FULL-DUPLEX OPTION for 16 Mbps TOKEN-RING STATIONS

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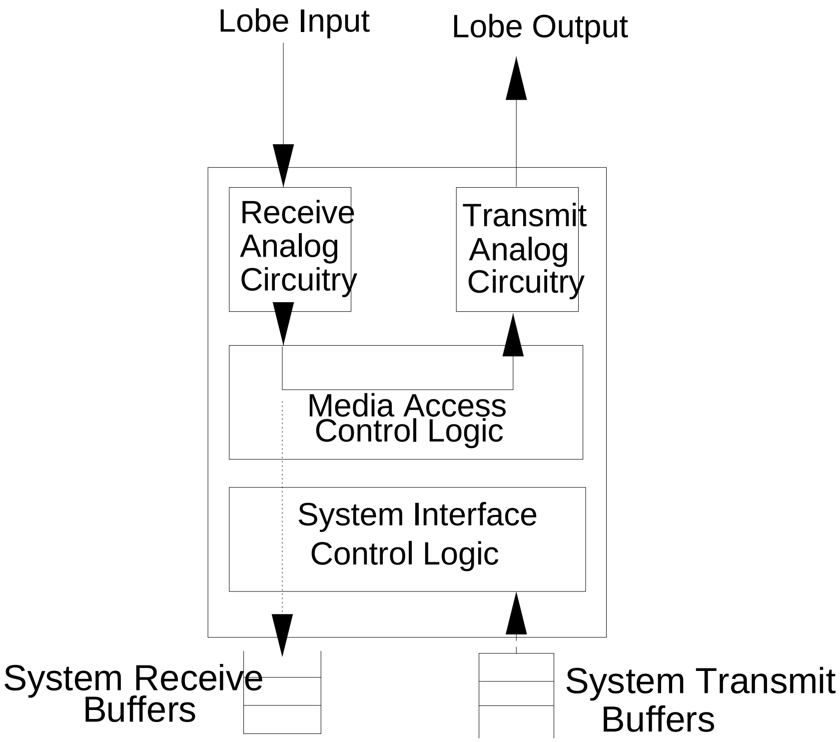
FULL-DUPLEX OPTION for 16 Mbps STATIONS

- Motivation
  - Significantly increase bandwidth of point-to-point links
  - Capitalize on emerging LAN packet-switch technology
  - Provide migration from shared-bandwidth LANs as new applications evolve (e.g., video distribution, etc.)
  - Position desktop workstation for future high-bandwidth enterprise ATM backbone
  - Preserve investment in existing token-ring systems

