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08 infra TI

# Introdução IP SAN



Universidade Presbiteriana Mackenzie

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Tema opcional. Para maiores detalhes ver o livro referência.

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# Driver for IP SAN Internetworking

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In FC SAN transfer of block level data takes place over Fibre Channel

Emerging technologies provide for the transfer of block-level data over an **existing IP network infrastructure**

IP is being positioned as a storage transport because:

- Easier management

- Existing network infrastructure can be leveraged**

- Reduced cost** compared to new SAN hardware and software

- Supports multi-vendor interoperability

- Many long-distance disaster recovery solutions already leverage IP-based networks

- Many robust and mature security options are available for IP networks

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# Block Storage Over IP – Protocol

## iSCSI

SCSI over IP

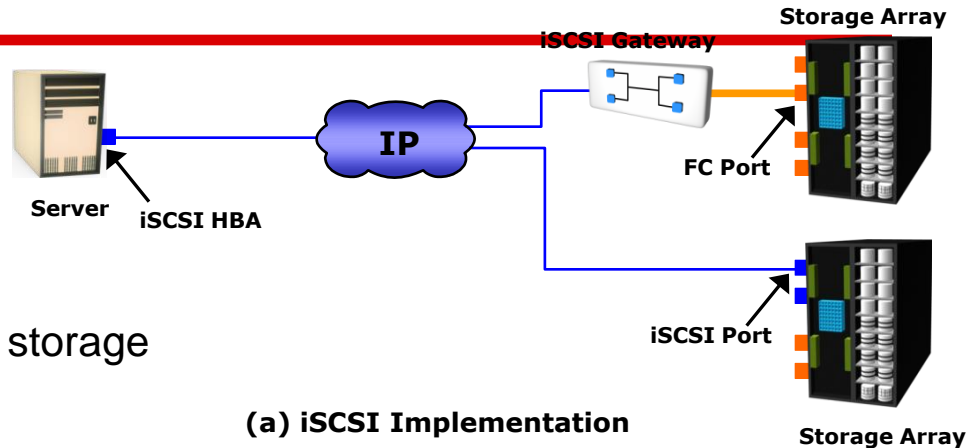
IP encapsulation

Ethernet NIC card

iSCSI HBA

Hardware-based gateway to Fibre Channel storage

Used to connect servers

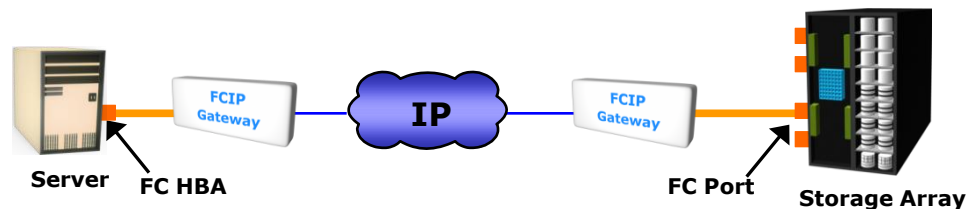


## FCIP

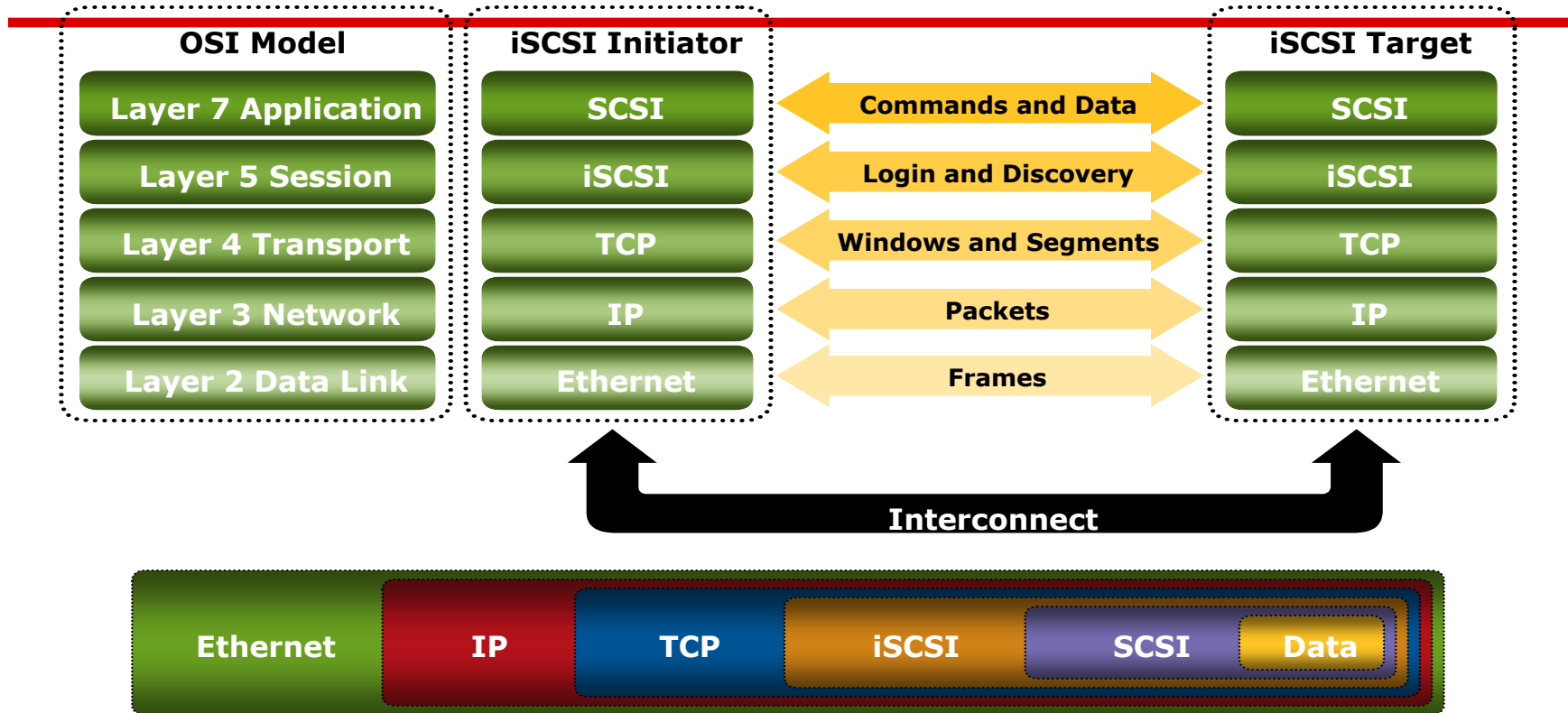
Fibre Channel-to-IP bridge / tunnel (point to point)

Fibre Channel end points

Used in DR implementations



# iSCSI Protocol Stack



# Fibre Channel over Ethernet (FCoE)

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A new protocol that maps Fibre Channel protocol natively over Ethernet  
Allows Fibre Channel to use **10 Gigabit Ethernet networks** (or higher speeds) while preserving the Fibre Channel protocol

Based on two standards :

FCoE standard, developed by T11 Fibre Channel Interfaces Technical Committee

Enhanced Ethernet standard, developed by the Ethernet IEEE Data Center Bridging Task Group

**Enables the consolidation of SAN traffic and Ethernet traffic onto a common 10 Gigabit network infrastructure**

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# FCoE: Benefits

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## Lower capital expenditure

Dramatic reduction in the number of adapters, switch ports and cables required

## Reduced power and cooling requirement

## Enabler for consolidated network infrastructure

Potentially lower administration cost, with convergence of LAN and SAN

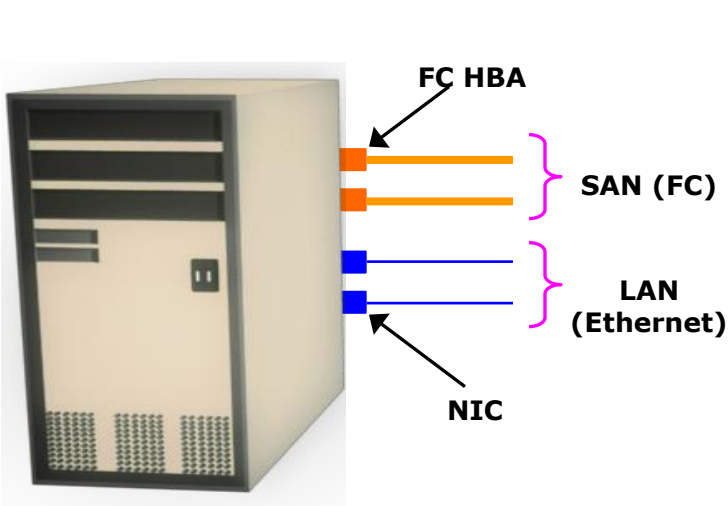
Effective sharing of high-bandwidth links

