Když to nejde pod zemí
tak to půjde nad zemí.

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IP-20 Platform

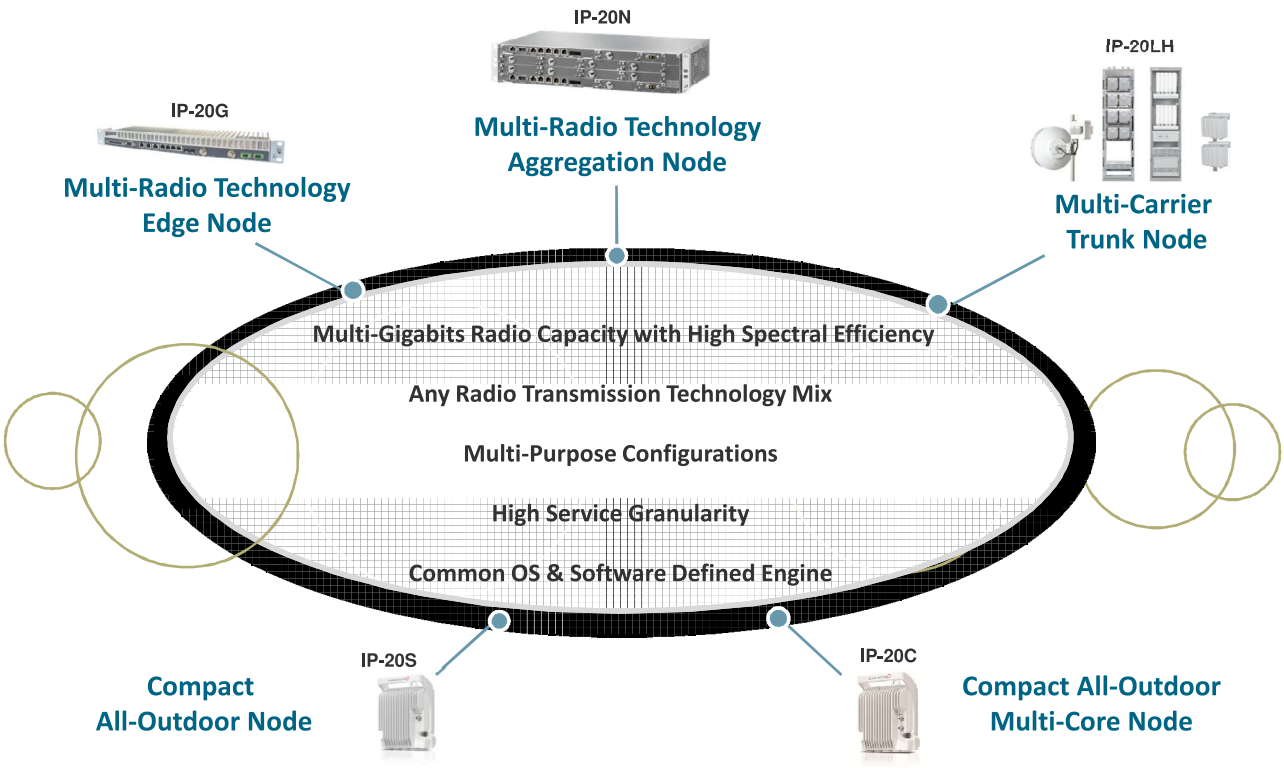
A Single Platform Serving All Radio Transport Technologies

