Genus Digital RFC/IFC

User Need

Flexible distribution of RF
- Allows distribution of chunks of spectrum, but not individual channels
- Dynamic switching for NGSO constellations
- Needs paths to be pre-configured

Transport of RF over distance
- Traditionally using Fibre between matrix switches
- DWDM to allow for distance
- Periodically regenerated with EDFAs

Enabling Technologies

DIF moves a lot of data
Simple example:
- Bandwidth 1000MHz
- Sample rate of 2000Msps
- 12 bit sample depth
- 16GB/s + protocol overheads

High sampling rates needed
- Nyquist – sample at > 2x signal b/w
- Oversampling improves C/No

High Speed Ethernet
- Ethernet speeds increasing with demand
- 100GBe now becoming “commodity”
- 400GBe commercially available
- 800GBe being demonstrated
- 1.6TBe under development

High Speed Data Converters
- L-band converters now becoming commodity
- ADCs capable up to Ku Band sampling

Genus Digital samples Analog RF signals from multiple sources, transporting them as IP packets on a single fibre reconstructing them as an RF signal at a remote location

Front Panel

Rear Connectivity

Unit Specification

RF Interface
- Frequency Range – 850-2450 MHz
- RF Inputs / Outputs
  - 500MHz overlapping – bidirectional channels
  - 2000MHz instantaneous B/W
  - In-built Dual Polarization Support
- 60dBc SFDR
- GPS Disciplined Oscillator
  - Low Phase Noise, High Frequency Accuracy

Digital Interface
- 100GbE data, DIFI compliant 1GbE control, SNMP, ETL RCM protocol

User Interface
- Local LCD touchscreen
- Web GUI

Physical
- 2U 19” Rack mount modular chassis
- Same box at either end of DIF system

DIF Benefits

Resilience
- Easier to re-route signals in digital domain
- No longer need specific fibre type required for RF over Fibre
- **Continuity of Operations (COOP)**

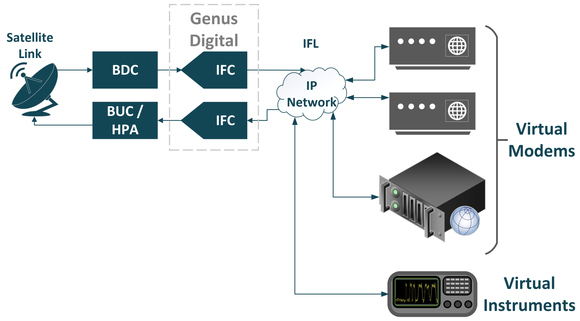
Signal Quality
- Signal quality defined by ADC / DAC parameters
- No longer dependant on distance of transmission

Flexibility
- Ease of deployment
- Modulation Agnostic
- Signal routing now moves to the IP domain
- Enabler for Virtualization
- IP domain signals can be further processed

Security
- Signal security maintained at source – encryption “behind the fence”

DIF Use Cases

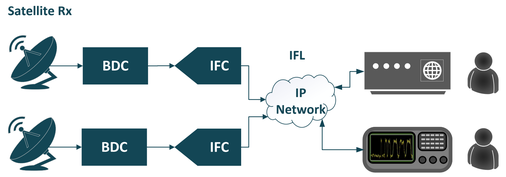
Virtualization



Virtual modems
- Enabler for digital modems - Software or Hardware based
- Local or Cloud
- CAPEX to OPEX
- Flexibility to deploy new waveforms

Virtual Instruments
- Spectrum Analyzer
- Carrier Monitoring
- Interference Detection / Geolocation
- Monitoring any signal from anywhere

Security and Intelligence

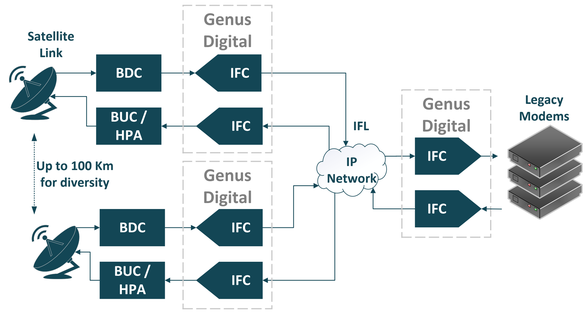


Decoupling Antenna from Modem
- “Behind the wire” encryption
- Remote surveillance
- Only the antenna in “line of fire”
- Remote Monitoring

Additional Signal Processing
- Further processing of received spectrum
- Receive Only for Lawful Intercept

Signal detection / location
- High precision timestamping enabling transmitter location

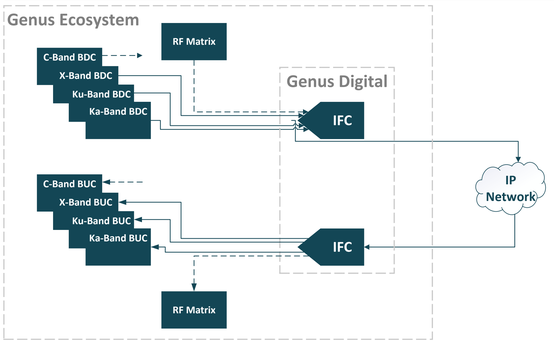
Diversity Antenna Sites



Antenna Diversity for Resiliance
- Rain fade and Atmospheric Conditions
- Kinetic Strike
- Transmission over 100s of miles without degradation
- Modulation Agnostic
- Signal routing and re-routing in the IP domain

Signal Quality
- Signal quality is no longer a function of length of fibre or quality of RF cabling
- This allows increased diversity antenna separation – key as satellite frequencies increase
- No longer need multiple fibre regeneration points to maintain signal quality

Genus Eco System Support



Genus Digital is part or the ETL Genus ecosystem
Supporting a range of:
- Frequency converters (L, C, X, Ku, Ka bands)
- RF Matrix Switches
- Amplifiers and more

Providing:
- Flexibility of deployment
- Future proofing
- Ease of transition and interoperation with extant equipment
- Hybrid deployments

Easing the transition from the Analog to Digital World

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