

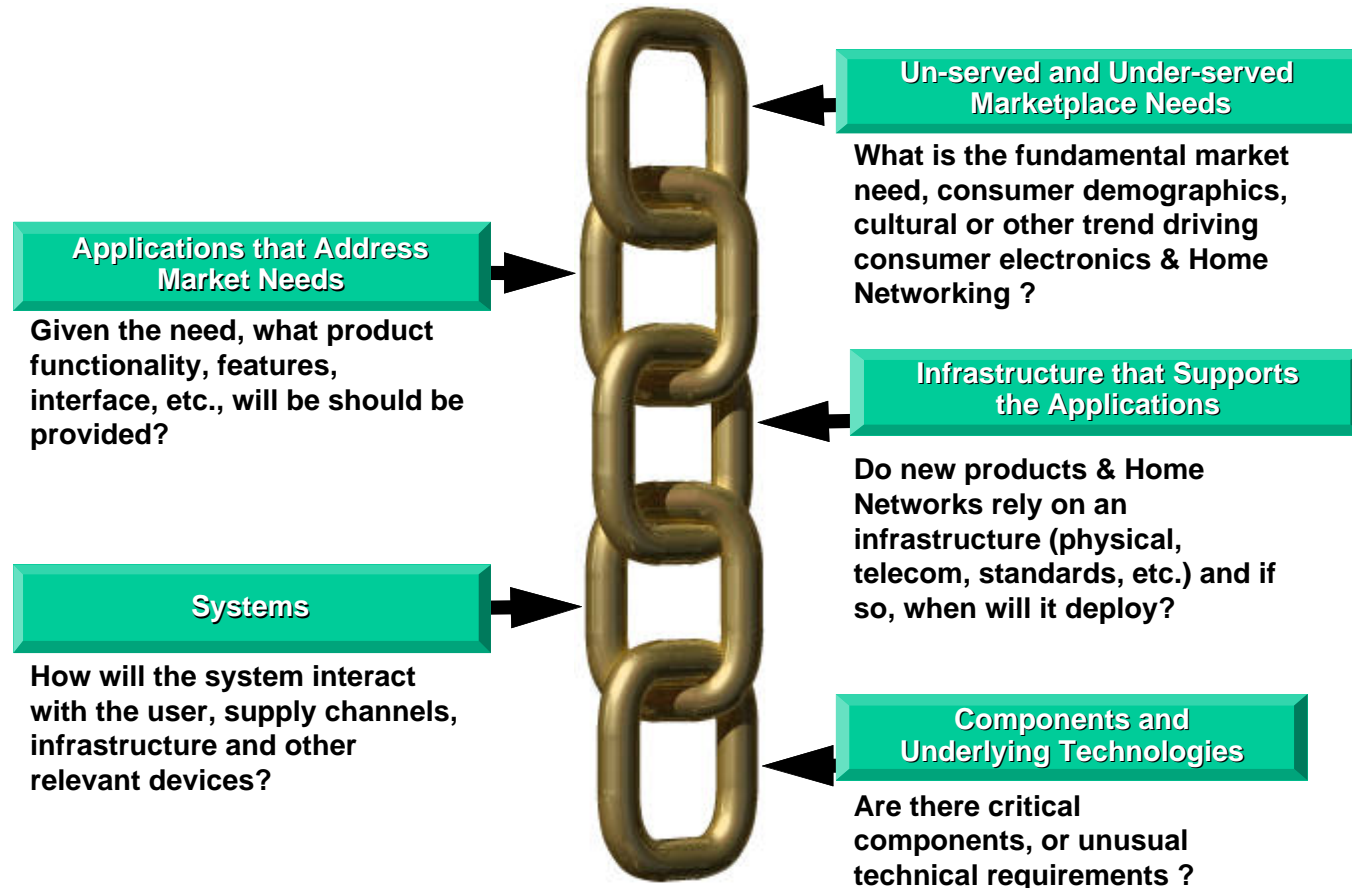
Outline

In this new world of *convergence* and *hypercompetition* there is no safe haven-- the cable industry has recognized the challenges and is proceeding to remake itself

- Introduction
- Drivers
- Summary and Conclusions

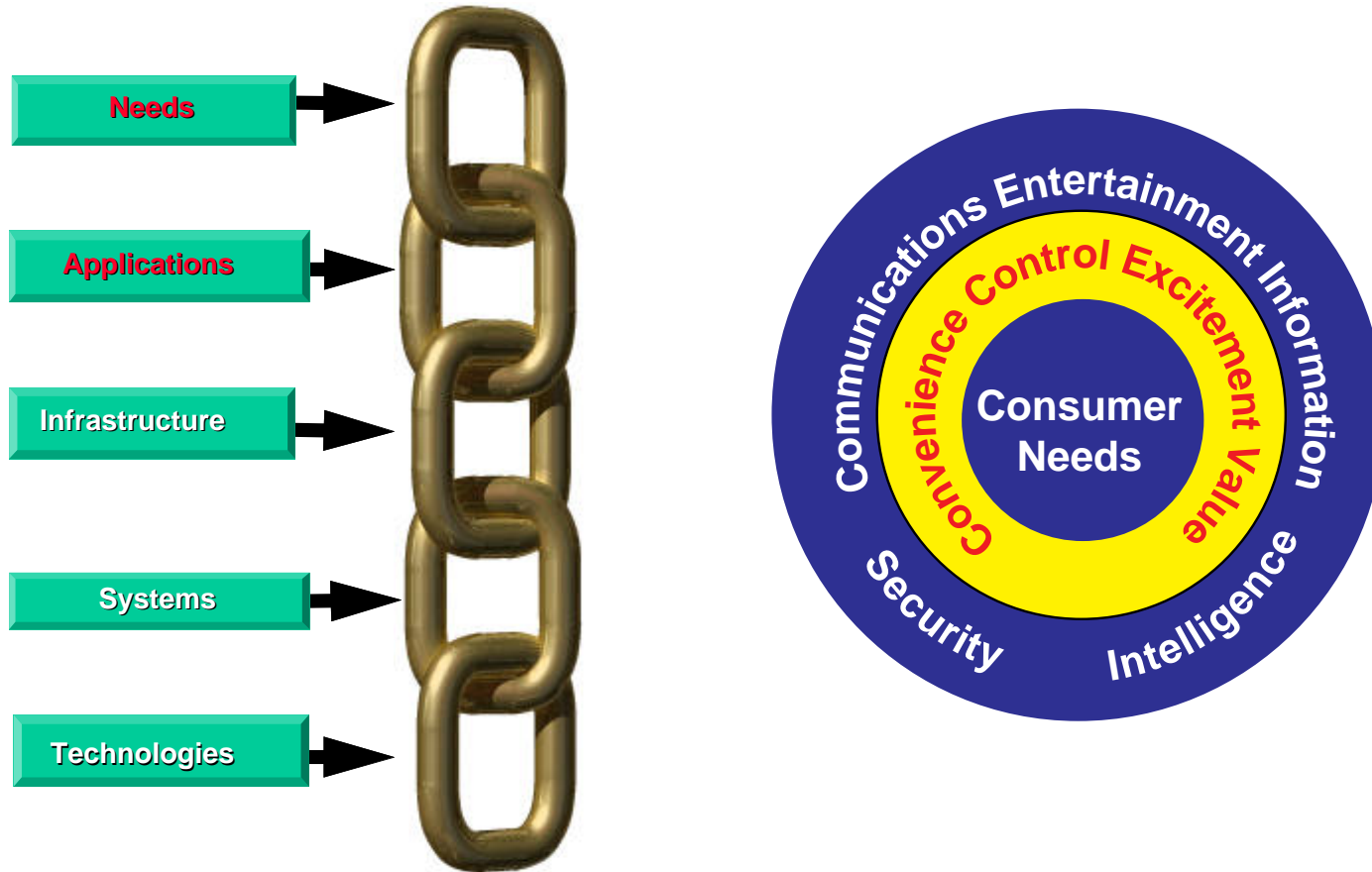
Introduction- The Food Chain

Business opportunities occur when the chain is fully populated.



