

## Dialogic® I-Gate® 4000 Mobile Backhaul Session Bandwidth Optimizers

The Dialogic® I-Gate® 4000 Mobile Backhaul Session Bandwidth Optimizers consist of the I-Gate 4000 SBO MB and the I-Gate 4000 SBO MBX (collectively, I-Gate 4000 MB and MBX SBOs), which are standalone systems that can optimize bandwidth and increase bandwidth capacity significantly in the backhaul segments of both 2G and 3G mobile networks. Because they optimize Abis and Iub data streams, including both ATM and IP-based Iub streams, the I-Gate 4000 MB or MBX SBO can provide a cost-effective and efficient strategy for increasing backhaul capacity, translating to significantly reduced capital and operational expenses. The I-Gate 4000 MB and MBX SBOs both offer several configurations and interface types, each of which has the same technical features.



The I-Gate 4000 MB and MBX SBOs can accept native IP and VoIP streams and transmit the combined optimized stream over TDM and/or IP. Along with Abis and Iub optimization, the I-Gate 4000 MB and MBX SBOs leverage statistical multiplexing and grooming techniques developed by Dialogic that have been shown in field trials to typically double the capacity of backhaul links while preserving the quality and integrity of the original data traffic through Quality of Service (QoS) protection techniques. The table below highlights features and benefits of the I-Gate Mobile Backhaul Session Bandwidth Optimizers.

Features	Benefits
<b>Leverage special bandwidth and IP packet rate optimization technologies developed by Dialogic, while preserving the quality and integrity of the original data traffic</b>	Enables cost-effective optimization and increased capacity for mobile backhaul segments in 2G and 3G mobile networks
<b>Each uses unparalleled bandwidth optimization algorithms and techniques to optimize mobile backhaul data sessions</b>	Reduces backhaul bandwidth usage by up to 50% without degrading original data sessions as shown in field trials
<b>Both combine high-quality payload optimization and QoS protection techniques</b>	Can deliver substantial CAPEX and OPEX savings in 2G and 3G mobile backhaul segments
<b>Each supports multiple topologies, such as point to point, point to multi-point, drop and continue, data offload, and ring</b>	Works with a wide range of mobile backhaul designs and topologies for effective optimization
<b>GUI-based management system with runtime reports showing traffic mix, comparative bandwidth, and QoS behavior</b>	Enables ease of operation and supplies a snapshot of important statistics on demand
<b>99.9995% (“five-nines”) availability through a fully redundant 1 RU platform</b>	Provides high reliability in a small footprint at the hardware, software, and network levels
<b>Supporting a wide range of transmission infrastructures</b>	Can be used in terrestrial, satellite, and radio link installations, and over TDM or Ethernet links



