# SANs Today: More Trouble than they're Worth

- **Fibre Channel is not the problem — It's the switches**
  - 90% of storage devices still direct-attached (only 10% SAN)

Fibre Channel adapters and RAID controllers have become reliable, fairly interoperable, and ubiquitous…

FC Switch **FC Switch**

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…but Fibre Channel switches still suffer from interoperability problems, don't scale to large networks, and require a separate management system and staff
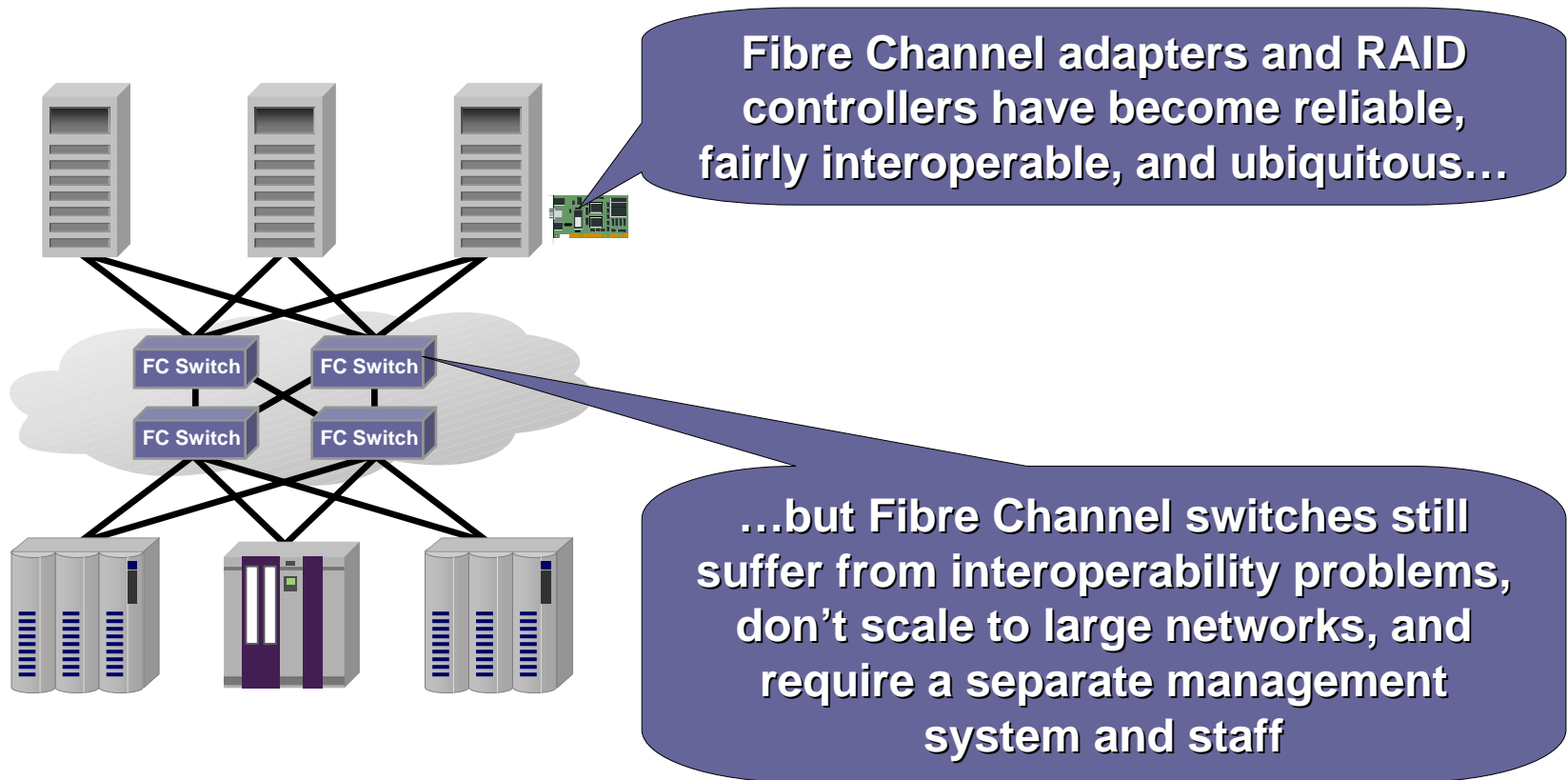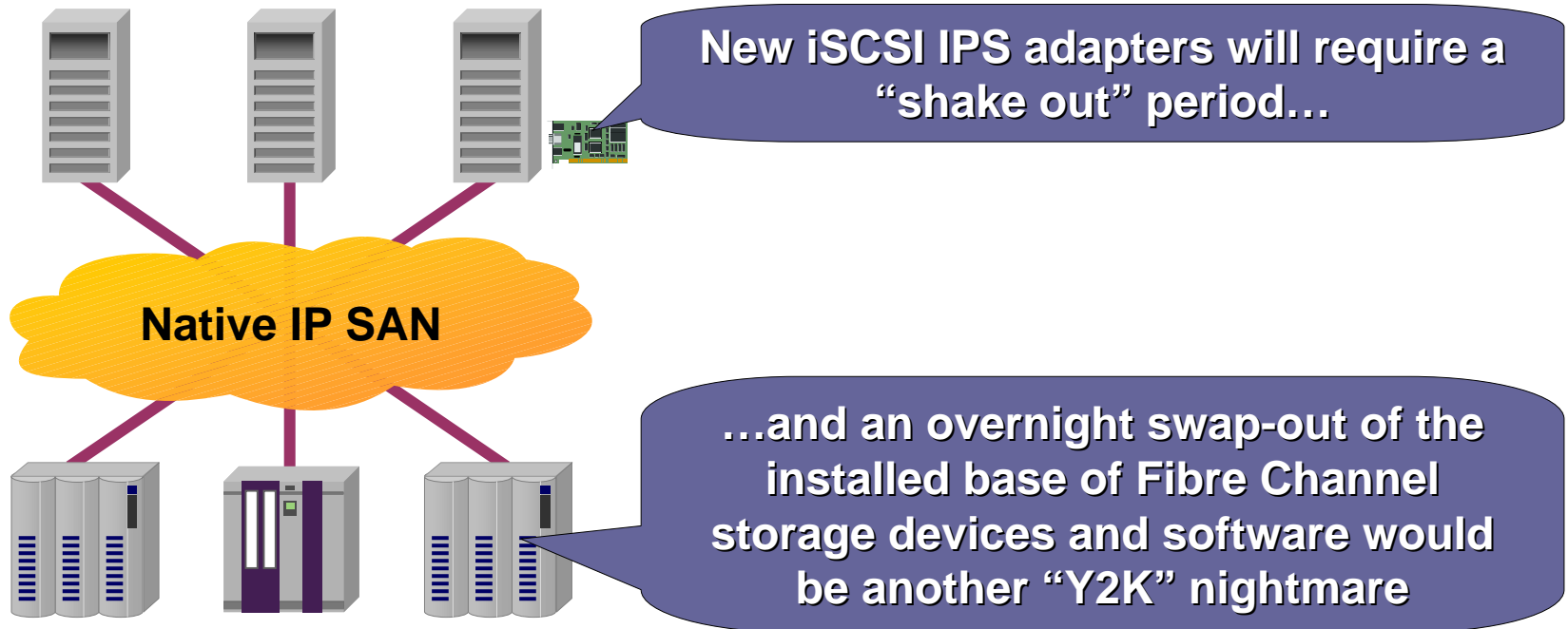
Another Drawback: No Fibre Channel WANs

Wide area networks are based on IP and Gigabit Ethernet, not FC, so must use costly point-to-point dark fiber or optical multiplexers to connect FC SANs
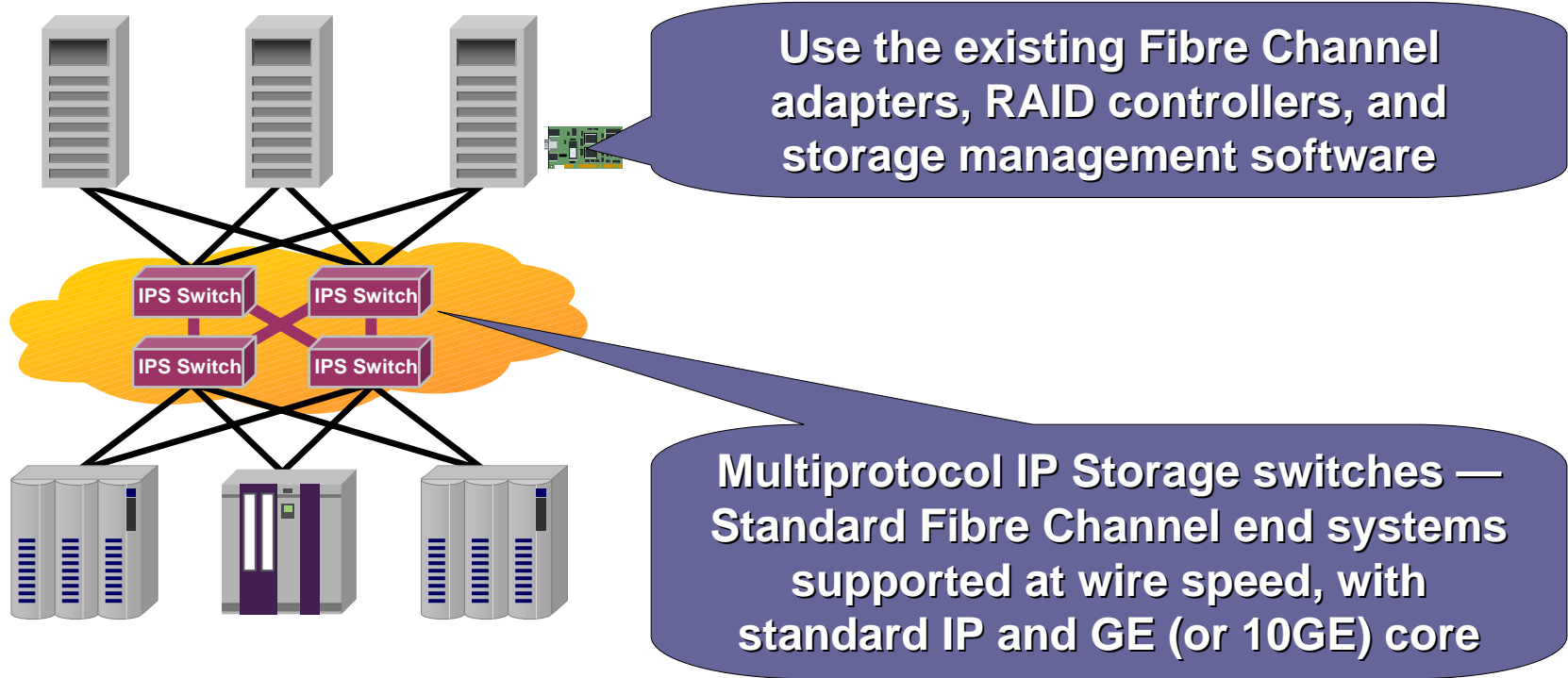
FC SAN

