: