

“Reinventando Internet”: UETS

PRESENTACIÓN ESNOG14

24 de octubre de 2014



Dr. José Morales Barroso

Evolución de las Tecnologías de Red

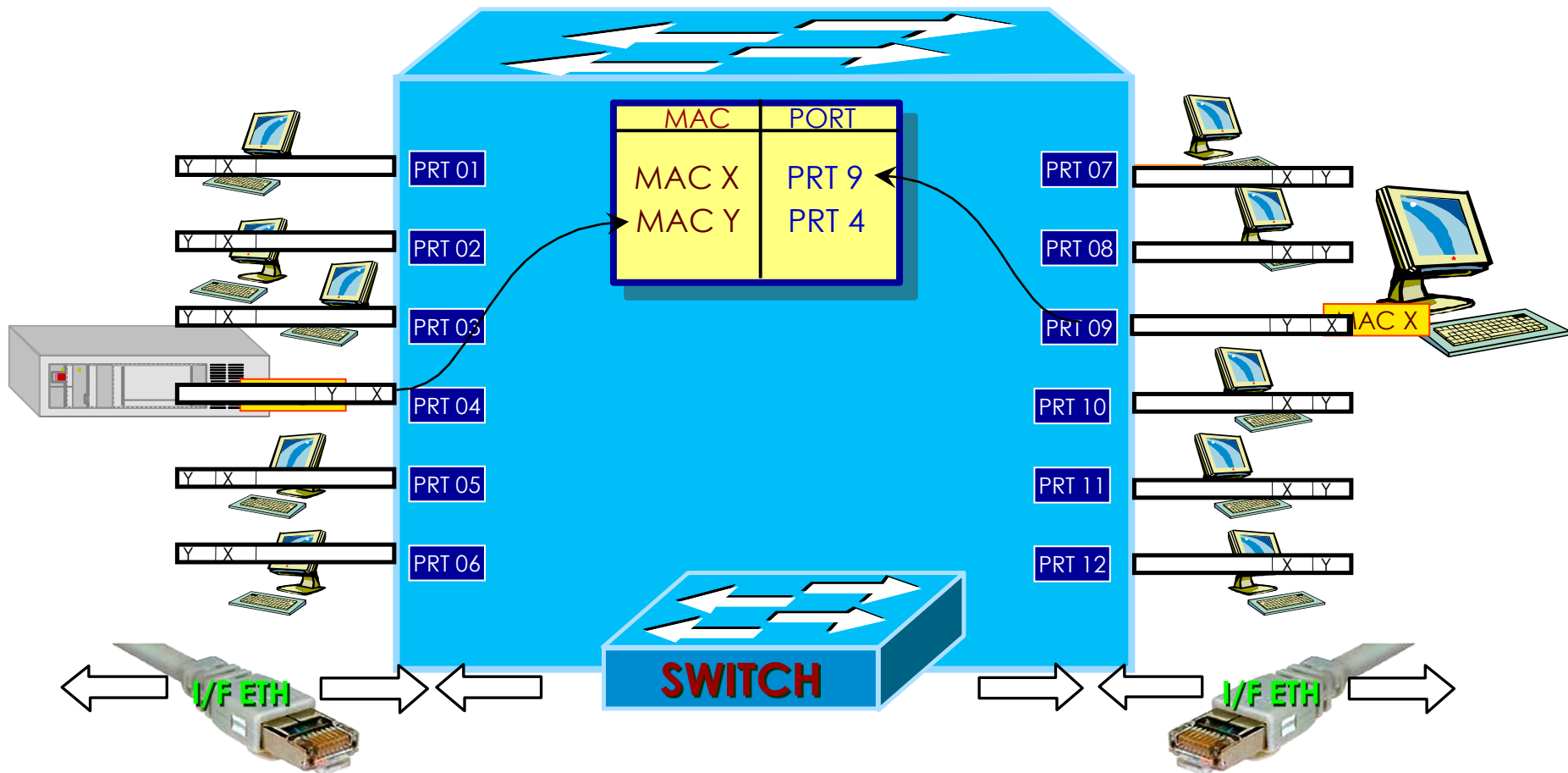
Circuitos y Paquetes

Routers y Bridges

El servicio de conmutación de circuitos es suministrado y controlado por el proveedor de red



Bridges: "L2 Switching"



“Reinventando Internet”


Simplificación radical


Seguridad inherente

UETS

Universal Ethernet Telecommunications Service

25 de mayo de 2004, Dr. José Morales Barroso

 <p>OFICINA ESPAÑOLA DE PATENTES Y MARCAS</p> <p>ESPAÑA</p>	<p>⑪ Número de publicación: 2 246 702</p> <p>⑫ Número de solicitud: 200401335</p> <p>⑬ Int. Cl.: H04L 12/46 (2006.01) H04L 29/02 (2006.01)</p>
	<p>⑭ PATENTE DE INVENCION CON EXAMEN PREVIO</p> <p>B2</p>
<p>⑮ Fecha de presentación: 02.06.2004</p> <p>⑯ Fecha de publicación de la solicitud: 16.02.2006</p> <p>Fecha de la concesión: 30.04.2007</p> <p>Fecha de modificación de las reivindicaciones: 24.04.2007</p> <p>⑰ Fecha de anuncio de la concesión: 16.06.2007</p> <p>⑱ Fecha de publicación del folleto de la patente: 16.06.2007</p>	<p>⑲ Titular/es: L & M Data Communications, S.A.</p> <p>⑳ Inventor/es: Morales Barroso, José</p> <p>㉑ Agente: Trigo Peces, José Ramón</p>
<p>㉒ Título: Servicio universal de telecomunicaciones Ethernet.</p>	

<p>U.S. PAT. 7,710,936 B2</p> <p>The Director of the United States Patent and Trademark Office</p> <p><i>Has received an application for a patent for a new and useful invention. The title and description of the invention are enclosed. The requirements of law have been complied with, and it has been determined that a patent on the invention shall be granted under the law.</i></p> <p>Therefore, this</p> <p>United States Patent</p> <p><i>Grants to the person(s) having title to this patent the right to exclude others from making, using, offering for sale, or selling the invention throughout the United States of America or importing the invention into the United States of America, and if the invention is a process, of the right to exclude others from using, offering for sale or selling throughout the United States of America, or importing into the United States of America, products made by that process, for the term set forth in 35 U.S.C. 154(a)(2) or (c)(1), subject to the payment of maintenance fees as provided by 35 U.S.C. 41(b). See the Maintenance Fee Notice on the inside of the cover.</i></p> <p><i>David J. Kappas</i></p> <p><small>Director of the United States Patent and Trademark Office</small></p> 
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IEEE 802 Amendment for Local Media Access Control (MAC) Addressing

CRITERIA FOR STANDARDS DEVELOPMENT (CSD)

Based on IEEE 802 LMSC Operations Manuals approved 15 November 2013
Last edited 20 January 2014

1. IEEE 802 criteria for standards development (CSD)

The CSD documents an agreement between the WG and the Sponsor that provides a description of the project and the Sponsor's requirements more detailed than required in the PAR. The CSD consists of the project process requirements, 1.1, and the 5C requirements, 1.2.

1.1 Project process requirements

1.1.1 Managed objects

Describe the plan for developing a definition of managed objects. The plan shall specify one of the following:

- The definitions will be part of this project.
- The definitions will be part of a different project and provide the plan for that project or anticipated future project.
- The definitions will not be developed and explain why such definitions are not needed.

c) This is an architecture document so it has no managed objects

1.1.2 Coexistence

A WG proposing a wireless project shall demonstrate coexistence through the preparation of a Coexistence Assurance (CA) document unless it is not applicable.

- Will the WG create a CA document as part of the WG balloting process as described in Clause 13? (yes/no)
- If not, explain why the CA document is not applicable.\\

A CA document is not applicable because this is not a wireless project

1.2 5C requirements

1.2.1 Broad market potential

Each proposed IEEE 802 LMSC standard shall have broad market potential. At a minimum, address the following areas:

- Broad sets of applicability.
- Multiple vendors and numerous users.

Today, every physical bridgeable port (e.g. IEEE 802.3 and 802.11) shipped consumes a Globally Unique MAC address. MAC address usage increased dramatically with the emergence of network ports on phones, tablets, set top boxes, etc.

Virtual ports need addresses assigned as they are created. Global addresses are not appropriate as consumption of global address space by such ephemeral devices could exhaust the address space. Proprietary protocols have been created to distribute addresses for virtual ports. Some protocols have used Global MAC address blocks for these assignments because there was no mechanism for obtaining a Local MAC address block. Some have used a fixed or default block in the local address space. Fibre Channel over Ethernet (FCoE) has standardized a protocol for distributing FCoE virtual port MAC addresses from blocks in the Local MAC address space.