## Efficient Mobile Backhaul Optimization

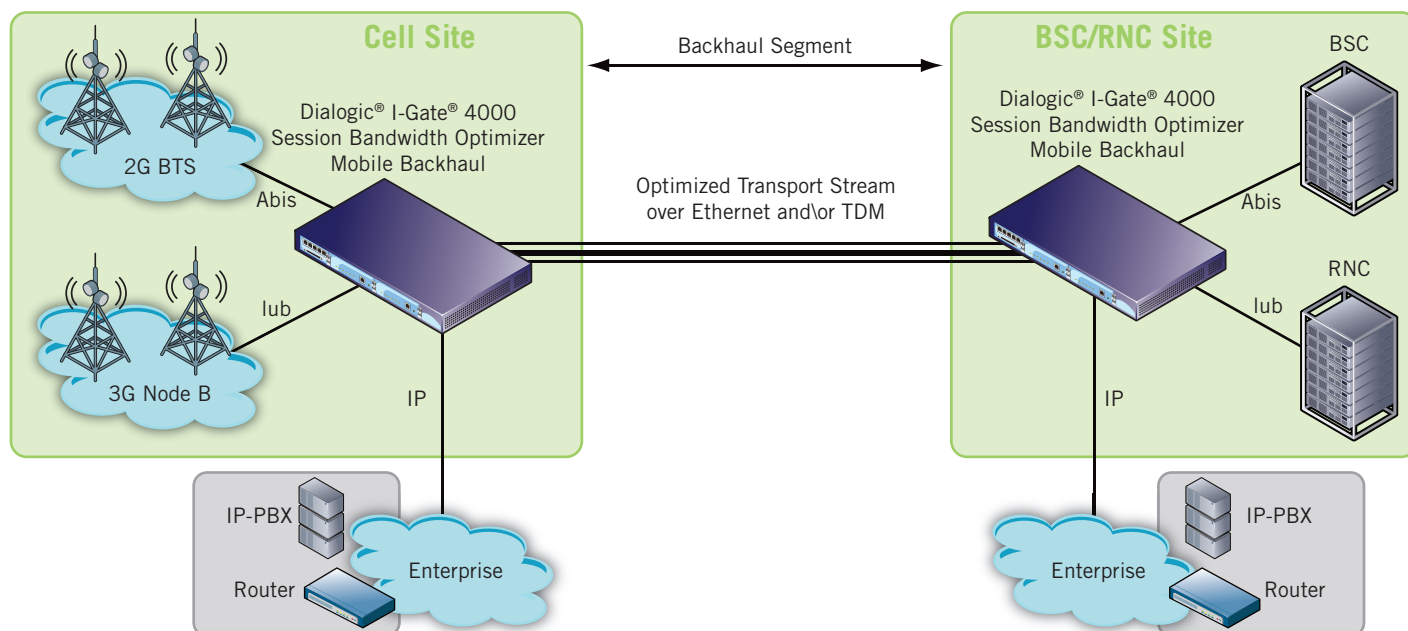


Figure 1. Dialogic® I-Gate® 4000 Session Bandwidth Optimizer Mobile Backhaul in a Backhaul Segment on a Mobile Network

Both the I-Gate 4000 SBO MB and I-Gate 4000 SBO MBX can optimize bandwidth in the backhaul segments of both 2G (Abis) and 3G (Iub) streams (ATM and IP-based). In addition to Abis and Iub optimization, either one can also be used to simultaneously take in VoIP and IP streams, to optimize these streams, and to transmit the optimized stream over Ethernet and/or TDM. See Figure 1 for an example of a sample configuration. Because units are placed within the current physical backhaul segment, optimizing with an I-Gate 4000 MB or MBX SBO is not as disruptive or costly as other alternatives for increasing bandwidth capacity, such as adding expensive leased lines, deploying fiber, adding microwave spectrum, or moving to Ethernet ring. I-Gate 4000 MB and MBX SBOs can also be used in addition to other options for increasing bandwidth capacity, and can coexist with such other options.

## Key Performance Indicators

The I-Gate 4000 MB and MBX SBOs monitor and maintain Key Performance Indicators (KPI) by which mobile backhaul infrastructure performance is measured. These include delay, jitter, bit error rate, and availability. Adherence to prescribed KPIs is considered critical to maintaining high subscriber Quality of Experience (QoE) and to meeting Service Level Agreements (SLAs) for voice and data services.

## Application Topologies

Both the I-Gate 4000 SBO MB and the I-Gate 4000 SBO MBX support a wide range of deployment strategies, including these topologies:

- Point to Point (PTP)
- Point to Multi-Point (PTMP)
- Drop and Continue
- Ring
- Data Offload

Deployments may consist of the I-Gate 4000 SBO MB, the I-Gate 4000 SBO MBX or a mixture of both depending on needs.

For more information about these application topologies, see the “[Dialogic® I-Gate® 4000 Session Bandwidth Optimizer Mobile Backhaul – Application Topologies](#)” Technology Brief.

## Dialogic® XMS Management System

The Dialogic® xMS Management System provides the network operator with an enhanced Fault, Configuration, Performance and Security management tool to manage a network of I-Gate 4000 MB and/or MBX SBO terminals. The xMS provides an easy to use web-based interface with a logical step-by-step approach to provisioning and event handling.

The xMS provides a rich set of reports for the operator, depicting the traffic and operational information of I-Gate 4000 MB and/or MBX SBO terminals. It also provides alarm and event handling mechanisms to help the operator troubleshoot the network and isolate faults. Runtime configuration provides the ability to change the working parameters of I-Gate 4000 MB and/or MBX SBOs without the need to reset the terminal and disrupt traffic. Figure 2 shows a snapshot of the configuration and bandwidth usage.