Stanislav Kofroň, Brno

13. března 2014

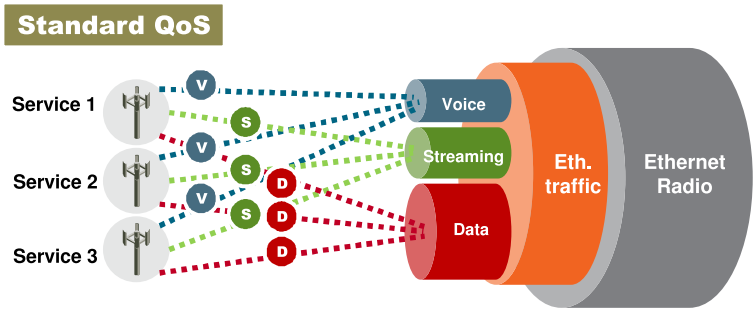
IP-20 Platform

A Single Platform Serving All Radio Transport Technologies

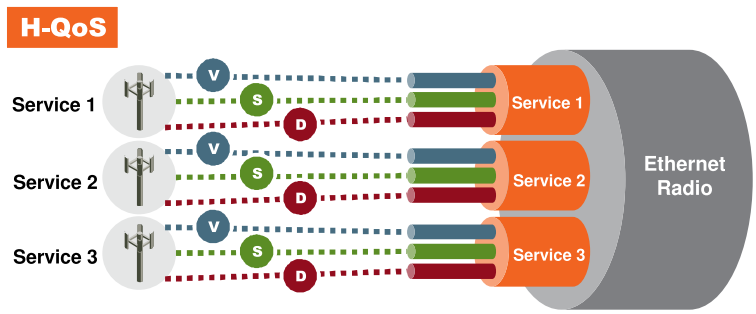


Hierarchical QoS (H-QoS) vs. Standard QoS

- Differentiation between different traffic classes (CoS)
- Services within the same traffic class are treated as a single aggregate with no isolation
- Limited per-service visibility and control



- Each service gets its own personalized treatment
- TDM-grade performance providing per-service full visibility and control



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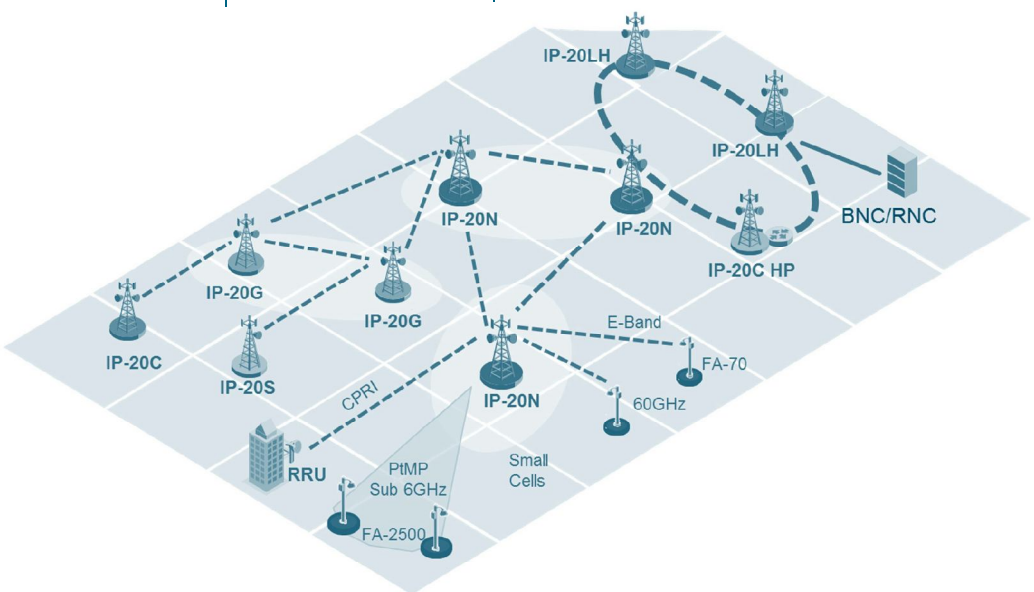
IP-20 Selection Guidelines

Capacity	Installation	Application	Output Power
Up to 500Mbps	All-outdoor	Access/Edge	Standard
500Mbps – 1Gbps	Split-mount	Multi-direction (Node)	High
Above 1Gbps	All-indoor	Multi-carrier (Trunk)	Ultra-High