Introduction- Needs

Consumers are diverse and multifaceted and so are their needs.



Introduction- Applications

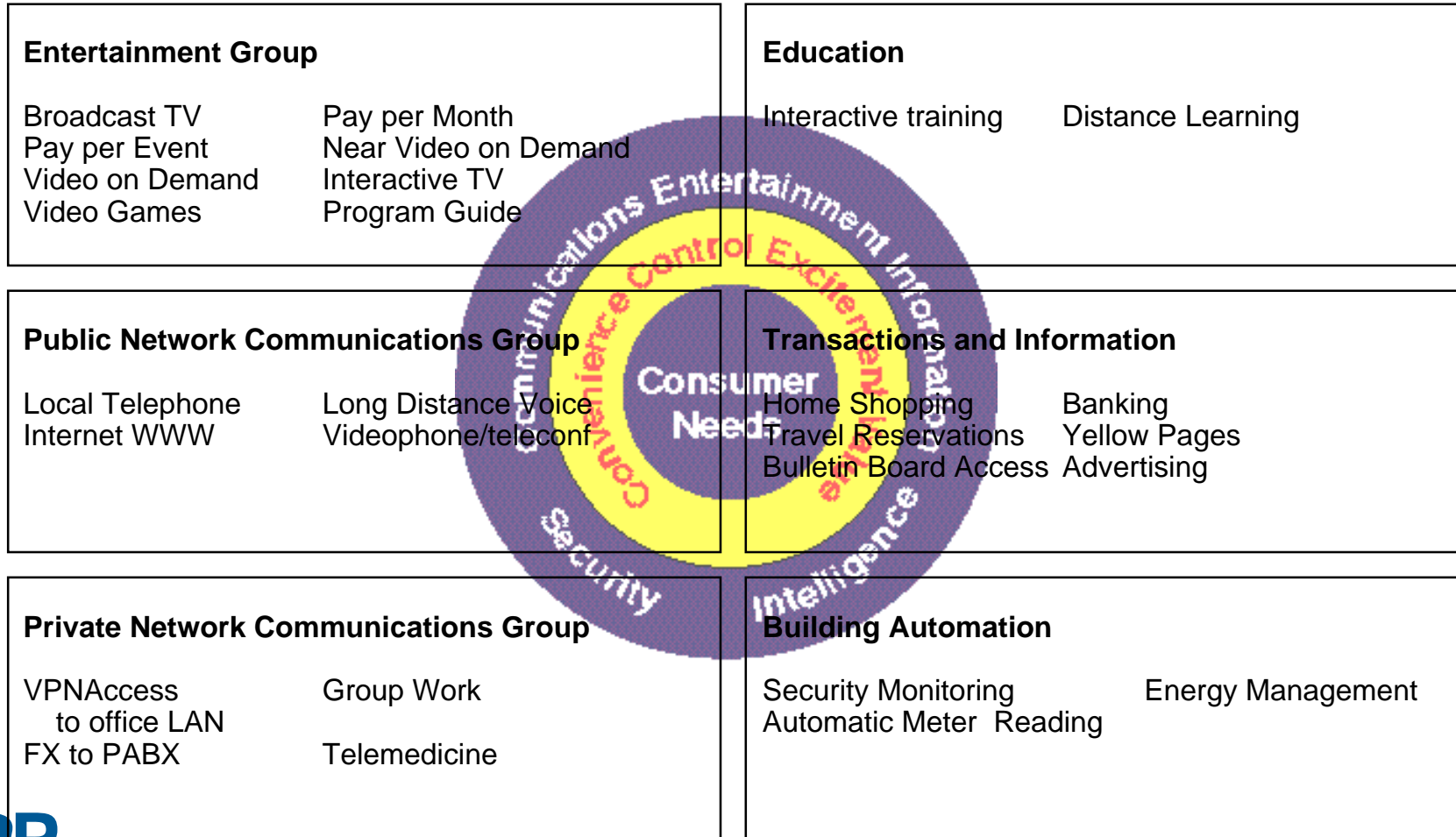
The historical cable industry application was simple broadcast TV.

Entertainment Group

Broadcast TV Pay per Month

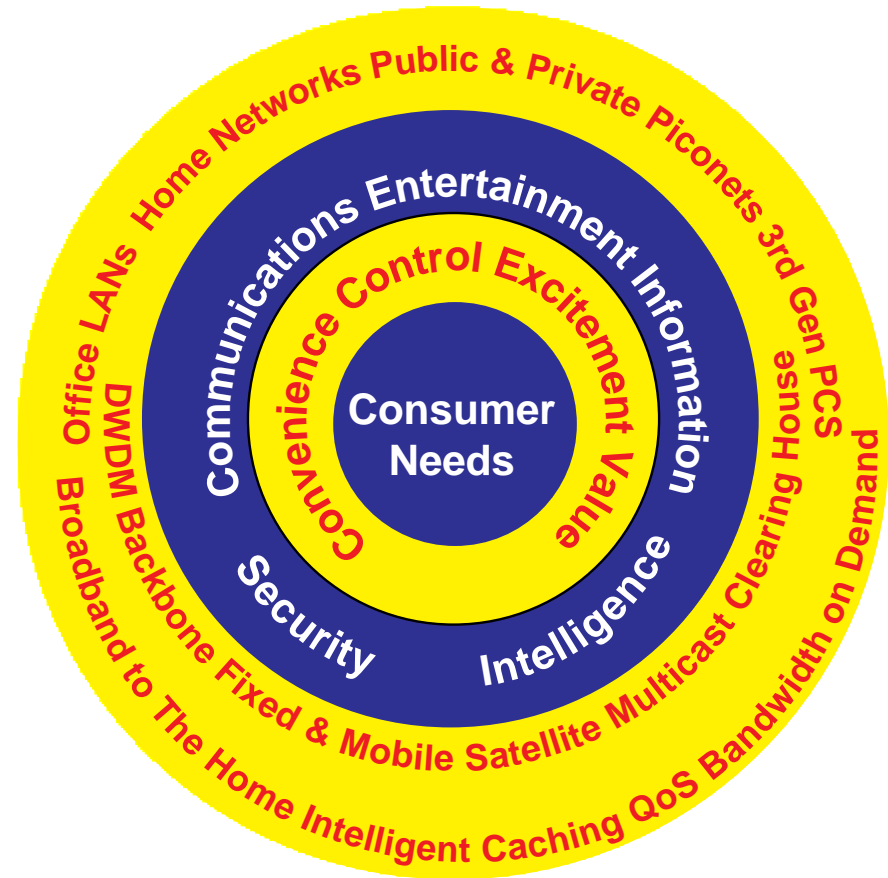
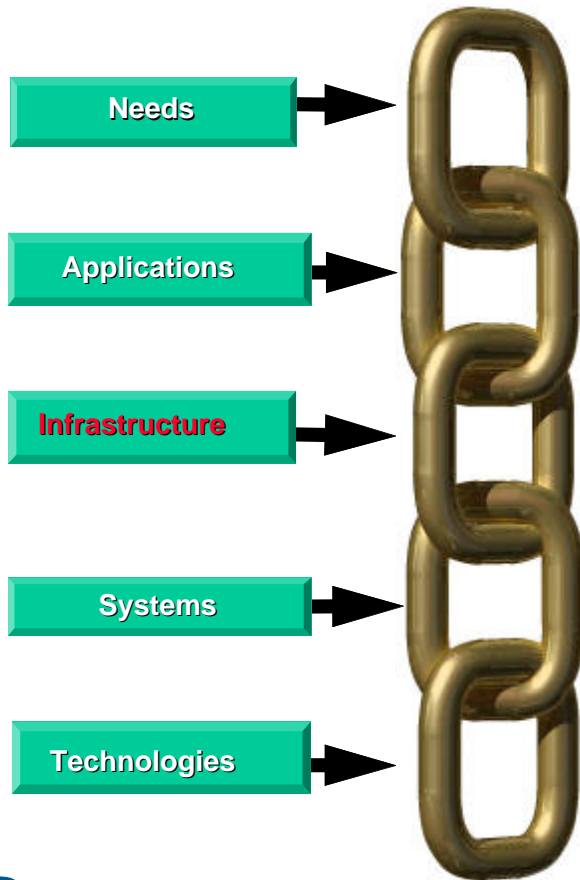
Introduction- Applications

However consumer needs are driving new applications



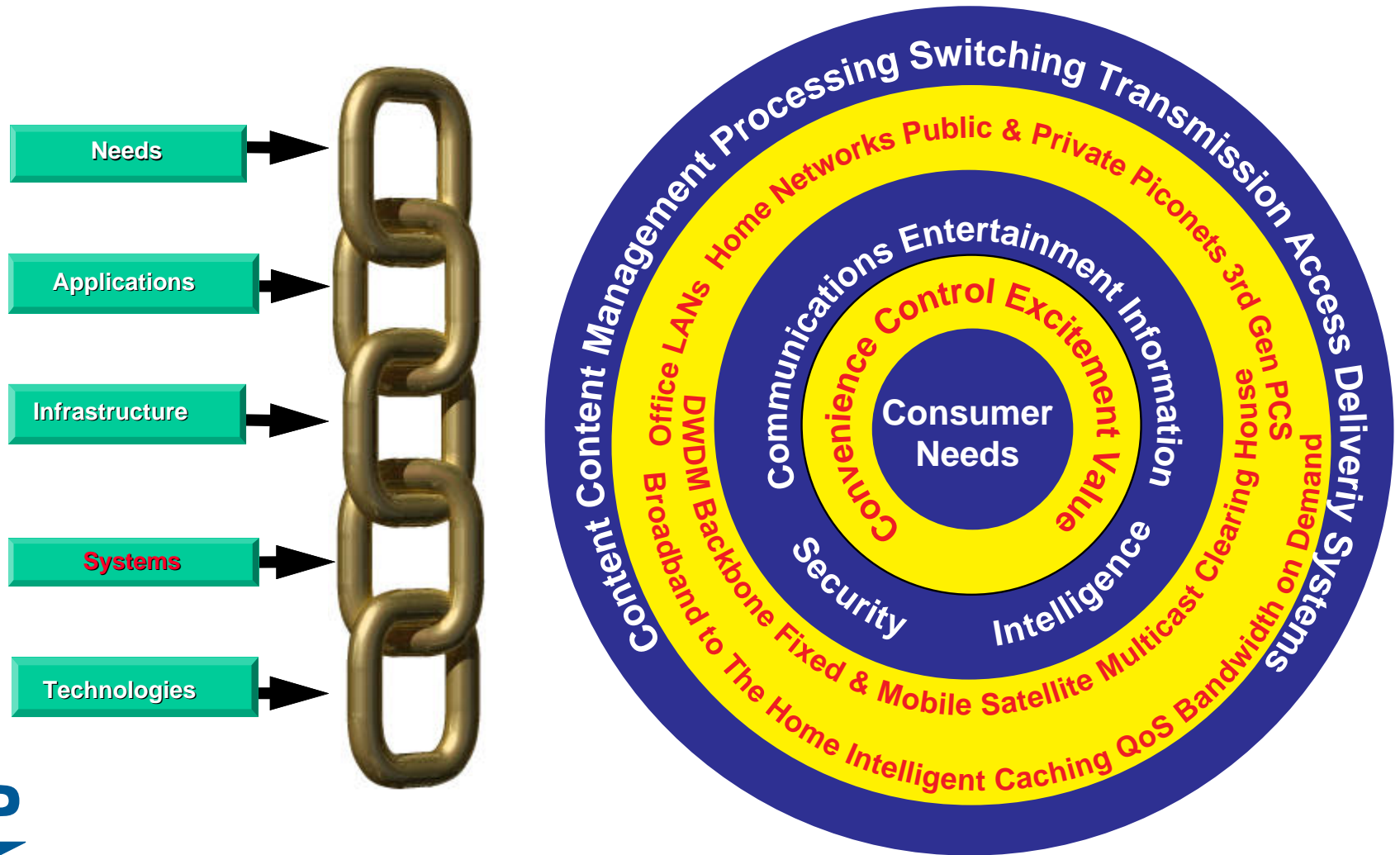
Introduction- Infrastructure

Supporting these new applications requires flexible, broadband, rights managed infrastructure.



