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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
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

IP-20 Selection Guidelines

<table>
<thead>
<tr>
<th>Capacity</th>
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<th>Application</th>
<th>Output Power</th>
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<td>All-outdoor</td>
<td>Access/Edge</td>
<td>Standard</td>
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<tr>
<td>500Mbps – 1Gbps</td>
<td>Split-mount</td>
<td>Multi-direction (Node)</td>
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1. IP-20 Selection Guidelines

**Capacity**
- Up to 500Mbps
- 500Mbps – 16bps
- Above 1Gbps

**Installation**
- All-outdoor
- Split-mount
- All-indoor

**Application**
- Access/Edge
- Multi-direction (Node)
- Multi-carrier (Trunk)

**Output Power**
- Standard
- High
- 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**
- Up to 500Mbps
- 500Mbps – 16bps
- Above 1Gbps

**Installation**
- All-outdoor
- Split-mount
- All-indoor

**Application**
- Access/Edge
- Multi-Direction (Node)
- Multi-Carrier (Trunk)

**Output Power**
- Standard
- High
- 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
3. IP-20 Selection Guidelines

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**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

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**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
5. IP-20 Selection Guidelines

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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

6. IP-20 Selection Guidelines

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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
7. IP-20 Selection Guidelines

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Evolution 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

Ultra-high Capacity at Any Spectrum
Multi-Gigabits Radio Capacity with High Spectral Efficiency

Radio Capacity without any optimization ↔ Capacity Boosting Techniques

Spatial Efficiency
4x4 LoS MIMO

Spectral Efficiency
Asymmetrical

Wide Channels
2048QAM
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
**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.

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**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

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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

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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
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

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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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Thank You