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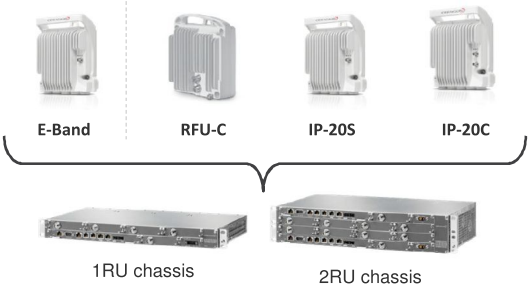
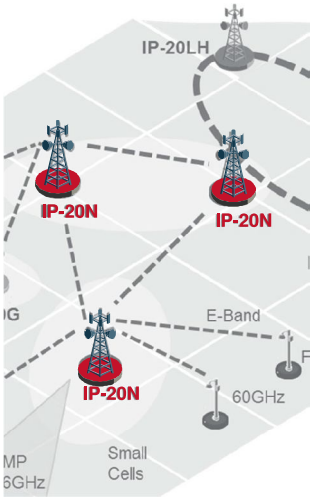
1. IP-20 Selection Guidelines

Capacity	Installation	Application	Output Power
• Up to 500Mbps	• All-outdoor	• Access/Edge	● **Standard**
● **500Mbps – 1Gbps**	● **Split-mount**	● **Multi-direction (Node)**	• High
● **Above 1Gbps**	• All-indoor	• Multi-carrier (Trunk)	• Ultra-High

FibeAir IP-20N

Multi-Radio Technology Aggregation Node





- Highly scalable & modular
- Hybrid multi-service platform –TDM & Ethernet
- Single Network Element for all any radio transmission technology mix (4-86GHz)

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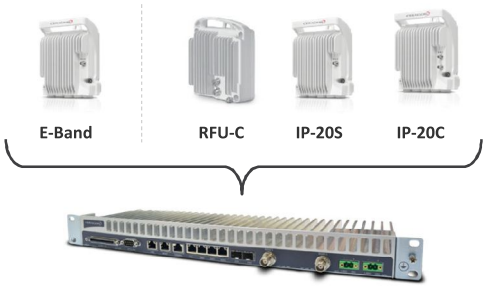
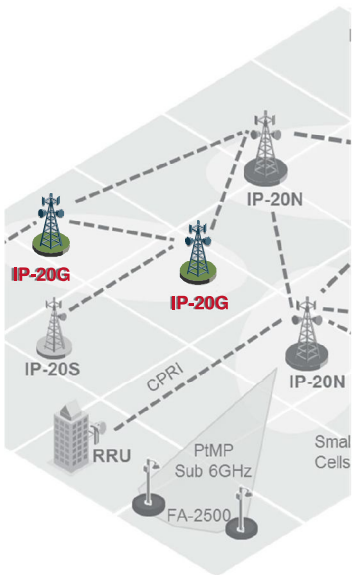
2. IP-20 Selection Guidelines

Capacity	Installation	Application	Output Power
● **Up to 500Mbps**	• All-outdoor	● **Access/Edge**	● **Standard**
● **500Mbps – 1Gbps**	● **Split-mount**	● **Multi-Direction (Node)**	• High
• Above 1Gbps	• All-indoor	• Multi-Carrier (Trunk)	• Ultra-High

FibeAir IP-20G

Multi-Radio Technology Edge Node





- Optimized for access/edge sites
- Easy to install and maintain
- Low footprint fixed design - quick, simple and reliable set up
- Hybrid multi-service platform –TDM & Ethernet

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3. IP-20 Selection Guidelines

Capacity	Installation	Application	Output Power
Up to 500Mbps	**All-outdoor**	**Access/Edge**	**Standard**
500Mbps – 1Gbps	**Split-mount**	**Multi-direction (Node)**	High
Above 1Gbps	All-indoor	Multi-carrier (Trunk)	Ultra-High

FibeAir IP-20C

Compact All-outdoor Multi-Core Node

- Multi-core radio – enables remote activation of the 2nd TRX
- High capacity - LoS MIMO and up to 2048 QAM modulation
- Integrated Carrier Ethernet switch
- East-west, all-outdoor node in a single box
- All-outdoor or split-mount