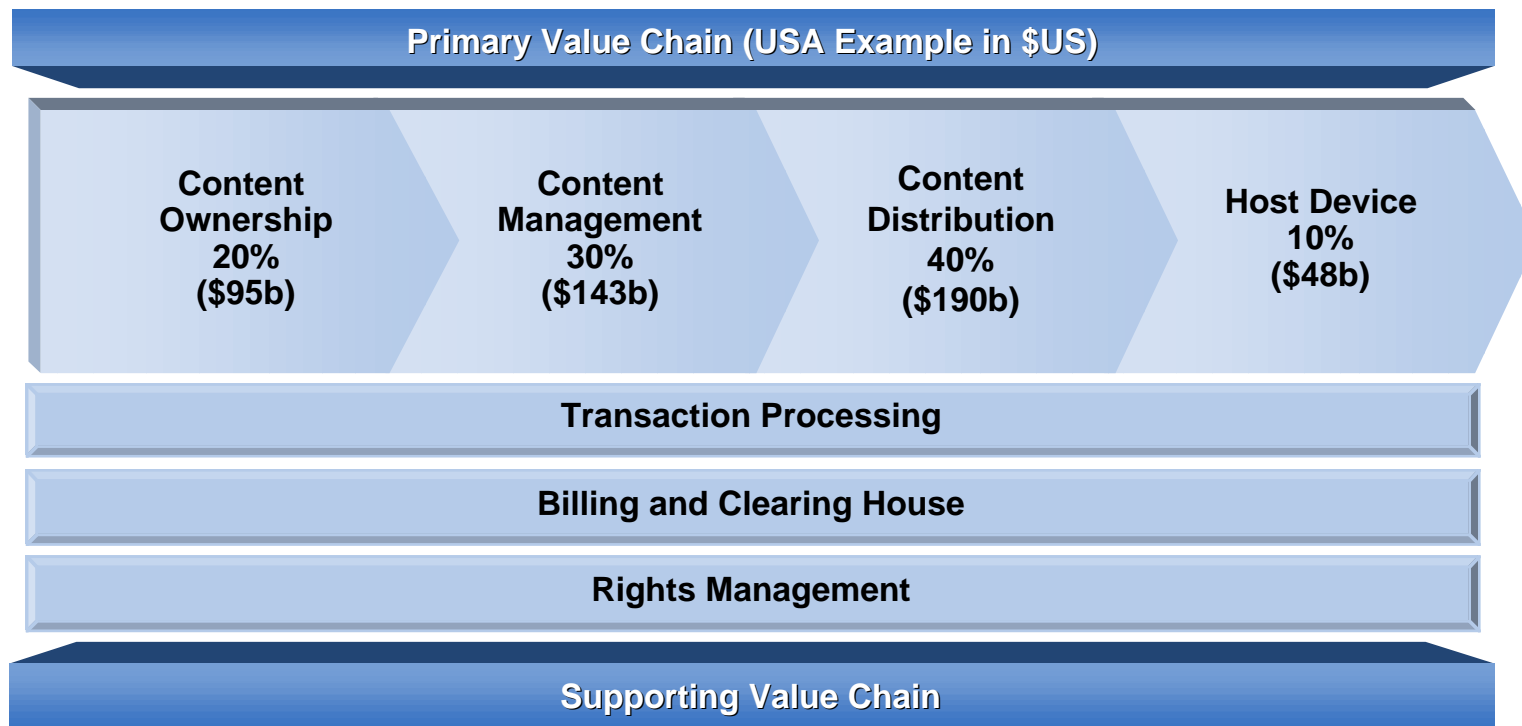
Introduction- Systems

The systems required by the food chain must cover the full value chain



Introduction- Systems

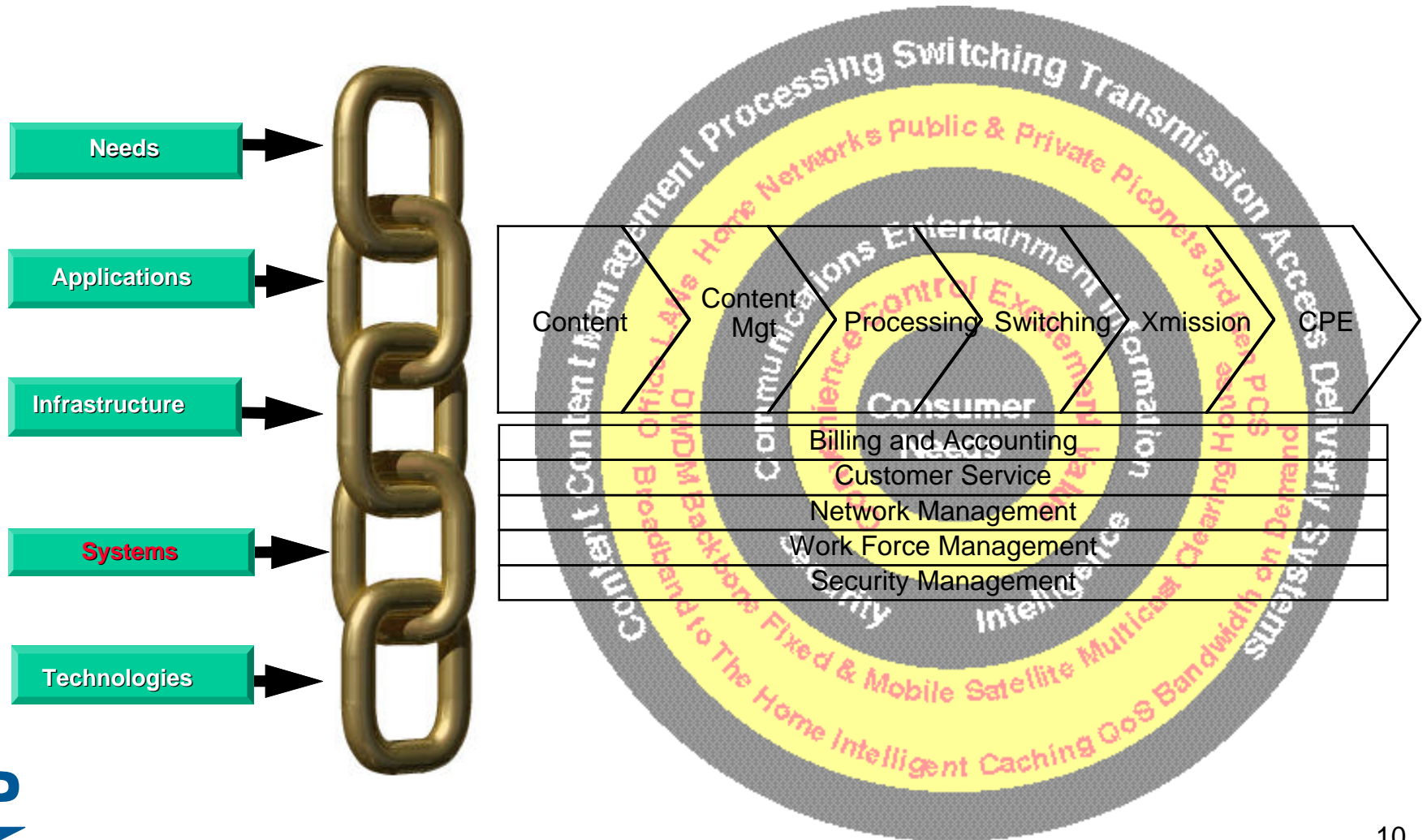
There is also substantial business opportunity if one plays across the entire value chain.