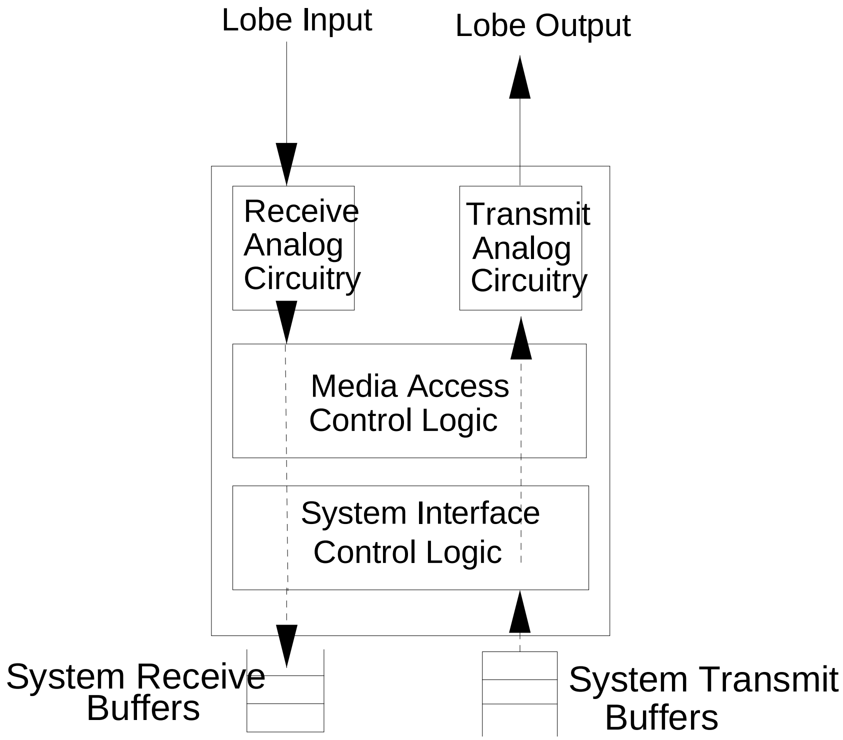
FULL-DUPLEX OPTION for 16 Mbps STATIONS

- Direction
  - Single LLC/MAC interface definition for either 16 Mbps Full-Duplex or standard 16/4 Mbps token-ring operation
  - Maintain token-ring frame format and application interfaces
  - Preserve existing token-ring infrastructure
    - *Wiring media & connectors*
    - *Installed concentrators, bridges, and stations*
    - *Network management platforms and protocols*

STANDARD vs FULL-DUPLEX OPERATION



Standard Token-Ring Mode
(Transmit or Receive)

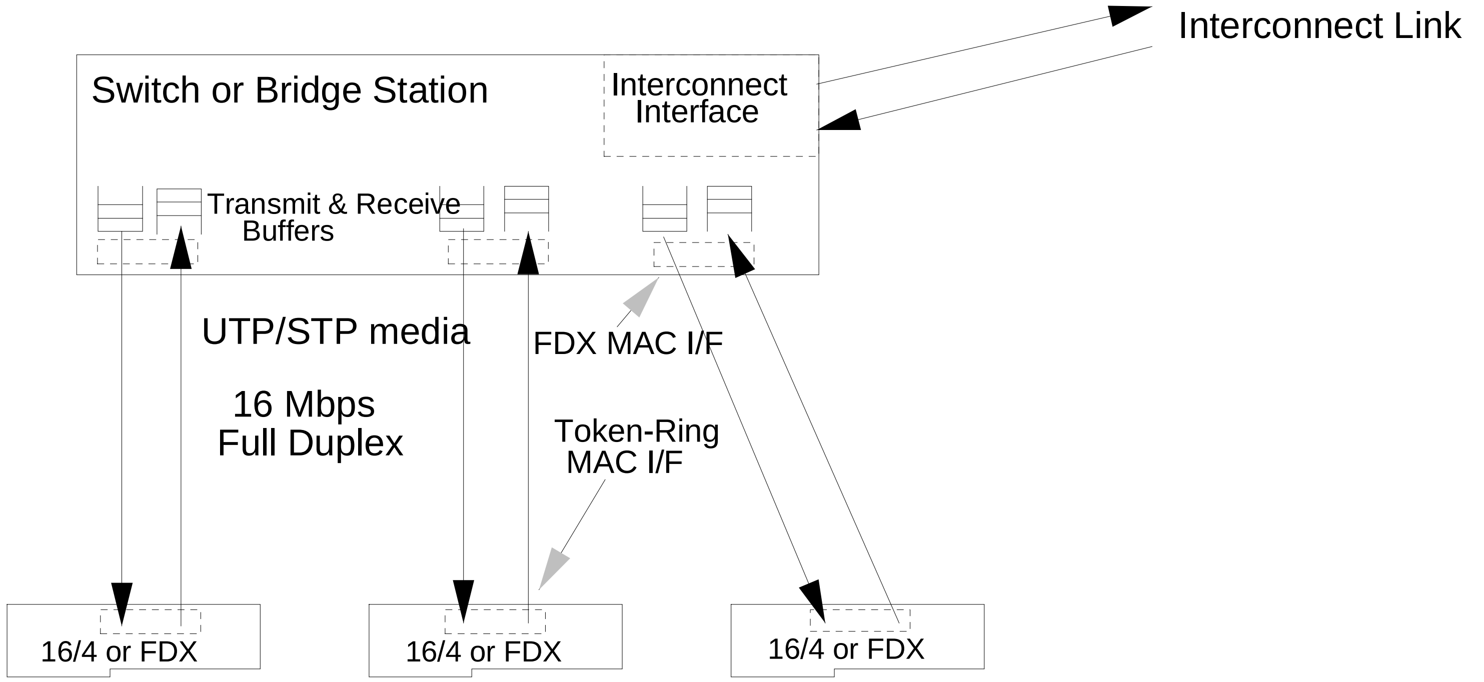


Full-Duplex Mode (option)
(Transmit and Receive)