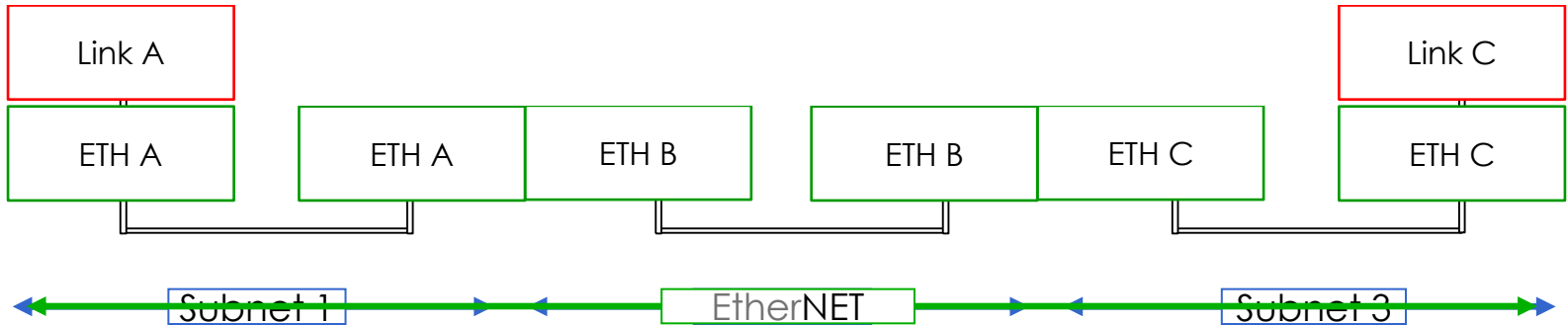
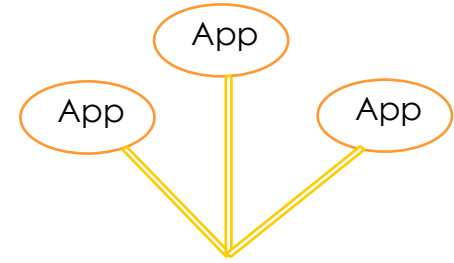
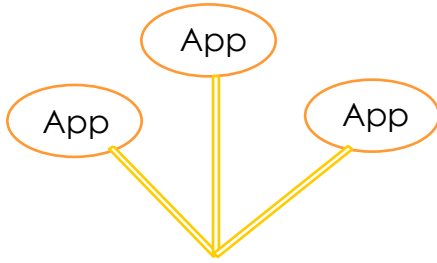
Emerging usage for the Internet of Things (IoT) ports on sensors, actuators, lights, appliances, etc. could vastly increase address usage by physical ports. Most such devices would not need Globally Unique MAC addresses if there were protocols available to obtain a Local MAC address.

A first step in enabling protocols for claiming or assignment of Local MAC addresses is to organize the MAC address space so that entities can be assigned a block of the Local Address space through the Company ID (CID) as a default. Another part of the space will be defined for local administration.

Proyecto IEEE 802c: Nuevo estándar para utilización de direcciones MAC locales, elemento clave del UETS

- Amendment: Local Media Access Control (MAC) Addressing
- “It's clear that if the **Internet of Things (IoT)** is to work, it **must employ locally administered MAC addresses**. Our old assumption, that the universally administered addresses were virtually inexhaustible, is not sustainable in the context of IoT. And IoT is simply going to happen; market demand is plain.”
- “Emerging usage for the **Internet of Things (IoT)** ports on sensors, actuators, lights, appliances, etc. could vastly increase address usage by physical ports. Most such devices would not need Globally Unique MAC addresses if there were protocols available to obtain a **Local MAC address**.”

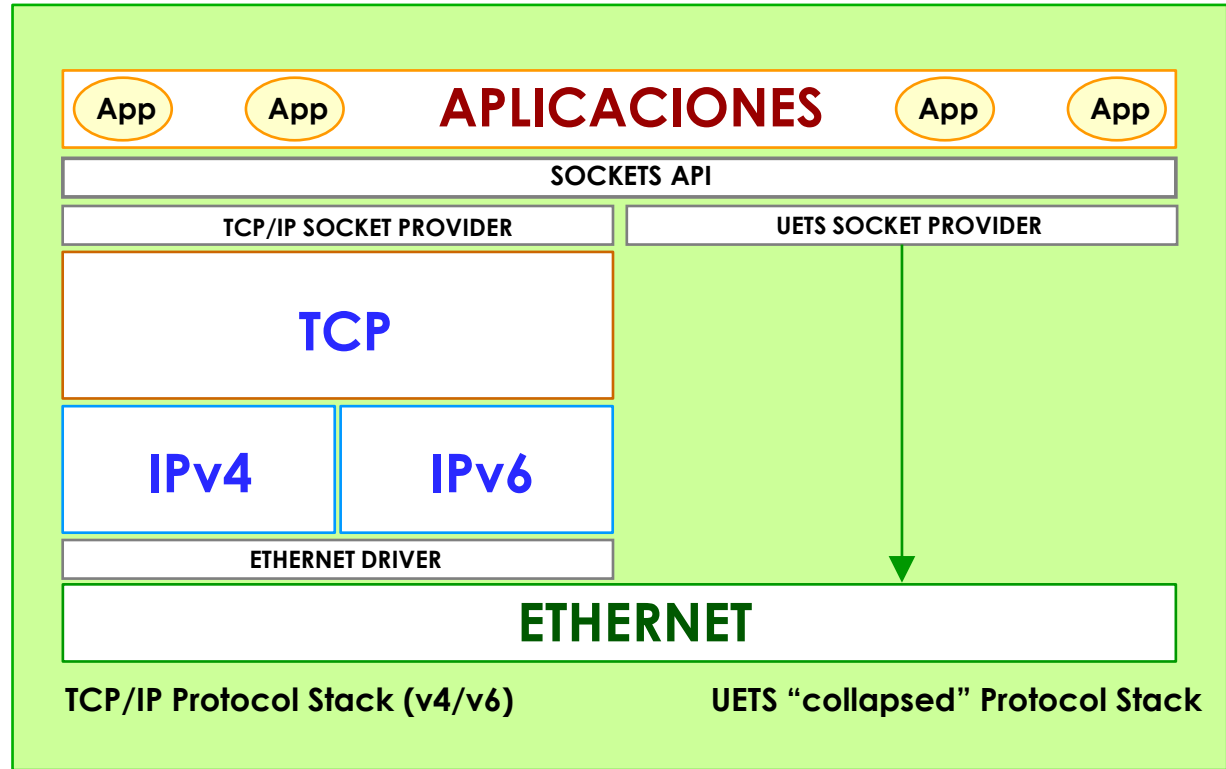
UETS: the “Thinnest Waist” of the Earth’s Internet