Source: EC Study (1996 reporting 1994 numbers) and ADL calculations

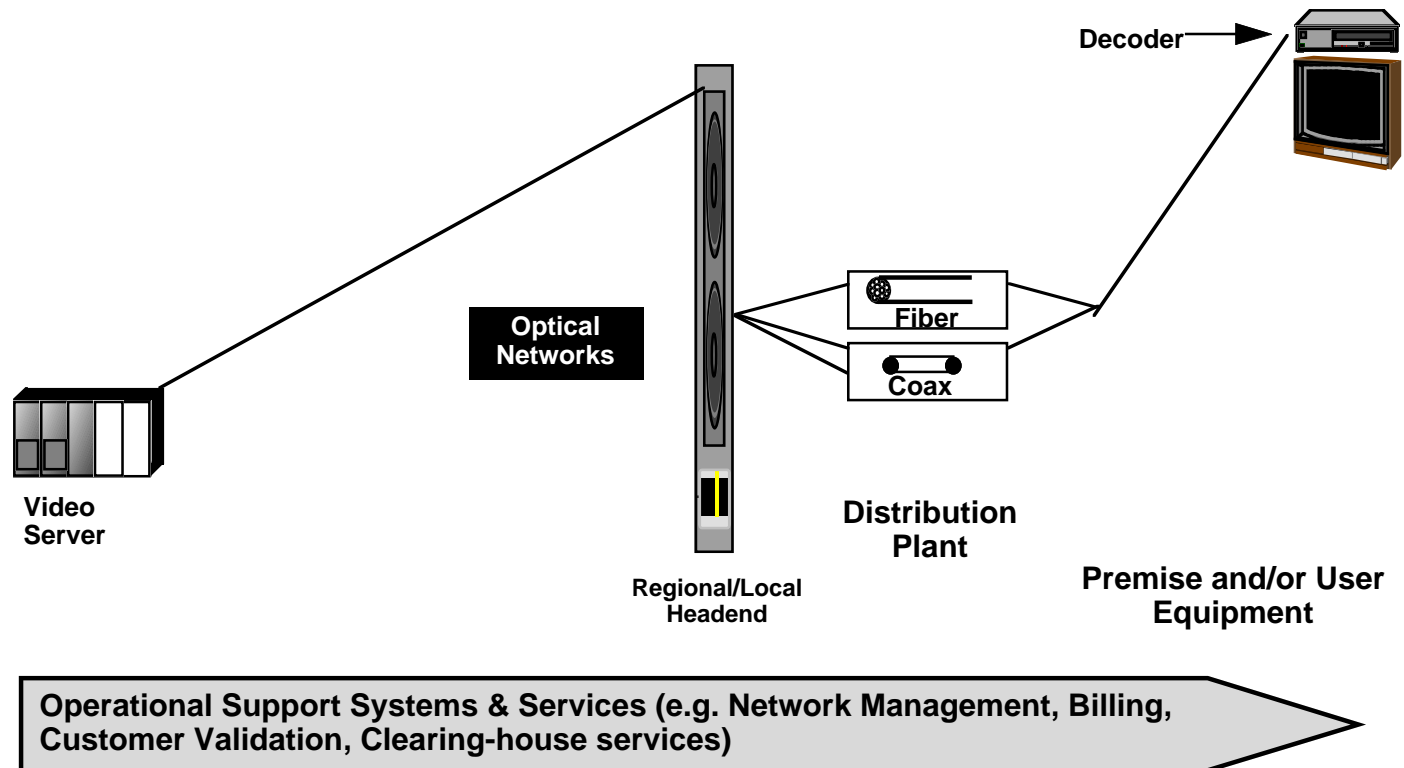
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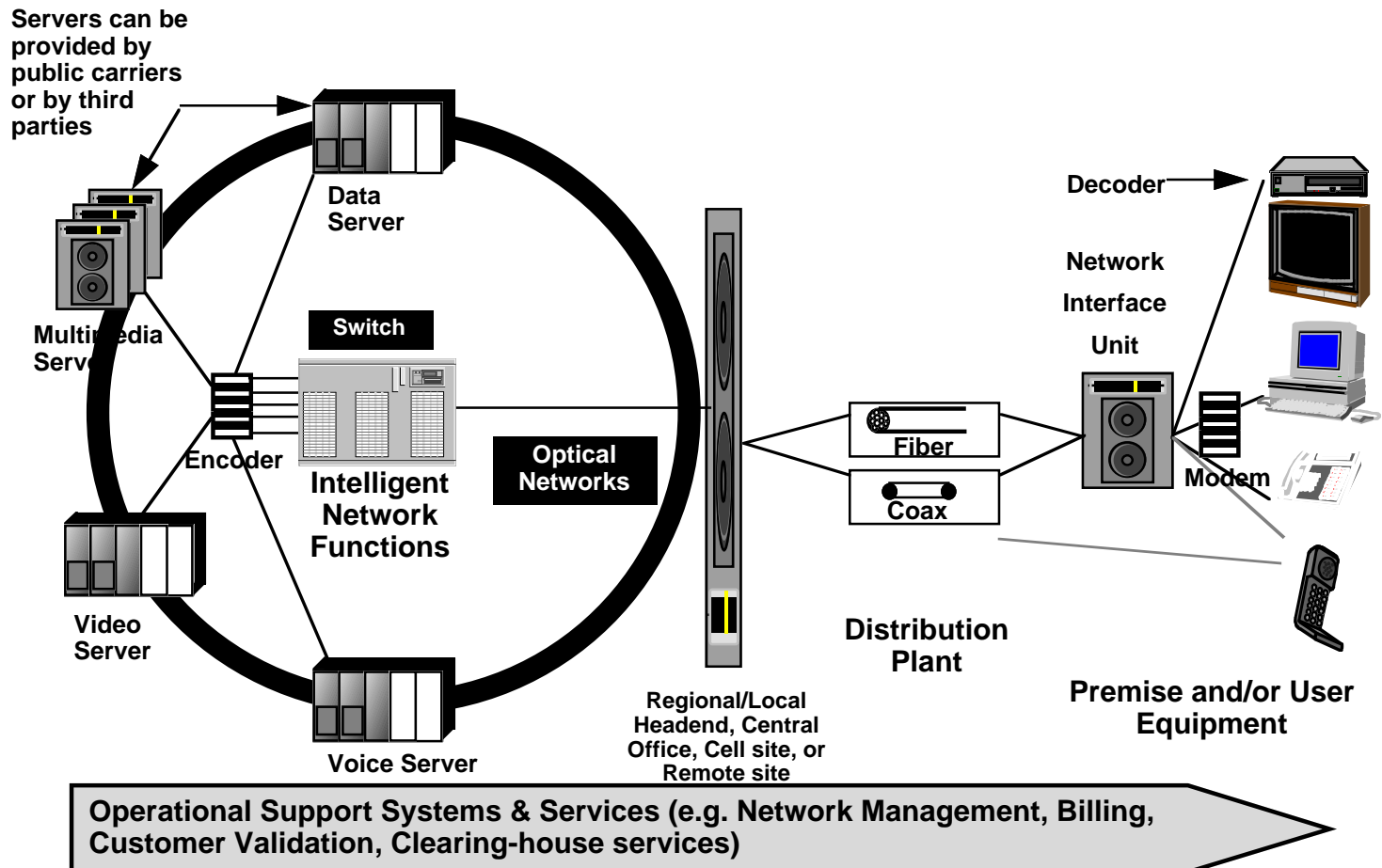
Introduction- Systems

Historical cable systems were designed to deliver broadcast analog video.