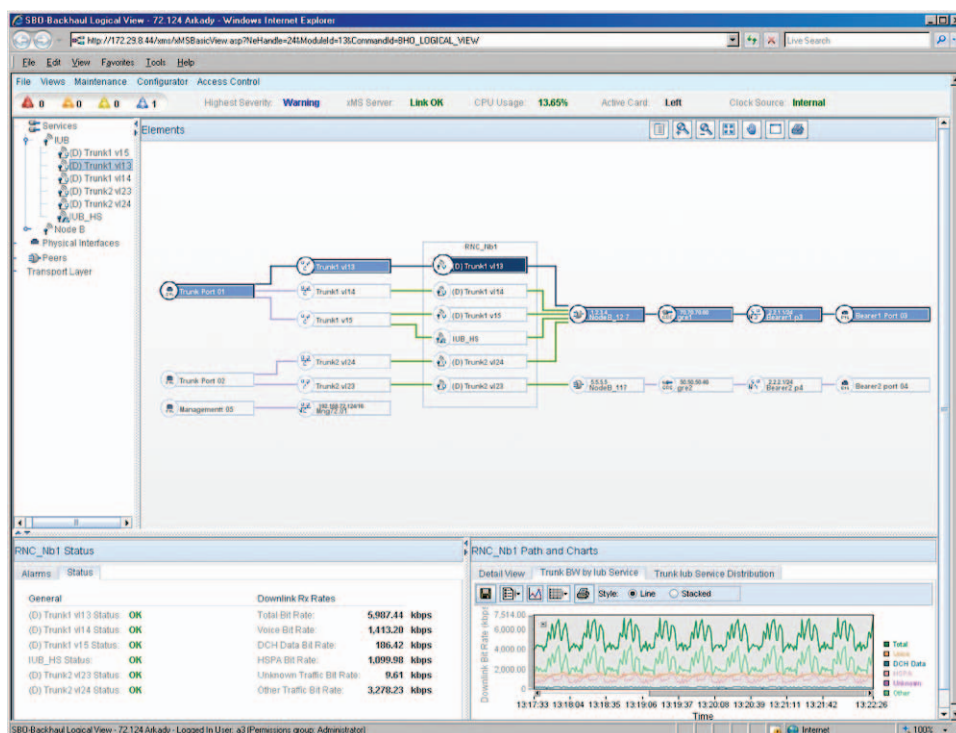


Figure 2. Dialogic® XMS Management System Showing a Snapshot of the Configuration and Bandwidth Usage for a Dialogic® I-Gate® 4000 Mobile Backhaul Session Bandwidth Optimizer

### Technical Specifications

Except where indicated, all technical specifications apply to the I-Gate 4000 SBO MB as well as the I-Gate 4000 SBO MBX.

#### Traffic Handling

##### Abis-over-TDM Traffic Optimization

- Idle Channel Suppression
- Silence Removal
- HDLC flag removal
- TRAU frame optimization
- VAD enhancing optimization
- Extended GPRS/EDGE optimization
- Supported TRAU frames:
  - FR (13 kbps), EFR (12.2 kbps), HR (5.6 kbps), AMR (4.75/12.2 kbps) codecs
  - FR data, HR data, Extended data
  - O&M frames

##### Iub-over-ATM Traffic Optimization

- ATM layer header optimization
- Idle cell removal
- AAL header optimization (AAL2 and AAL5)

##### Iub-over-IP Traffic Optimization

- Iub Header optimization and aggregation for all protocol layers from Layer 2 up to and including RLC
- Supported transport bearers
  - Iub DCH
  - Iub HS-DSCH
  - Iub E-DCH
  - Iub FACH
  - Iub RACH
  - Iub PCH

##### Abis-over-IP (Packetized Abis), Native IP and VoIP Optimization

- Headers optimization and Packets aggregation
- Statistical multiplexing

##### Auto Detection

- Automatic TRX allocation detection for Abis traffic and AAL for the ATM-based Iub traffic

##### Payload Aggregation

- Static RTP Multiplexing
- Statistical Multiplexing between all types of traffic