UETS: Arquitectura “colapsada”



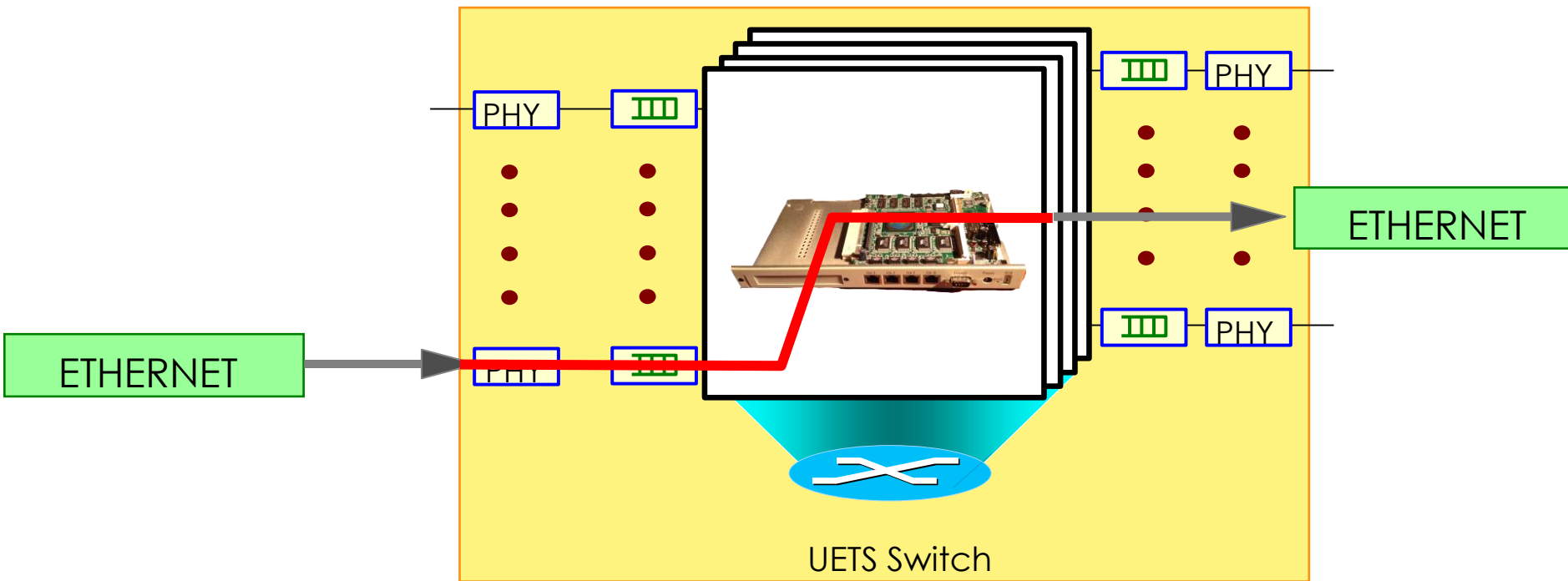
UETS Host



UETS: "Auto-Routing"

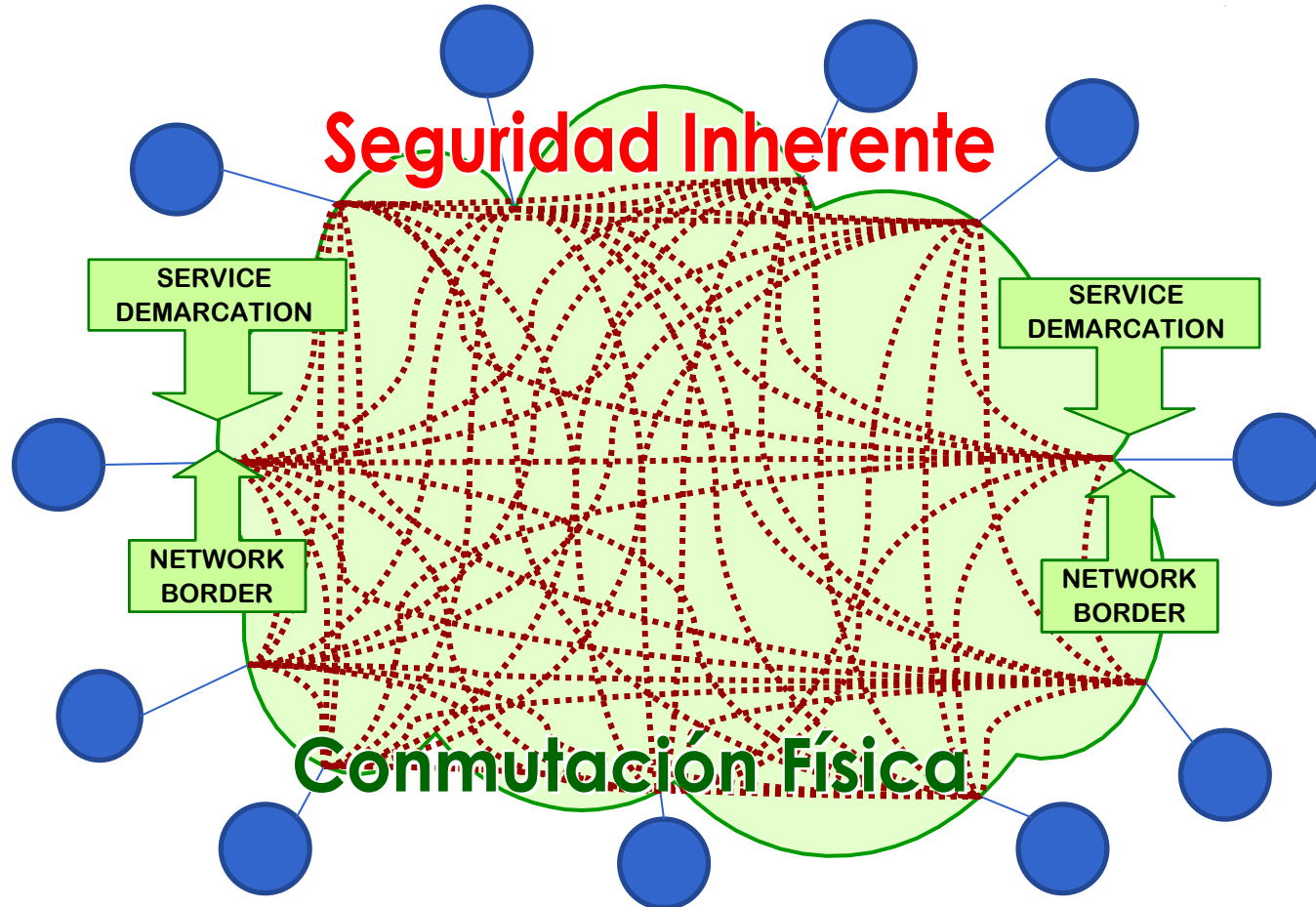
Conmutación FISICA "end-to-end" de datagramas Ethernet