## Lower Total Cost of Ownership (TCO)

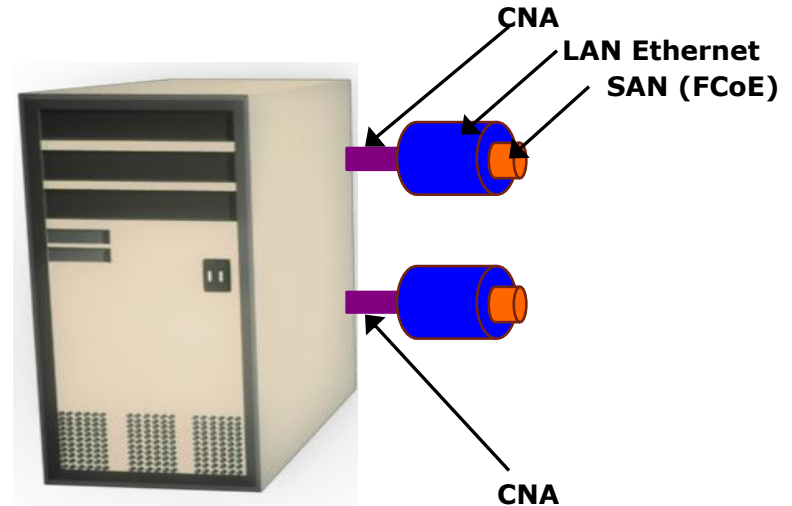
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# I/O Consolidation with FCoE

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**Typical Server Connectivity in data center environments**



**Server with CNA supporting both SAN and LAN**

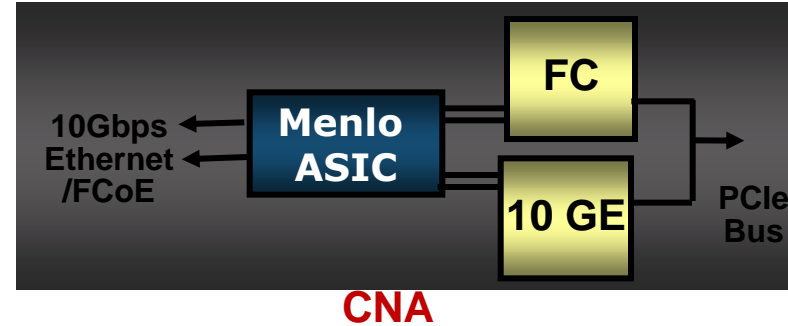
# FCoE - Physical Elements

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Host Interface: CNA (Converged Network Adapter)  
PCIe card on host consolidates NICs and HBAs  
Provides a 10 Gigabit Ethernet link that carries  
consolidated traffic  
10 Gbps connectivity options: Host to FCoE switch