FULL-DUPLEX MODE OPERATION

- Suspend Unused Token-ring MAC Functions
  - Active/passive monitor functions
  - Neighbor notification protocol and frames
  - All token-access control mechanisms
- Full-Duplex Transmit /Receive Mode Operation
  - Transmit packets without token-wait
  - Receive all incoming packets or filter on address
  - Maintain token-ring frame format and addressing
  - Preserve existing frame error detection
- Physical Level Clocking & Timing
  - Stations transmit on local crystal
  - Stations receive on derived clock

FULL-DUPLEX INTERCONNECT OVERVIEW

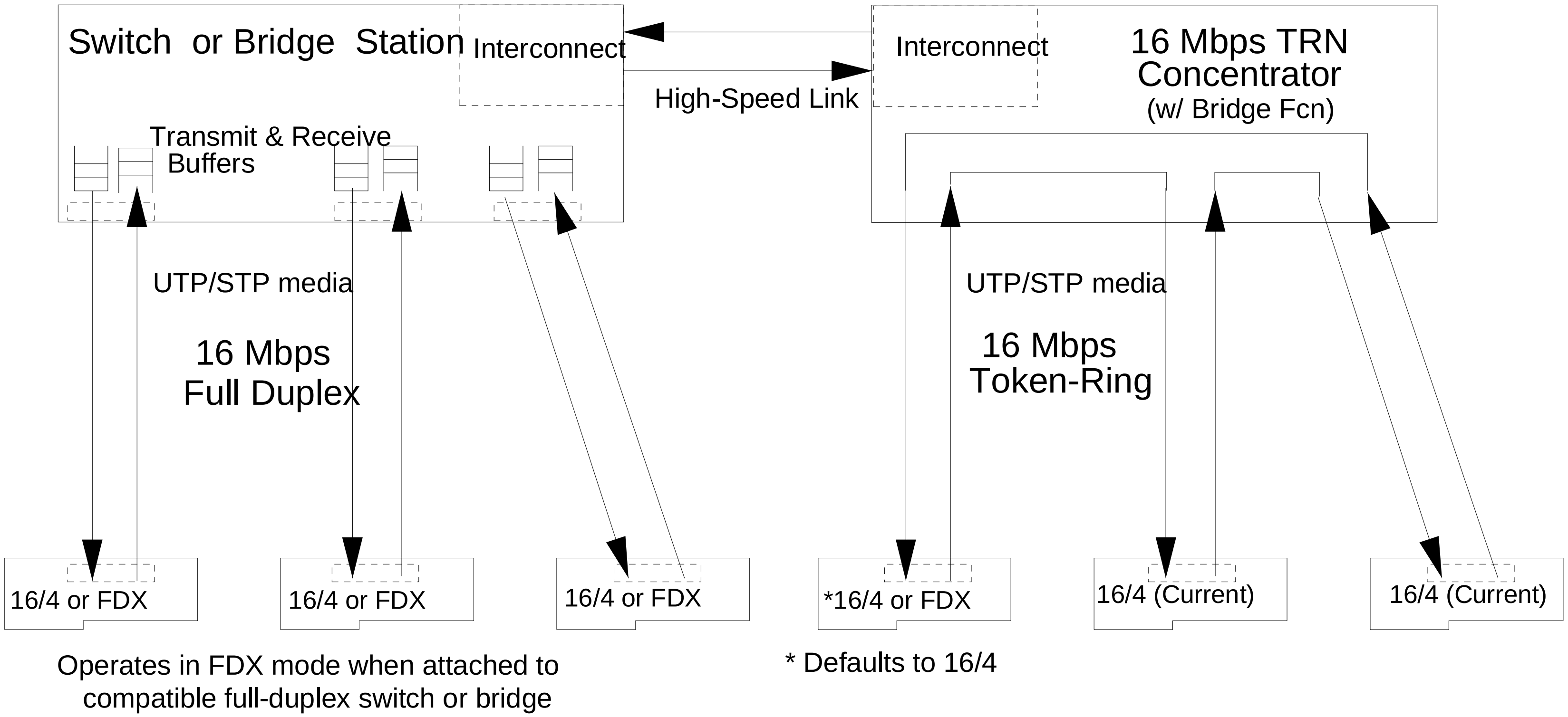


Operate in FDX mode when attached to compatible full-duplex switch or bridge

ROLE OF INTERCONNECT STATION

- Reliable Packet Delivery
  - Buffer incoming packet(s) to avoid packet loss
  - Route packets to destination port(s) via destination address or routing information field
  - Provide multicast and broadcast support
  - Prioritize packet transfer based on FC YYY bits
- Backbone Access
  - Access to high-speed interconnect links, such as ATM
- Management
  - Lobe monitoring and control
  - Station address mapping