MAXIMA EFICIENCIA

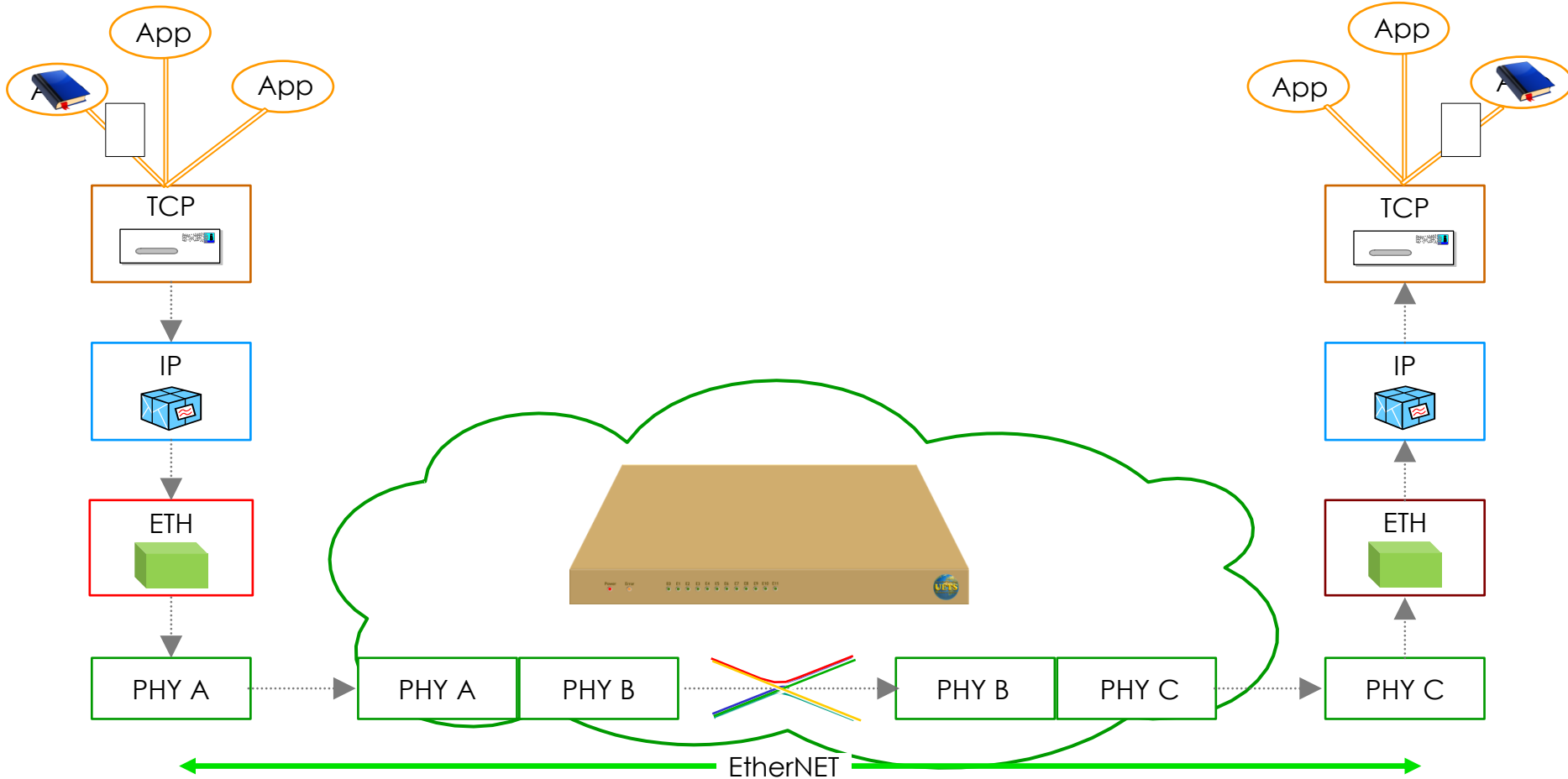


MINIMA ENERGIA

UETS utiliza las técnicas de conmutación de circuitos para encaminar las tramas Ethernet “end-to-end”