Option1: Copper-based  
Cost effective option

Option2: Standard optical

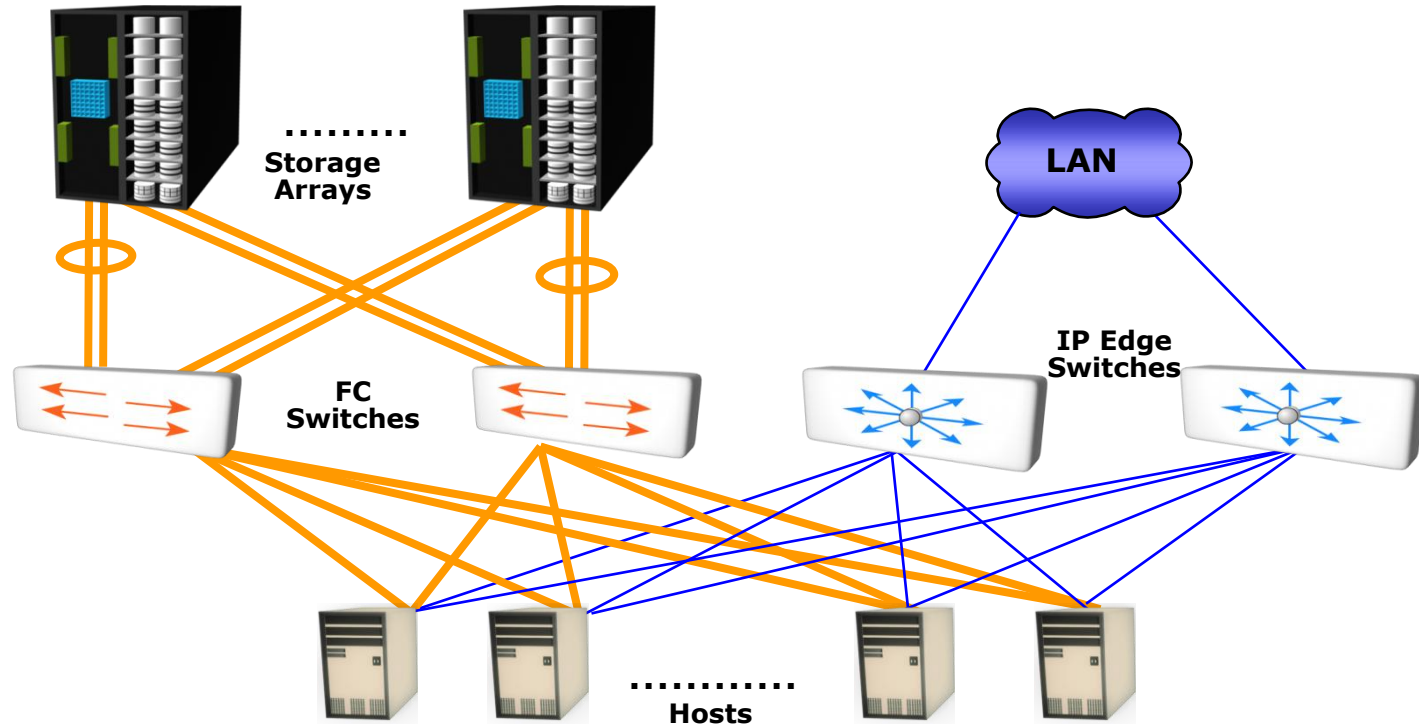


**Copper Cable**



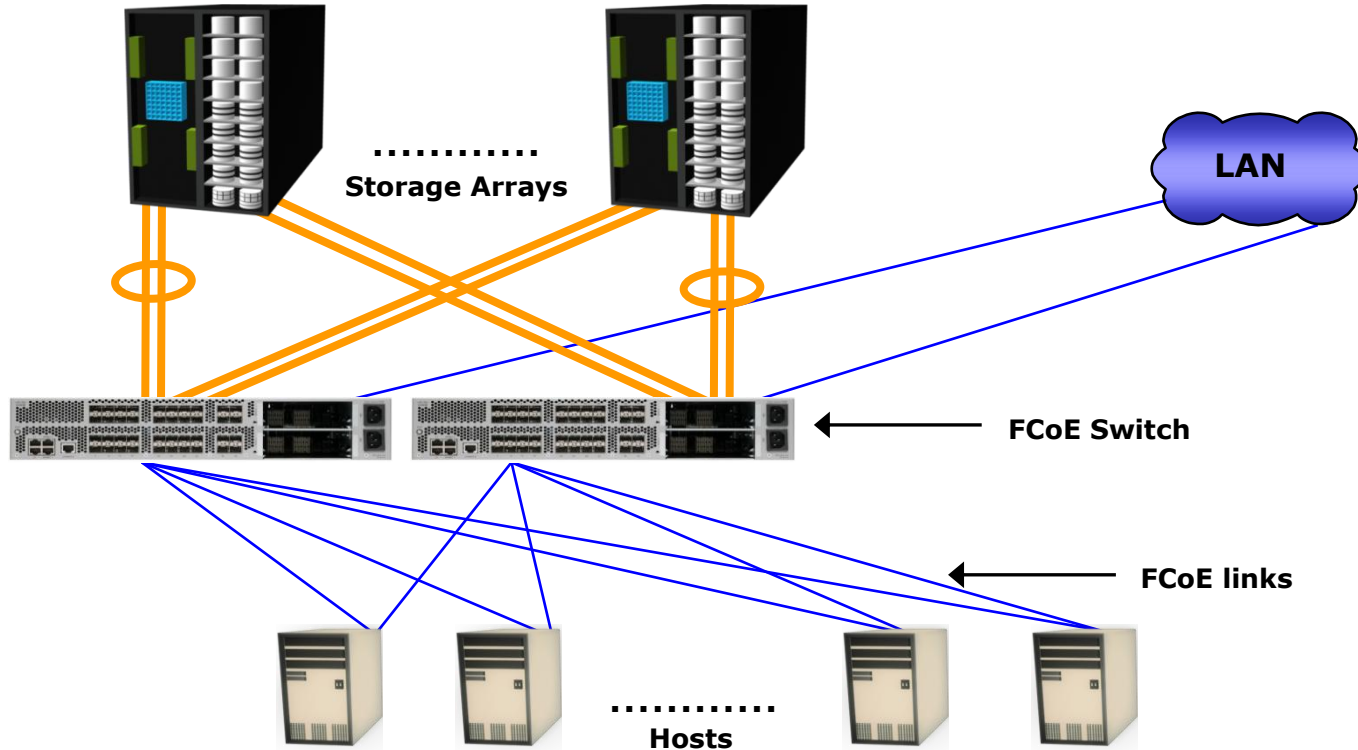
# Infrastructure - Before FCoE

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# Infrastructure – With FCoE

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# Discussão e exercícios

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Cite ao menos duas vantagens do tráfego da rede de armazenamento (SAN) por IP.

O que uma arquitetura FCoE consolida e simplifica na infra estrutura de um data center ?

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# Leitura recomendada

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## Capítulo 8

**Information Storage and Management Storing, Managing, and Protecting Digital Information in Classic, Virtualized, and Cloud Environments**

2nd Edition Edited by Somasundaram Gnanasundaram, Alok Shrivastava

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