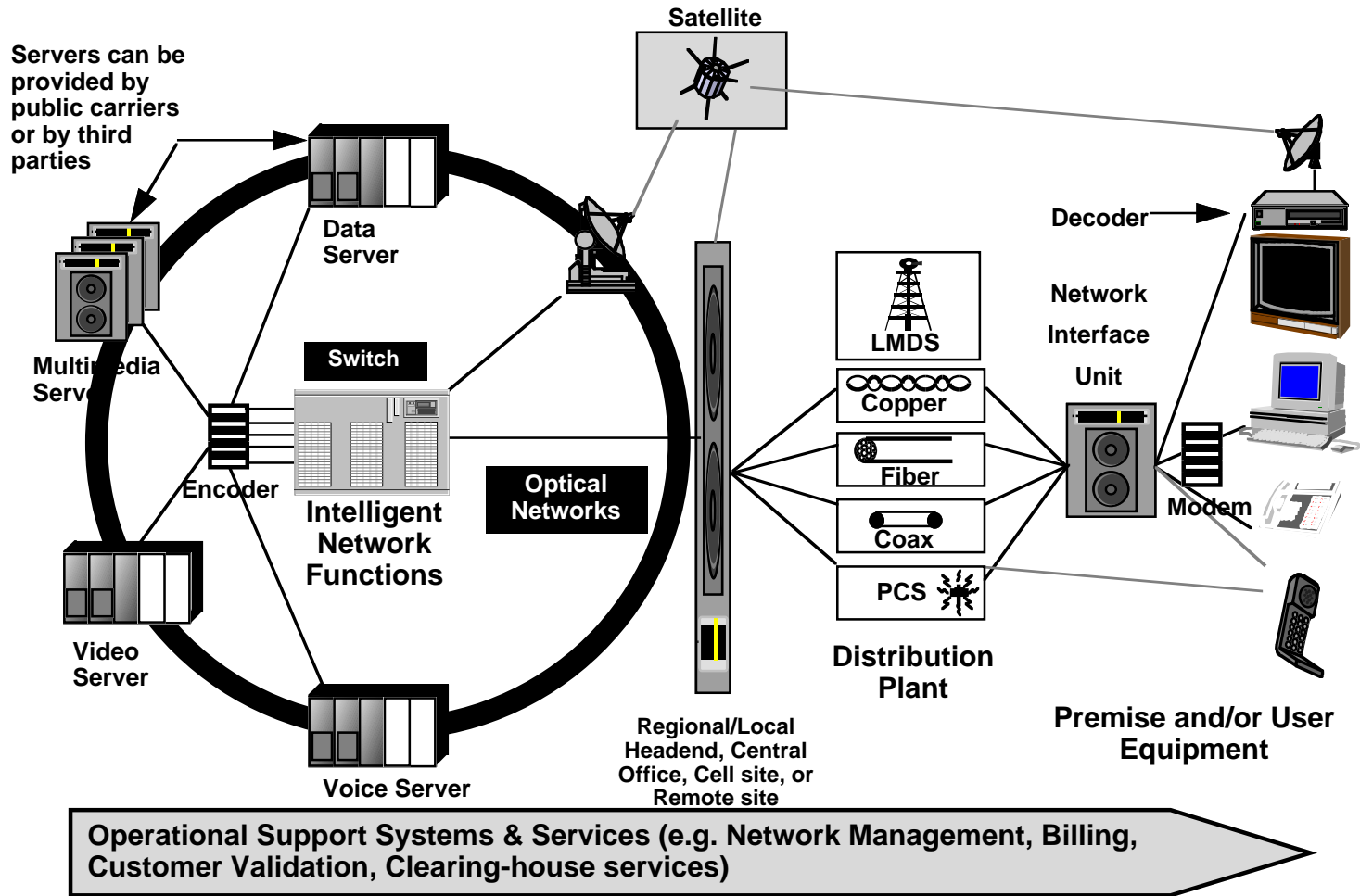
Introduction- Systems

Building upon past HFC investments, new systems are being added.



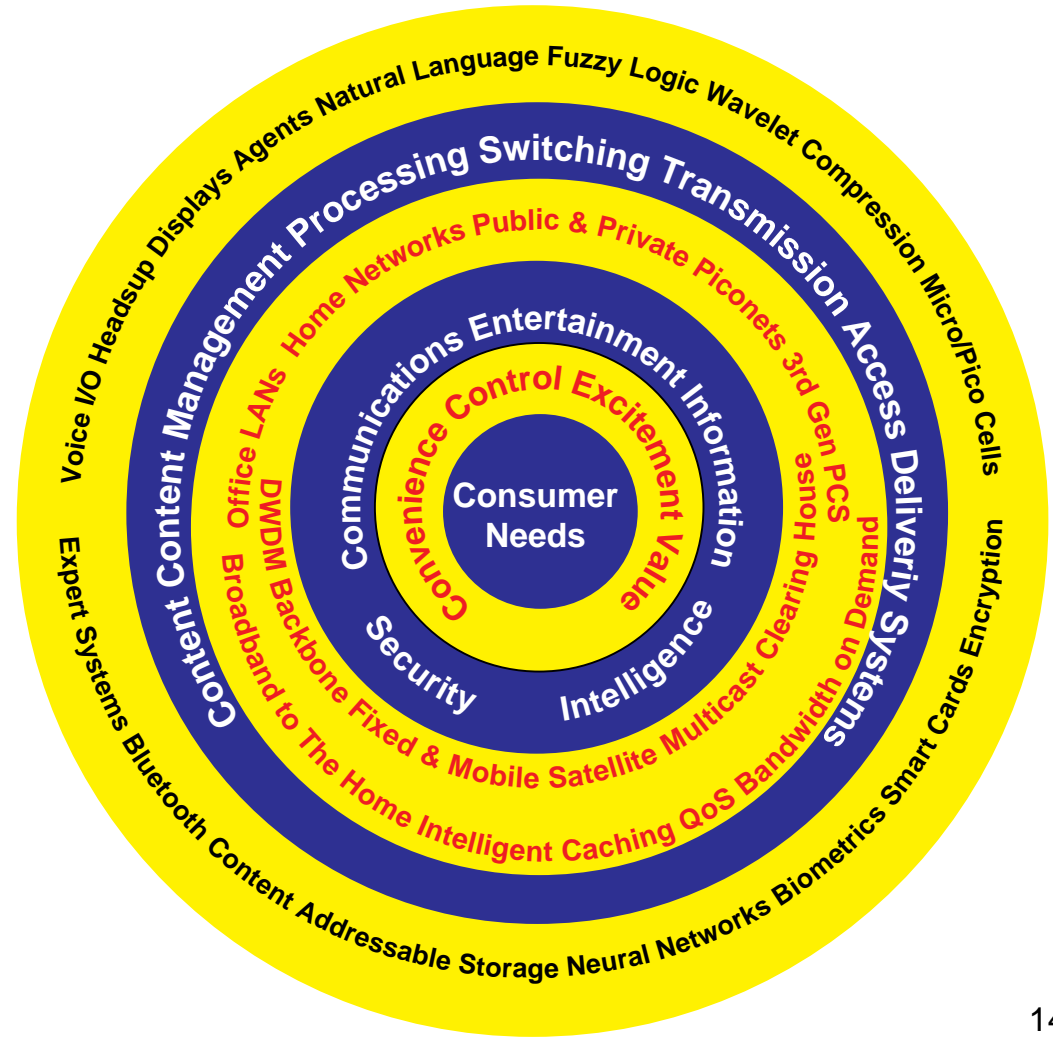
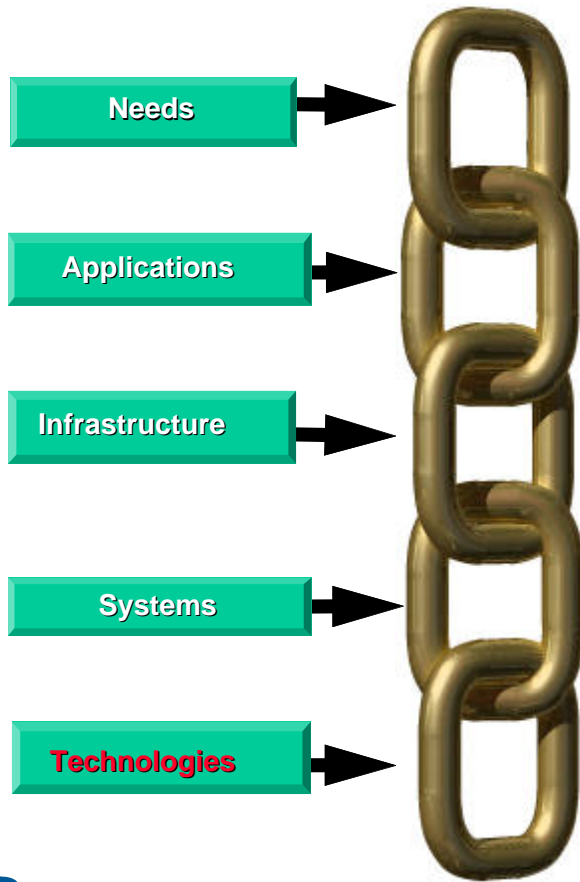
Introduction- Systems