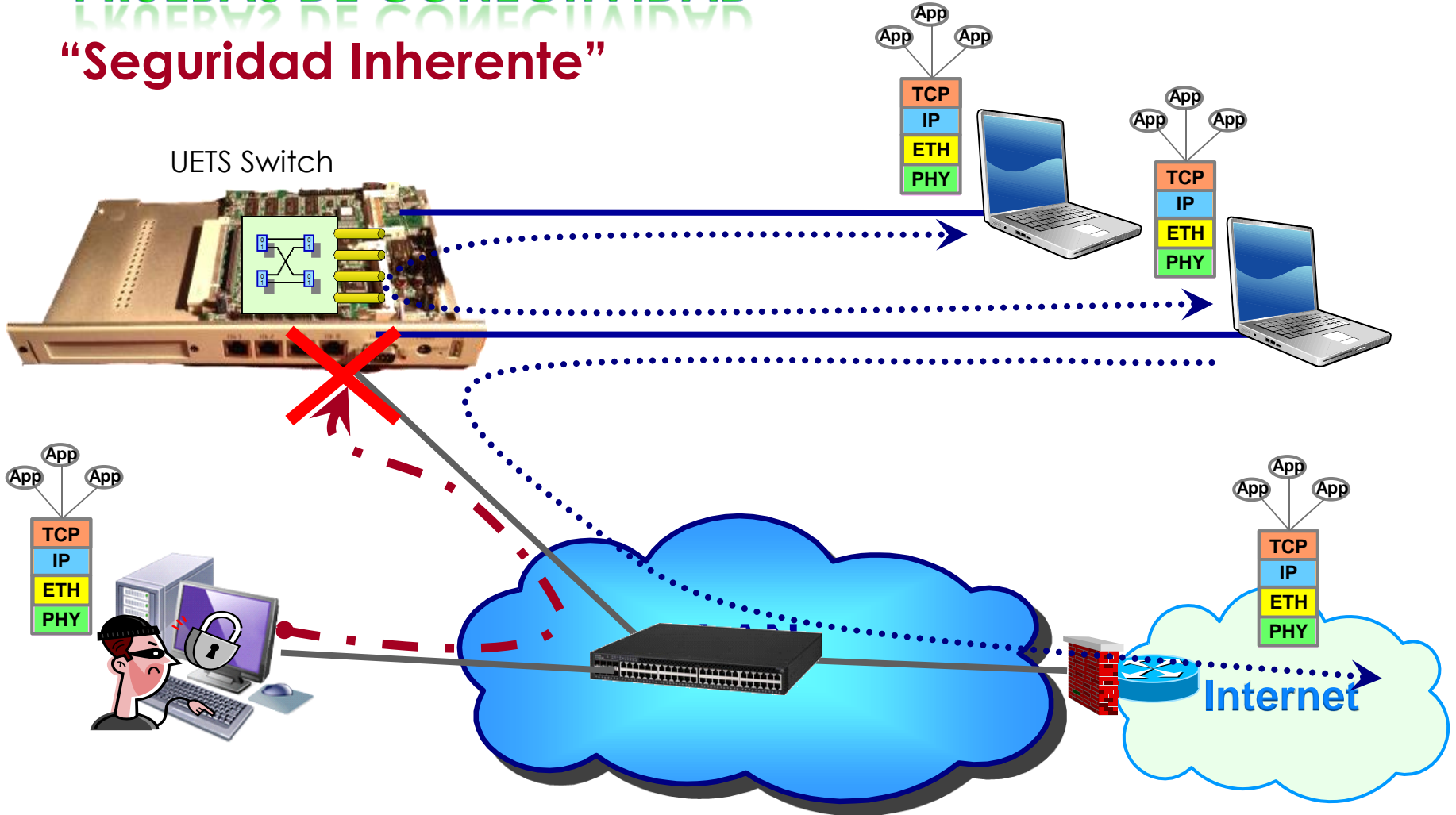


Protocolos TCP/IP sobre Red UETS

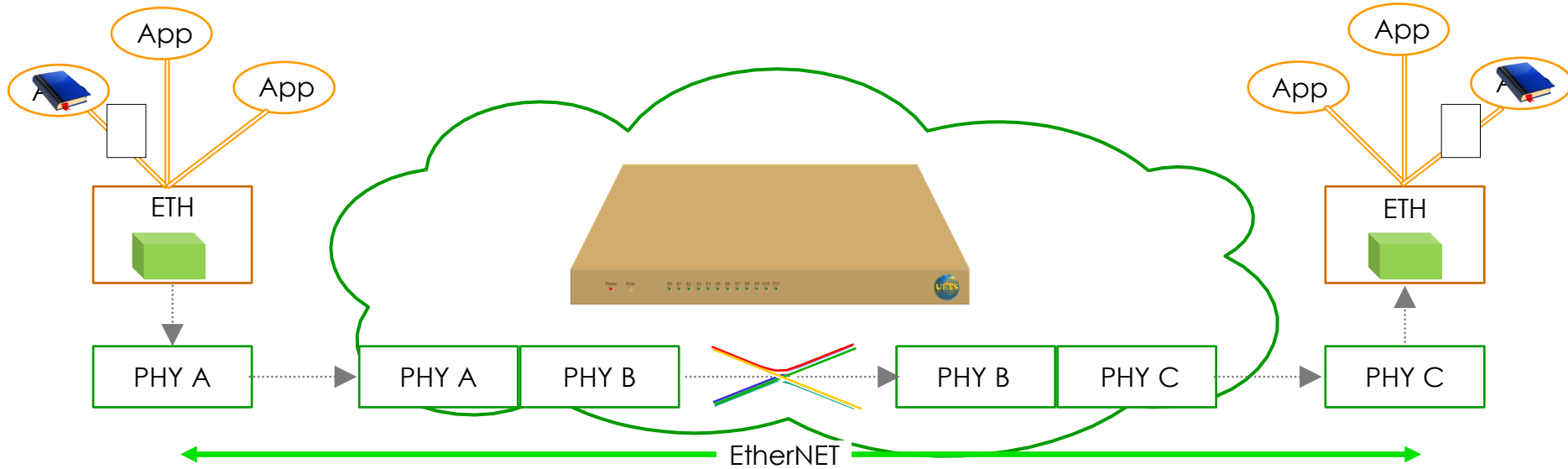


PRUEBAS DE CONECTIVIDAD

“Seguridad Inherente”