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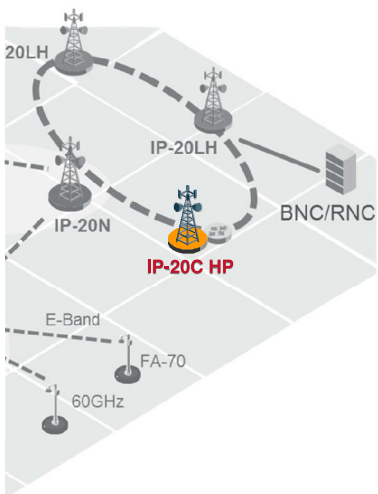
4. IP-20 Selection Guidelines

Capacity	Installation	Application	Output Power
Up to 500Mbps	All-outdoor	Access/Edge	Standard
500Mbps – 1Gbps	**Split-mount**	Multi-Direction (Node)	**High**
Above 1Gbps	All-indoor	**Multi-Carrier (Trunk)**	Ultra-High

FibeAir IP-20C HP

Compact High Power, Multi-Carrier Trunk

- High power, multi-core radio with compact, low loss branching
- Up to 4+0/2+2 all-outdoor direct mount
- High capacity - up to 2048 QAM modulation
- Integrated Carrier Ethernet switch
- All-outdoor or split-mount configuration
- Hybrid multi-service platform –TDM & Ethernet



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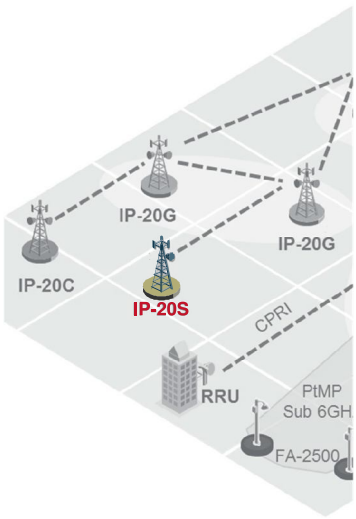
5. IP-20 Selection Guidelines

Capacity	Installation	Application	Output Power
Up to 500Mbps	**All-outdoor**	**Access/Edge**	**Standard**
500Mbps – 1Gbps	Split-mount	Multi-Direction (Node)	High
Above 1Gbps	All-indoor	Multi-Carrier (Trunk)	Ultra-High

FibeAir IP-20S

Compact All-outdoor Node

- Integrated Carrier Ethernet switch
- Up to 2048 QAM modulation
- All-outdoor or split mount configuration
- Quick and simple installation and maintenance



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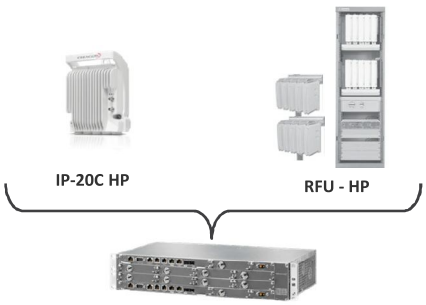
6. IP-20 Selection Guidelines

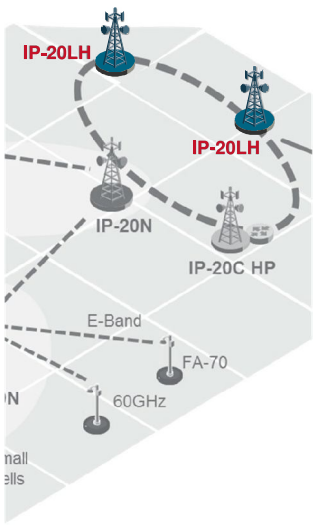
Capacity	Installation	Application	Output Power
Up to 500Mbps	All-outdoor	Access/Edge	Standard
500Mbps – 1Gbps	**Split-mount**	Multi-Direction (Node)	**High**
Above 1Gbps	**All-indoor**	**Multi-Carrier (Trunk)**	**Ultra-High**