Fibre Channel SAN

FC SAN
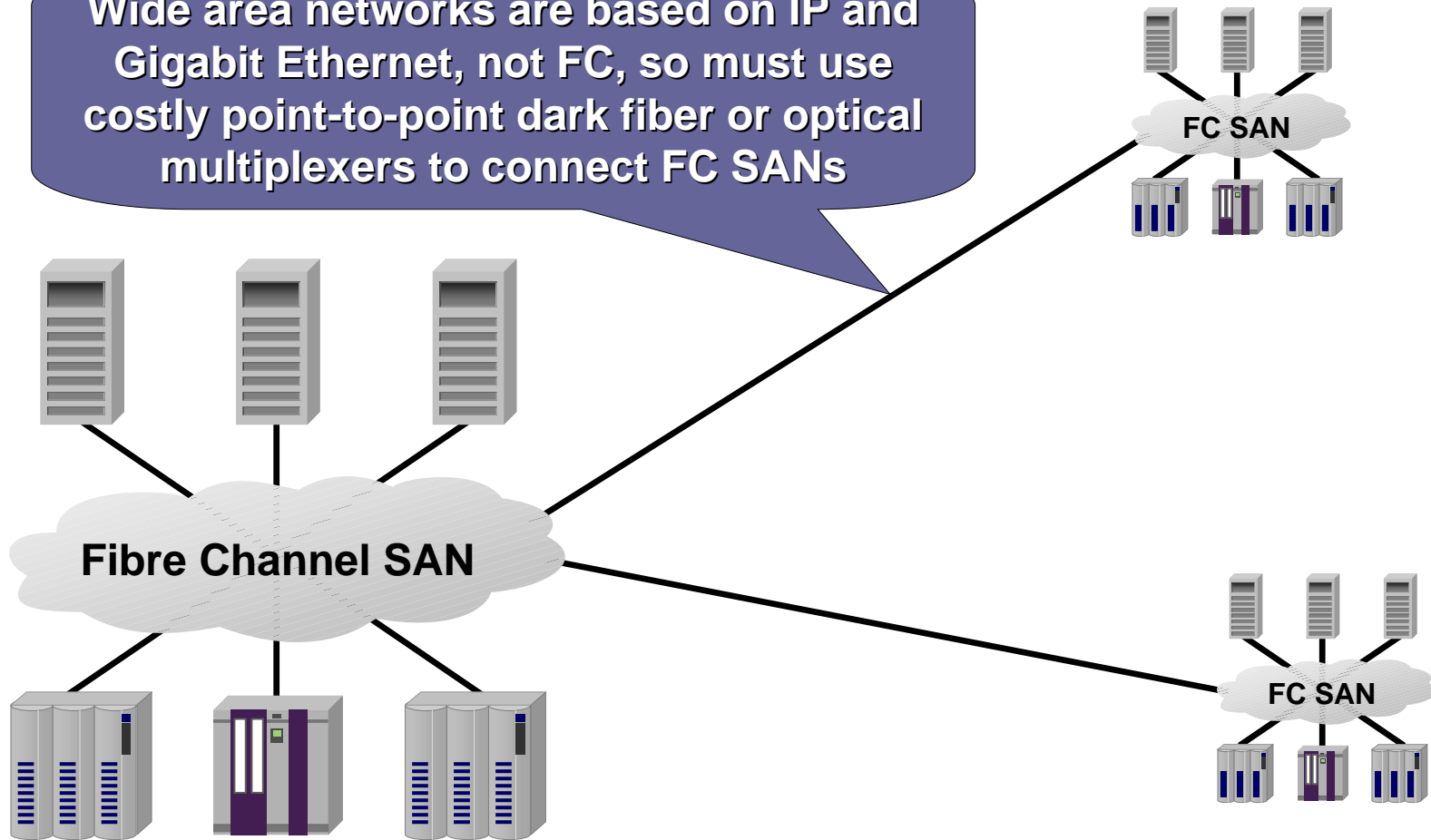
Possible Fix: IP Storage Adapters, Switches

- ● Good long-term solution, but will take awhile
  - • Until iSCSI IPS adapters can challenge the performance, reliability, and interoperability of Fibre Channel adapters