At the same time new competitors are emerging.



Introduction- Technology

Just in time, critical technologies are emerging to support complexity and rights management.



Drivers of Change and Opportunities

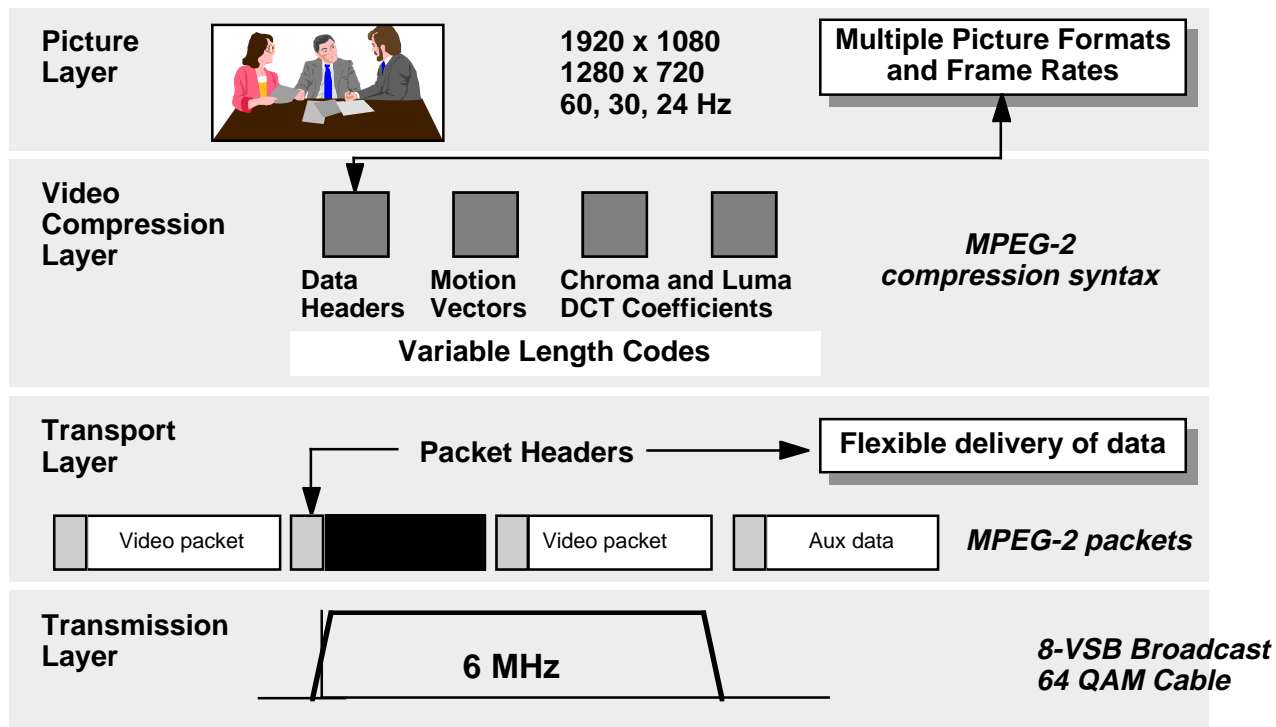
There are a variety of developments that are driving change and enabling new opportunities.

- Migration from NTSC analog to ATSC digital video
- DTV plug and play agreements and FCC DTV tuner regulations
- Secure QoS managed IP transparent digital packet infrastructure with unicast, multicast, and broadcast capabilities
- Intelligent set-top boxes with integrated DRMs
- Home networking
- Bundling mobility services with traditional fixed services
- Offering of voice telephony services
- Video on demand servers
- Advanced network, operations, and business support systems

Drivers of Change and Opportunities Digital Video

ATSC video migration allows flexibility in trading off quantity for quality.

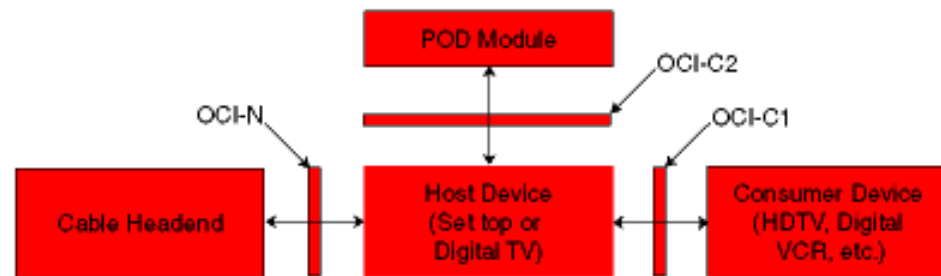
- **Typical 6MHz analog channel can carry up to 10X SDTV programs or 1 HDTV channel**
- **Potential to expand capacity from 85 to 850 programs**
- **Provides support for NVOD as well as free up spectrum**



Drivers of Change and Opportunities DTV Plug & Play

Following the FCC regulations the stakeholders went one step beyond.