FULL-DUPLEX INTERCONNECT TO TOKEN-RING

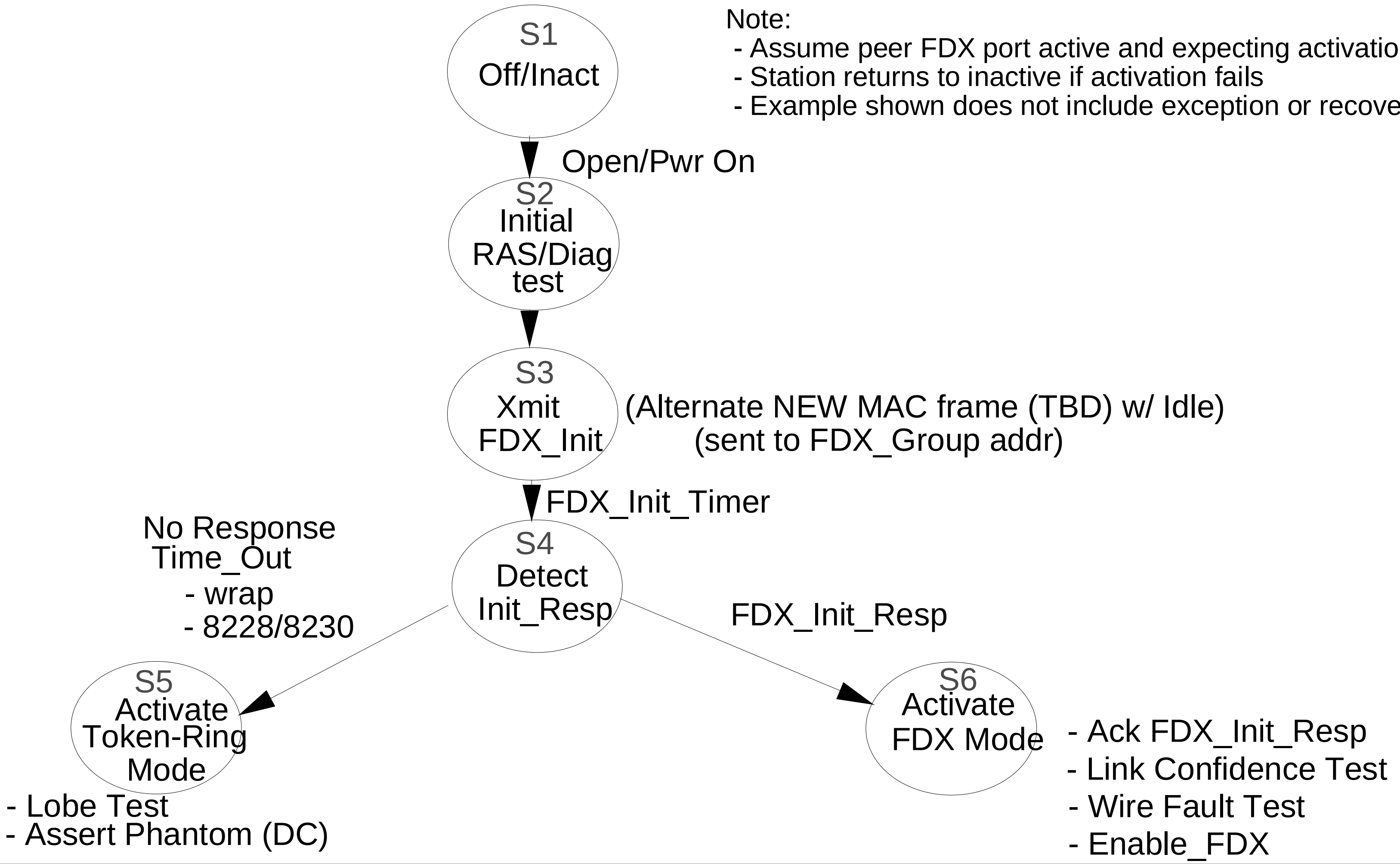


ACTIVATION PROTOCOL REQUIREMENTS

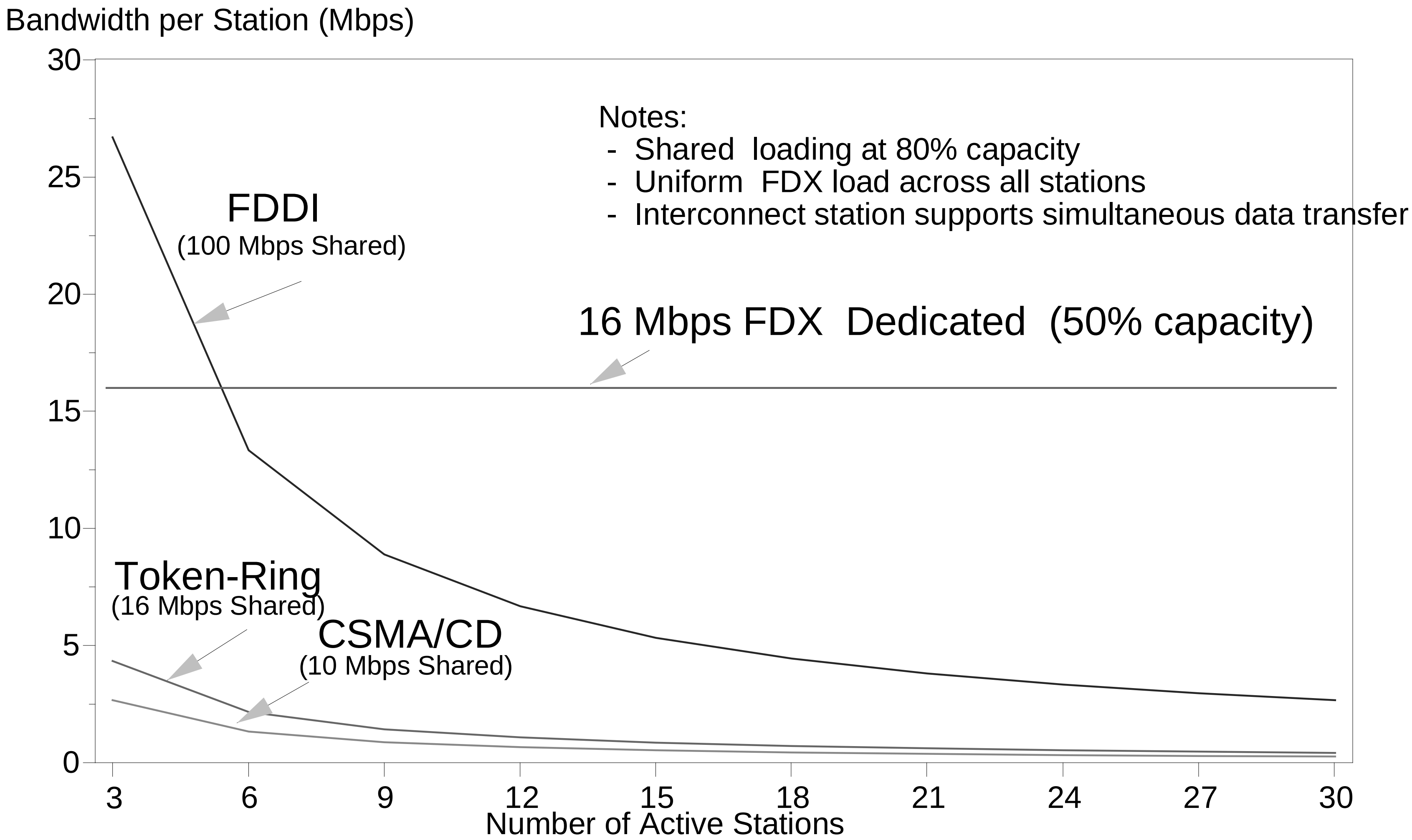
- Allow FDX mode as default on matched point-to-point links
  - Stations support both FDX and token-ring modes
  - Interconnect nodes may support FDX mode only
- Extention to current 802.5 activation protocol required
  - Allow FDX station to establish link if possible
  - New MAC frames and activation dialog
- Proceed to normal activation if FDX not available
  - Lobe test
  - Phantom assert