New iSCSI IPS adapters will require a "shake out" period…

Native IP SAN

…and an overnight swap-out of the installed base of Fibre Channel storage devices and software would be another "Y2K" nightmare
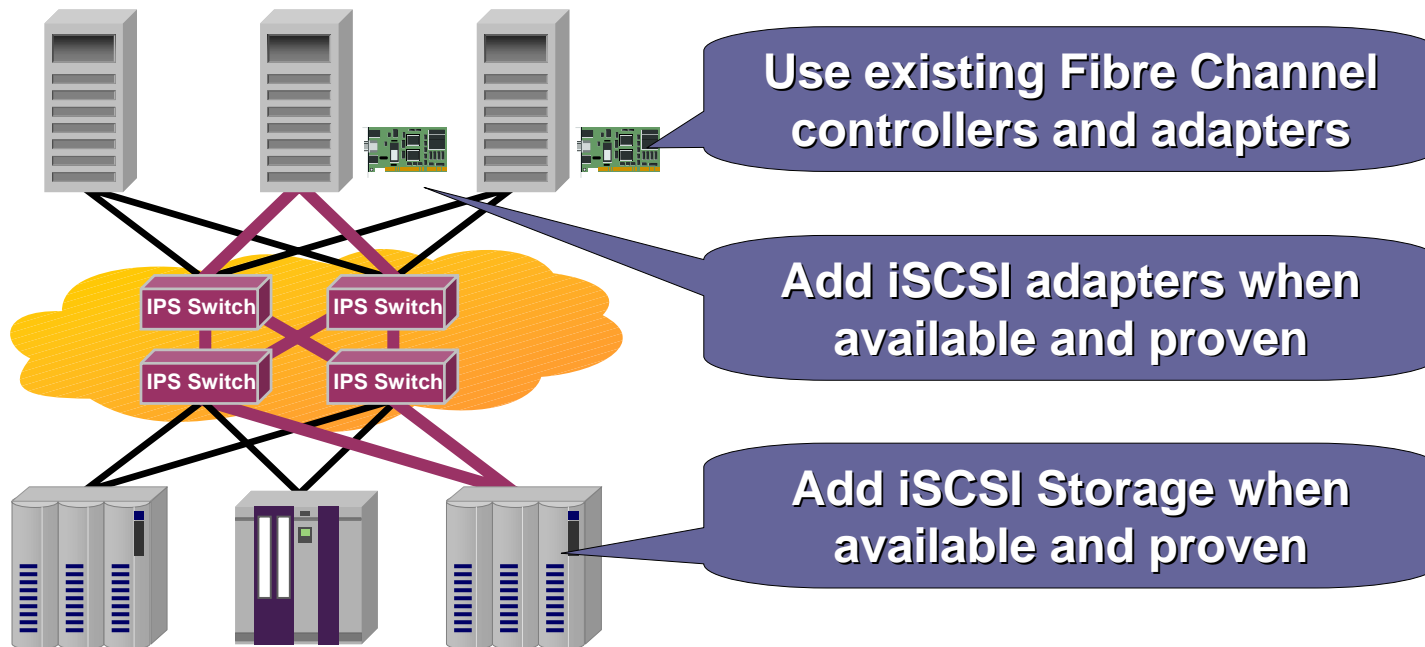
Immediate Solution: Multiprotocol IPS Switches

- ● Use the parts that work; Fix the parts that don't
  - Keep the $100B installed base of Fibre Channel end systems and storage management software applications (they work)
  - Grow the $1B base of FC switches with IP Storage switches

Use the existing Fibre Channel adapters, RAID controllers, and storage management software