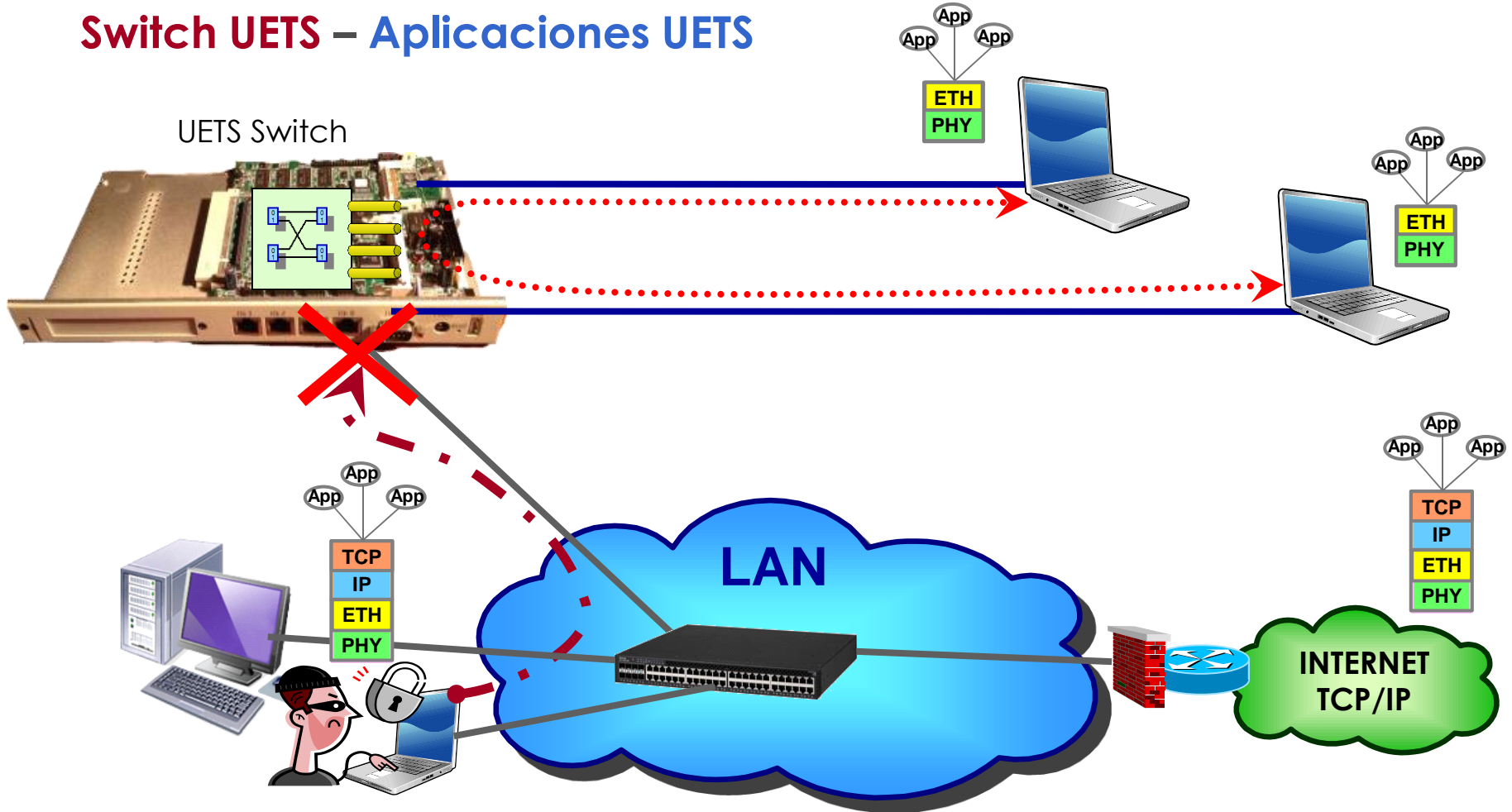


Protocolo UETS sobre Red UETS



RED "BLINDADA" ULTRAEFICIENTE

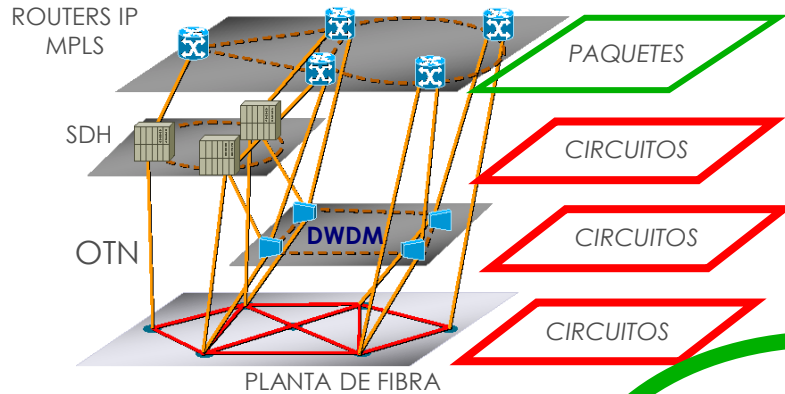
Switch UETS – Aplicaciones UETS



Más Ancho de Banda – Menos Consumo



Red Óptica para Transporte IP

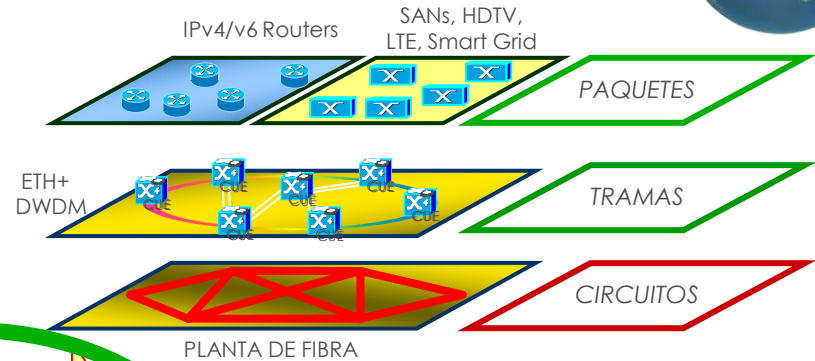


Trafico IP: 1

Utilización conmutación de circuitos SDH, WDM: 7%

Router Juniper 4xT640
21.044 W - 1.280 Gbps (16,44 W/Gbps)

Red basada en UETS



Tráfico UETS/EFR: 0,7

Utilización conmutación de tramas Ethernet: 60%

Crosspoint Switch Juniper TX
2.976 W - 2.500 Gbps (1,19 W/Gbps)

Ancho de Banda x 12
Energía 1/13,7

ANCHO DE BANDA: $0,7 \times 60\% / 1 \times 7\% = 12 \text{ VECES MÁS}$
CONSUMO ENERGÍA: $16,44 / 1,19 = 13,7 \text{ VECES MENOS}$

El Ecosistema UETS