##### Traffic Congestion Control

- Payload Priority Selection mechanism (PPS) for Abis
- Tail Drop
- DCAM

##### Embedded Cross-Connect

- Any-to-Any trunk DS0 channel For all configured DS0s

##### Pseudowire Emulation Edge-to-Edge (PWE3)

- SAToP (Structure-agnostic TDM over packet) - RFC 4553
- CESoPSN (Circuit Emulation Service over Packet-Switched Network) - RFC5086

##### QoS Management

- Multiple queues management
- IP packet classification and marking
- Multiple congestion avoidance
- Scheduling and Shaping
- Policing
- H-QoS

### Jitter Buffer

- Adaptive
- Up to 120 msec network jitter (for Abis traffic)

### Silence Suppression (for Abis traffic)

- GSM-AMR, GSM 06.94

### Traffic Links

- Supports: terrestrial links, microwave links, satellite links

### Tunneling

- Over GRE (Generic Routing Encapsulation)
- Up to 16 GRE tunnels

### QoS Protection

- Tail Drop mechanism
- Payload Priority Selection mechanisms

## Mobile Network Interfaces Protocols

### Abis Interface

- GSM R99, 3GPP 08 Series specifications
- Codec: FR, EFR, HR, AMR all rates
- Data services: EDGE, GPRS, HSCSD

### Iub interface (ATM and IP based)

- 3GPP specifications
- Data services: HSPA, DCH-R99

## Network Interfaces

### Gigabit Ethernet Ports

#### Interfaces

- Compliance with IEEE 802.3z (optical)
- Compliance with IEEE 802.3ab (electrical)

#### Connector

- SFP -- Optical SM (1310 nm) or MM (850 nm) (LC connector)
- RJ45 (electrical)

#### VLAN Tag

- IEEE 802.1q
- IEEE 802.1p (VLAN priority bits)
- Up to 32 VLANs

#### BVI Support

- Supports BVI (Bridge Group Virtual Interface)

### E1 Interface

#### Electrical characteristics

- Complies with ITU-T Recommendation G.703

#### Impedance

- 120Ω balanced

#### Frame structure

- Complies with ITU-T Recommendation G.704

#### Line code

- HDB3

#### CRC-4 and E bit use

- Configurable

#### Unframed format

- Supported for PWE3 (SAToP)

#### Return loss

- Complies with ITU-T Recommendation G.703 paragraph 6.3.3 and with ETSI ETS 300166

### STM-1 Interface -- Optical

#### Characteristics

- ITU G.703, G.813, G.825, G.783, G.957 and Telcordia GR-253

#### STM1 Frame

- ITU G.707

#### Line code

- NRZ

#### STM1 Payload

- 63 E1 (AU4) or 3x21 E1 (AU3)

#### Fiber optic coupling

- Single Mode (1310 nm)

- Receiver Maximum Input Optical Power • -7dB
- Receiver Sensitivity • -29dB
- Connector type • LC SFP S1.1.1310 nm
- STM-1 Interface -- Electrical**
- Characteristics • ITU G.703, G.813, G.825, G.783, G.957 and Telcordia GR-253
- STM1 Frame • ITU G.707
- Line code • CMI
- STM1 Payload • 63 E1 (AU4) or 3x21 E1 (AU3)
- Connector type • SFP DIN 1.0/2.3 75 ohm according to CECC 22230

### Capacity

#### Abis-over-TDM Traffic

Parameter	I Gate SBO MB E1 Links	I Gate SBO MB STM-1 Links	I Gate SBO MBX E1 Links
Max. number of E1 links	16	24	36
Max. number of Abis groups	24	24	36
Max. number of Abis groups per E1	2	2	2

#### Iub-over-ATM Traffic

Parameter	I Gate SBO MB E1 Links	STM-1	I Gate SBO MBX E1 Links
ATM UNI links	16	63	40
ATM links per IMA group	8	8	8
Number of IMA groups	8	32	20

#### Iub-over-IP or Abis-ver-IP Traffic

Up to 200 Mbit/sec.