FibeAir IP-20LH

High Power Multi-Carrier Trunk



- Hybrid multi-service platform –TDM & Ethernet
- In all-indoor as well as split-mount configuration
- High availability & reliability – no single point of failure
- Integrated Carrier Ethernet switch



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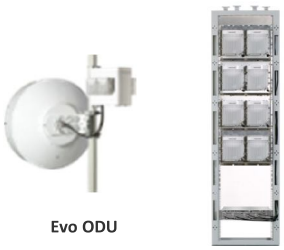
7. IP-20 Selection Guidelines

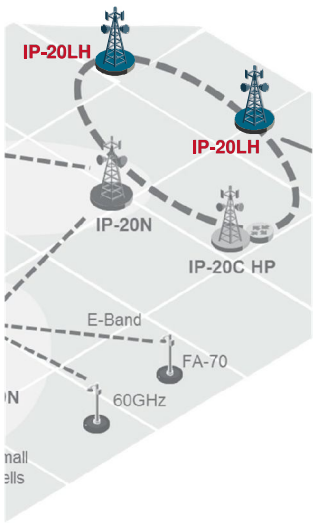
Capacity	Installation	Application	Output Power
Up to 500Mbps	All-outdoor	Access/Edge	Standard
500Mbps – 1Gbps	**Split-mount**	Multi-Direction (Node)	**High**
Above 1Gbps	**All-indoor**	**Multi-Carrier (Trunk)**	**Ultra-High**

Evolution IP-20LH

High Power Multi-Carrier Trunk



Evo ODU



- Hybrid multi-service platform –TDM & Ethernet
- In all-indoor as well as split-mount configuration
- High availability & reliability – no single point of failure
- Integrated Carrier Ethernet switch

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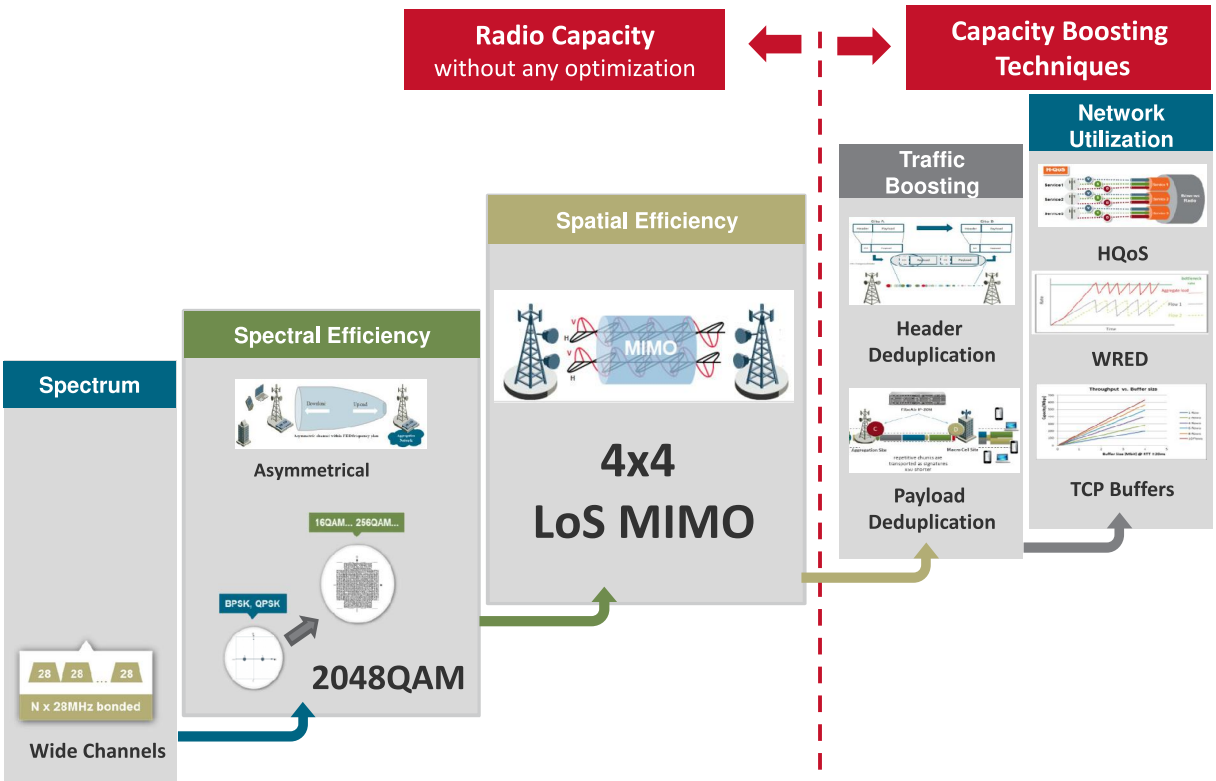
Ultra-high Capacity at Any Spectrum