IPS Switch IPS Switch
IPS Switch IPS Switch

Multiprotocol IP Storage switches — Standard Fibre Channel end systems supported at wire speed, with standard IP and GE (or 10GE) core
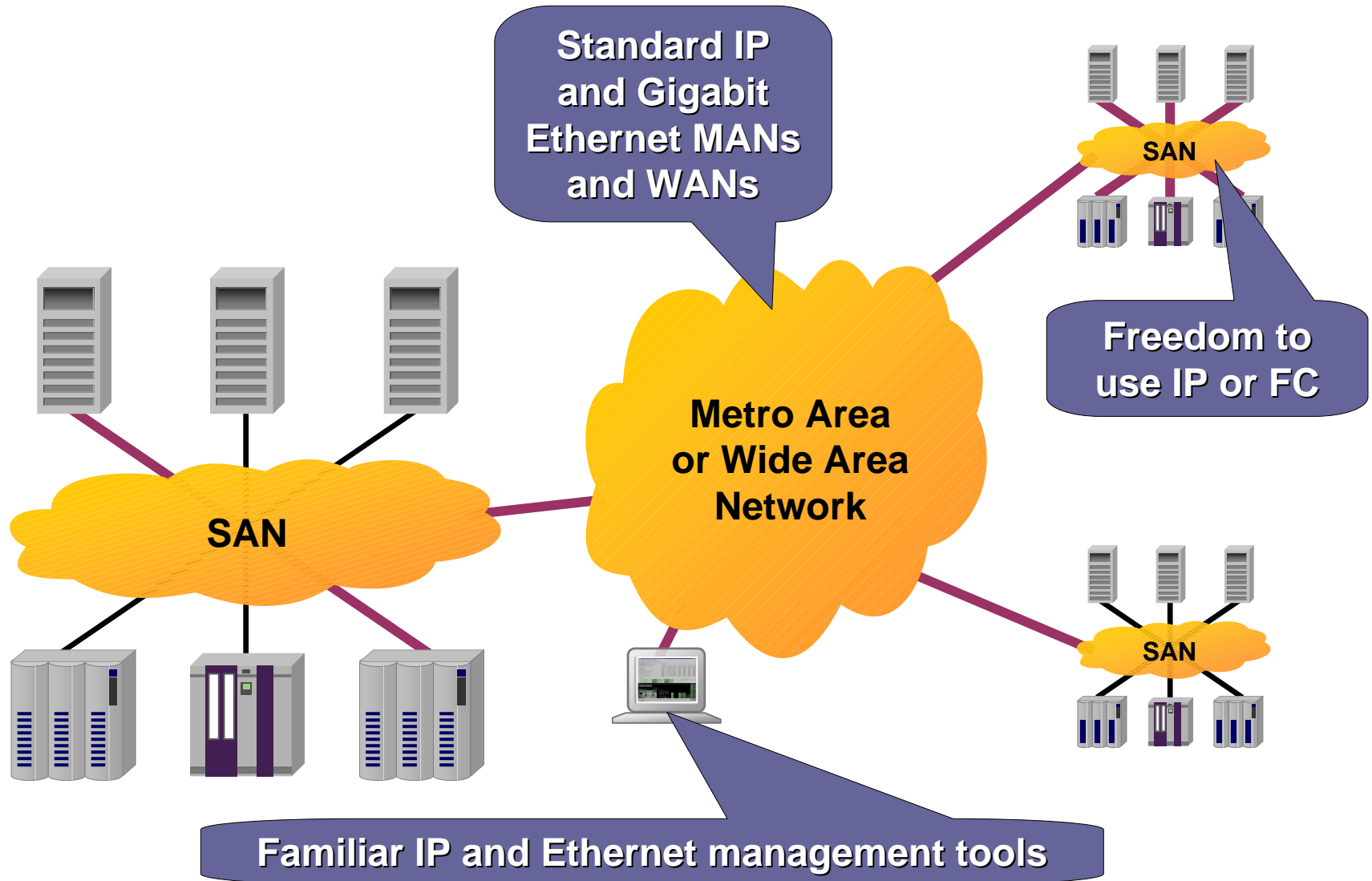
Gradually Add iSCSI Devices

- Add iSCSI devices now or later
  - Multiprotocol IP Storage switches support both FC and iSCSI
  - iSCSI devices can be added to the same IP Storage switch
  - Investment in IP Storage switches is protected

Use existing Fibre Channel controllers and adapters

Add iSCSI adapters when available and proven

Add iSCSI Storage when available and proven

IPS Switch IPS Switch
IPS Switch IPS Switch

Integrated IP SAN, MAN, and WAN Fabric

Standard IP and Gigabit Ethernet MANs and WANs

SAN

Freedom to use IP or FC

Metro Area or Wide Area Network

SAN

SAN

Familiar IP and Ethernet management tools

Three Clear Advantages of IP Storage

- **Manageability**
  - Even with Fibre Channel end systems attached, network core appears to be Ethernet switches or IP routers
  - Can be installed and managed by customer's existing Cisco, Extreme, Foundry, Juniper, or Nortel staff
  - An interoperable system, not just a bunch of boxes

- **Scalability**
  - Proven applications with 1000s of switches and routers

- **Extensibility**
  - Economical and accessible public or private networks, dedicated or shared, worldwide reach
  - 10Gbps router links shipping today