FULL-DUPLEX ACTIVATION PROTOCOL
Example

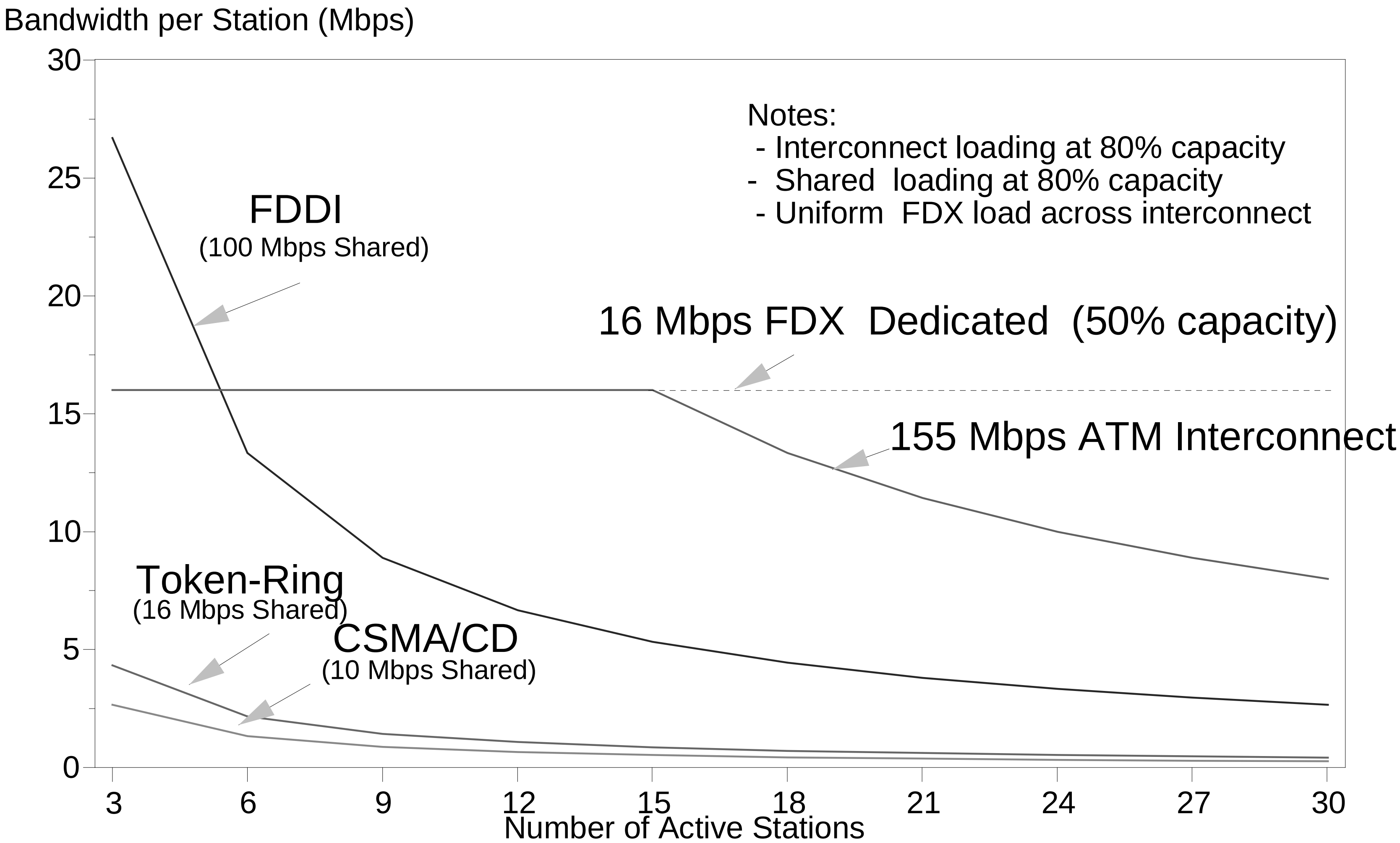
Note:
- Assume peer FDX port active and expecting activation sequence
- Station returns to inactive if activation fails
- Example shown does not include exception or recovery states



AGGREGATE BANDWIDTH PER STATION: Shared LAN vs 16 Mbps FDX Dedicated



AGGREGATE BANDWIDTH PER STATION: Shared LAN vs FDX with ATM Interconnect



SUMMARY

- Full-Duplex Option Can Significantly Increase Station Bandwidth
  - Improvement over current shared-LAN architectures
  - Satisfy requirements of existing and emerging high-bandwidth applications
  - Capitalize on advances in packet-switch technology
- Leverage Existing Token-ring Architecture in Key Areas
  - Frame prioritization within interconnect nodes
  - Preserve existing application interfaces
  - Maintain key network management and error reporting mechanisms
  - Larger frame size for efficient data transfer