Multi-Gigabits Radio Capacity with High Spectral Efficiency



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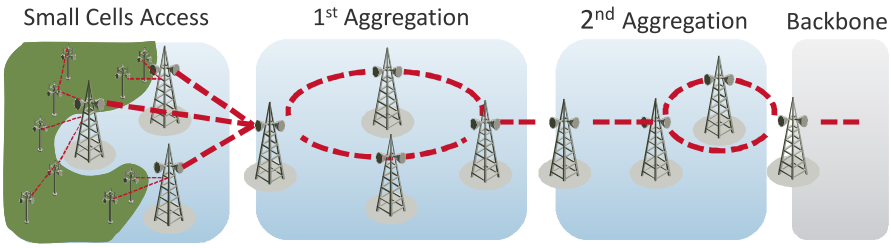
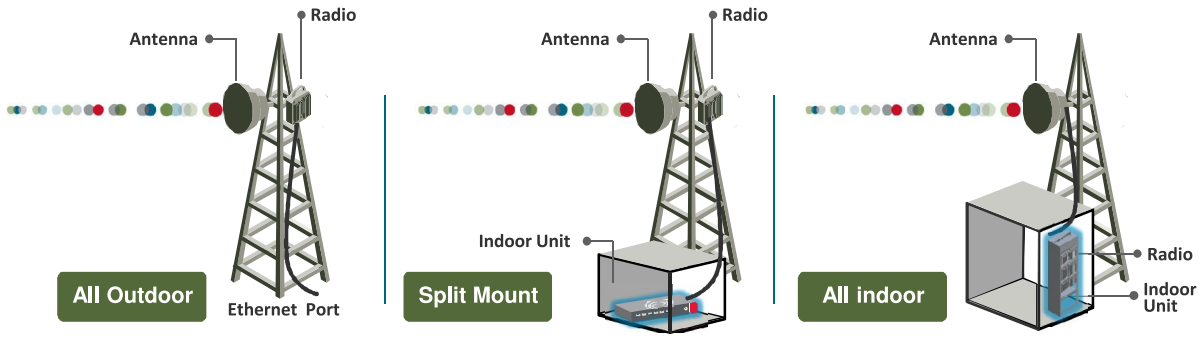
Ideal for Versatile Deployment Scenarios

Multi-Purpose Configurations

Access, Small Cells , Aggregation and Multi-carrier Trunk Deployments



Split -mount, All-outdoor and All-indoor Configurations



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FibeAir IP-20N

Multi-Radio Technology Aggregation Node

- **Any radio transmission technology mix**
  - Wireless multi-technology platform optimized for HetNets
- **Multi-Gigabits Radio Capacity with high spectral efficiency**
  - Ultra-high capacity over licensed and license-exempt frequency bands (4-86GHz)
- **Future proof, highly scalable & modular**
  - Highest carrier density in the market - up to 10 radio carriers in 2RU
- **Facilitates network modernization**
  - Multi-service support (hybrid) - fully interoperable with Ceragon installed-base units
  - Intelligent networking functions - MEF Carrier Ethernet 2.0-compliant, MPLS-TP-ready
- **Common OS & Software Defined Engine simplifies network modernization**
  - Unified CeraOS software across entire series, powered by programmable network processors