### Redundancy and High Availability

- Main Module
  - 1:1 MPTM, MPTH, or MPTI redundancy
  - 1:1 MPSX or HPTM redundancy
- Power Supply
  - 1:1 DCPS redundancy
  - Load sharing
- Power Feed
  - 2 independent power feed connections through main and redundant DCPS
- Fan Tray
  - 6 fans
  - Support for Fan Turbo mode
- Ethernet Link Protection
  - 1:1 (based on ELET/EHET/SOIE/ELS4/OPHT/OPS4 ports redundancy modes) (Ethernet Link redundancy (link protection) is handled at the BVI level for a BVI associated with more than one Ethernet link)
- Availability
  - 99.9995 % (five 9's)
- Additional High Availability Features
  - Hitless Hot-module swapping -- Hot extractions/insertions of modules
  - Hitless Hot Software Upgrade -- Non-traffic-affecting
  - Runtime configuration
- Temperature Control
  - Built-in temperature sensors
  - Fan Turbo mode
  - Alarms: High & Extreme High Temperature

### System Synchronization

- |                        |   |
|------------------------|---|
| Clock standards        | <ul style="list-style-type: none"><li>• IEEE1588v2</li><li>• SyncE</li></ul>  |
| Clock Source           | <ul style="list-style-type: none"><li>• Two clock sources can be standard TDM input bitstreams of any configured TDM interface.</li><li>• Two clock sources can be SyncE input of any configured Ethernet ports.</li><li>• PTP clock can be configured as clock source in addition to TDM and SyncE sources in terminal configured PTP Mode = Slave (PTP VLAN does not support BVI).</li><li>• In case of failure of all clock sources, Hold-Over on the last synchronized external clock source is performed (with an accuracy of <math>\pm 1</math> PPB per 24 hours).</li><li>• Internal clock with accuracy of Stratum 3E</li></ul> |
| Internal Timing Module | <ul style="list-style-type: none"><li>• Operation modes: Complies with ITU-T recommendations G.812 and G.813</li><li>• Jitter/Wander tolerance/transfer complies with AT&amp;T TR-62411 and Telcordia GR-1244 Stratum 3 specifications</li><li>• Jitter specifications comply with ITU-T G.823, G.824, and ANSI T1.101</li></ul>  |

### Power

- |                          |   |
|--------------------------|---|
| DC voltage input         | <ul style="list-style-type: none"><li>• -48 VDC / -60 VDC (nominal)</li><li>• -40.5 VDC / -72 VDC (min/max)</li></ul> |
| Max DC current           | <ul style="list-style-type: none"><li>• 7A</li></ul>  |
| Max DC power consumption | <ul style="list-style-type: none"><li>• 284W</li></ul>  |

### Physical Characteristics

- |                               |  |
|-------------------------------|--|
| Dimensions for I Gate SBO MB  | <ul style="list-style-type: none"><li>• Width: 435 mm (17.1") - not incl. mounting brackets</li><li>• Height: 44.45 mm (1.75" - 1U)</li><li>• Depth: 448 mm (17.6")</li><li>• Weight: 5.7 kg (full redundant system)</li></ul> |
| Dimensions for I Gate SBO MBX | <ul style="list-style-type: none"><li>• Width: 435 mm (17.1") - not incl. mounting brackets</li><li>• Height: 44.45 mm (1.75" - 1U)</li><li>• Depth: 450 mm (17.7")</li><li>• Weight: 6.0 kg (full redundant system)</li></ul> |
| Installation                  | <ul style="list-style-type: none"><li>• Can be installed in 19" or 23" cabinets or relay racks, or on top of any rigid infrastructure (desktop)</li><li>• I Gate SBO MB can be installed as wall mount</li></ul>               |

### Approvals, Compliance, and Warranty

- |                            |   |
|----------------------------|---|
| Hazardous substances       | RoHS compliance information at <a href="http://www.dialogic.com/rohs">www.dialogic.com/rohs</a> |
| Country-specific approvals | Call your local Dialogic sales representative   |
| Warranty                   | Call your local Dialogic sales representative   |

### For More Information

For more information about the product discussed in this datasheet, contact your local Dialogic representative. Worldwide contact information is available online at [www.dialogic.com/contact](http://www.dialogic.com/contact).

# Dialogic®

[www.dialogic.com](http://www.dialogic.com)

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The logo for Network Fuel, featuring the words "NETWORK FUEL" in a bold, sans-serif font. The text is white and set against a dark, rounded rectangular background. The background of the entire page is a complex network diagram with numerous nodes and connecting lines, rendered in a light gray color.