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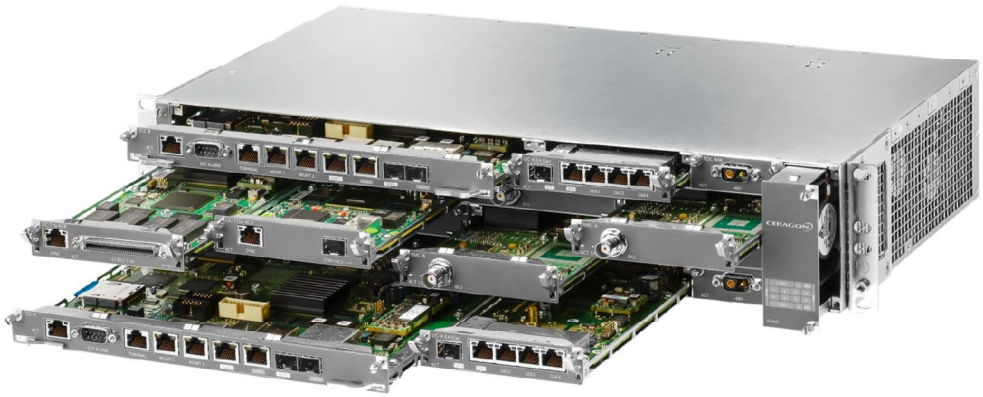
FibeAir IP-20N

Multi-Radio Technology Aggregation Node

- **FibeAir IP-20N** is a multi-radio technology aggregation node. It offers multi-Gigabit capacity throughput and supports any radio technology mix from 4-86GHz - which makes it ideal for HetNets Hauling and small-cell aggregation.

- **FibeAir IP-20N** comes in two modular designs: 10-port 2RU or 5-port in 1RU. On top of being interoperable with Ceragon's current install-base radios, it also supports any radio transmission mix, making it ideal for seamless network modernization



FibeAir IP-20G

Multi-Radio Technology Edge Node

- **Any radio transmission technology mix**
  - Wireless multi-technology platform optimized for HetNets

- **Multi-Gigabits Radio Capacity with high spectral efficiency**
  - Ultra-high capacity over licensed and license-exempt frequency bands (4-86GHz)

- **Easy to install, highly reliable**
  - Low footprint, fixed design, quick, simple and reliable set up

- **High service granularity enables rollout of new business models**
  - Intelligent service-centric management utilizing hierarchical QoS and advanced OAM capabilities
  - Integrated Ethernet switch - MEF Carrier Ethernet 2.0-compliant, MPLS-TP-ready

- **Common OS & Software Defined Engine simplifies network modernization**
  - Unified CeraOS software across entire series, powered by programmable network processors

FibeAir IP-20C

Compact All-Outdoor Multi-Core Node

- **Multi-core radio solution delivers multi-Gbps anywhere**
  - Remote activation of the 2nd IP-20C TRX – Future upgrades without additional sites visits
- **Multi-Gigabits Radio Capacity with high spectral efficiency**
  - Virtual fiber in licensed frequencies –1Gbps in-a-box
  - LoS 4x4 MIMO and up to 2048 QAM modulation
- **Multi-purpose platform, ideal for versatile deployment scenarios**
  - For access, small cells, aggregation and multi-carrier trunk deployments in split-mount or all-outdoor configurations
- **High service granularity enables rollout of new business models**
  - Intelligent service-centric management utilizing hierarchical QoS and advanced OAM capabilities
  - Integrated Ethernet switch - MEF Carrier Ethernet 2.0-compliant, MPLS-TP-ready
- **Common OS & Software Defined Engine simplifies network modernization**
  - Unified CeraOS across entire series, powered by programmable network processor

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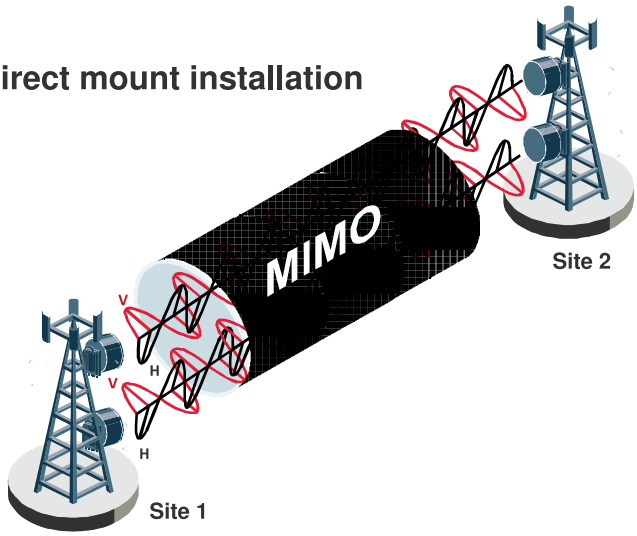
Line-of-Sight (LOS) MIMO
4 x Capacity on the *SAME CHANNEL!*

- **Using the a single channel to quadruple the capacity**
- **2 x IP-20C units at each site**
- **Simple direct mount installation**



1Gbps on a single 30/28 MHz channel

Upgrading the Capacity without network re-planning

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FibeAir IP-20S

Compact All-Outdoor Node

- **Single core radio node**
  - Integrated Ethernet switch - MEF Carrier Ethernet 2.0-compliant, MPLS-TP-ready
- **Multi-Gigabits Radio Capacity with high spectral efficiency**
  - Up to 2048 QAM modulation
- **Multi-purpose platform, ideal for versatile deployment scenarios**
  - For access, small cells, aggregation and deployments in split-mount or all-outdoor configurations
- **High service granularity enables rollout of new business models**
  - Intelligent service-centric management utilizing hierarchical QoS and advanced OAM capabilities
  - Integrated Ethernet switch - MEF Carrier Ethernet 2.0-compliant, MPLS-TP-ready
- **Common OS & Software Defined Engine simplifies network modernization**
  - Unified CeraOS across entire series, powered by programmable network processor

FibeAir IP-20LH

Multi-Carrier Trunk Node

- **Multi-purpose high power trunk solutions**
  - In all-indoor as well as split-mount configuration
  - Highly effectual branching system
- **Multi-Gigabits Radio Capacity with high spectral efficiency**
  - Up to 2048 QAM modulation
  - 10 Gig Ethernet port
- **Future proof, high availability & reliability**
  - Highest carrier density IDU in the market - up to 10 radio carriers in 2RU
  - Full redundancy - no single point of failure (SPoF) design
  - Ring/mesh support with sub-50msec convergence (including G.8032, G.8031 and MSTP)
- **Facilitates network modernization**
  - Multi-service support (hybrid) - fully interoperable with Ceragon 1500HP/RFU-HP installed-base radios
  - Hybrid Multi-carrier Adaptive Bandwidth Control (ABC)
  - Intelligent networking functionalities - MEF Carrier Ethernet 2.0-compliant, MPLS-TP-ready
- **Common OS & Software Defined Engine**
  - Unified CeraOS software across entire series, powered by programmable network processors

Evolution IP-20LH

Multi-Carrier Trunk Node

- **Multi-purpose high power trunk solutions**
  - In all-indoor as well as split-mount configuration
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- **Facilitates network modernization**
  - Multi-service support (hybrid) - fully interoperable with Ceragon Evolution installed-base radios
  - Hybrid Multi-carrier Adaptive Bandwidth Control (ABC)
  - Intelligent networking functionalities - MEF Carrier Ethernet 2.0-compliant, MPLS-TP-ready
- **Common OS & Software Defined Engine**
  - Unified CeraOS software across entire series, powered by programmable network processors

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Thank You