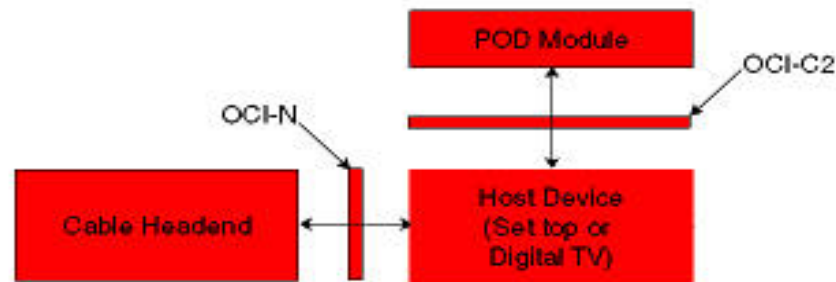
- FCC mandate for manufacturer DTV tuners frees up capex
- Industry Plug & Play agreements program DRM & secure infrastructure for high value video content delivery



Drivers of Change and Opportunities DTV Plug & Play

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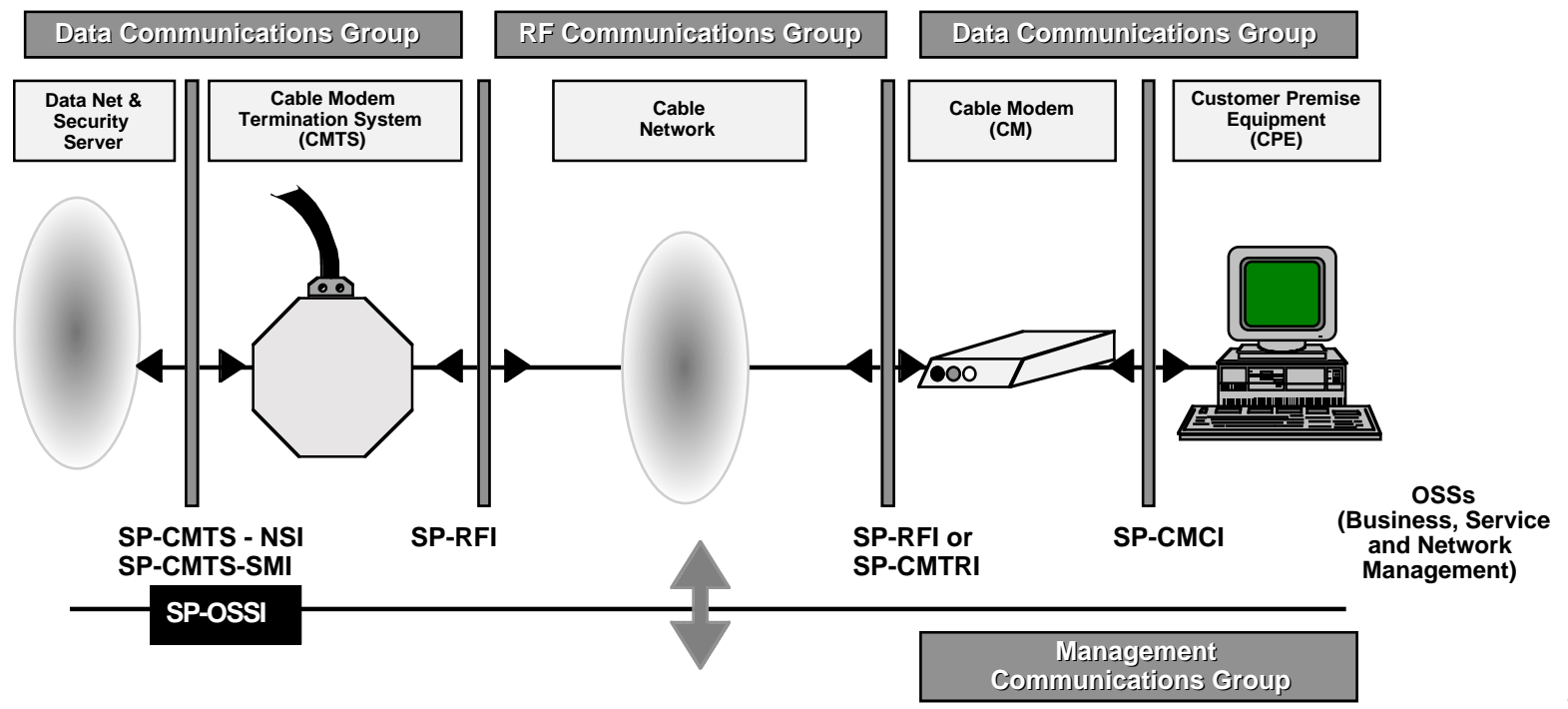
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Drivers of Change and Opportunities Secure QoS IP Infrastructure

Cablemodems provide secure QoS managed IP transparent digital packet infrastructure with unicast, multicast, and broadcast capabilities.

- DOCSIS 1.0 was designed for flexible expansion supporting both contention and reservation packet grants to cablemodem
- DOCSIS 1.1 added enhancements to support streaming content and packet fragmentation



Drivers of Change and Opportunities Intelligent Set-Top Boxes

Open cable efforts have yielded a set-top box spec with downloadable intelligence.

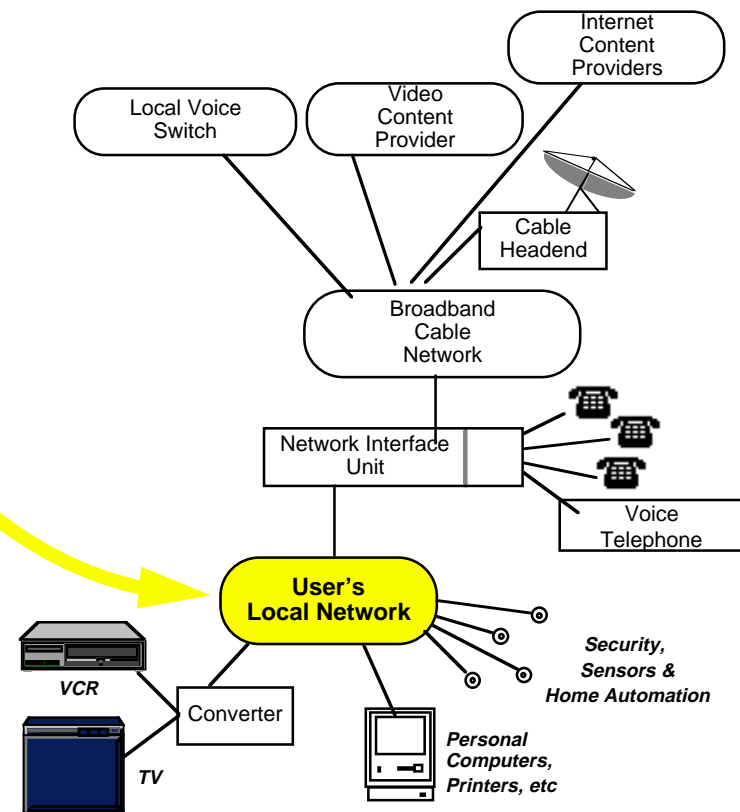
- Includes OCAP (OpenCable Applications Platform) a middleware software layer specification based on DVB-Multimedia Home Platform (MHP)
 - Supports JAVA application engine (AE) and ECMA Script
 - Includes presentation engine (PE) in OCAP2.0
- Open cable includes security features
 - Conditional access APIs
 - Copy control technology
- Some operators deploying set-top boxes with USB ports to support future music downloads.



Drivers of Change and Opportunities Home Networks

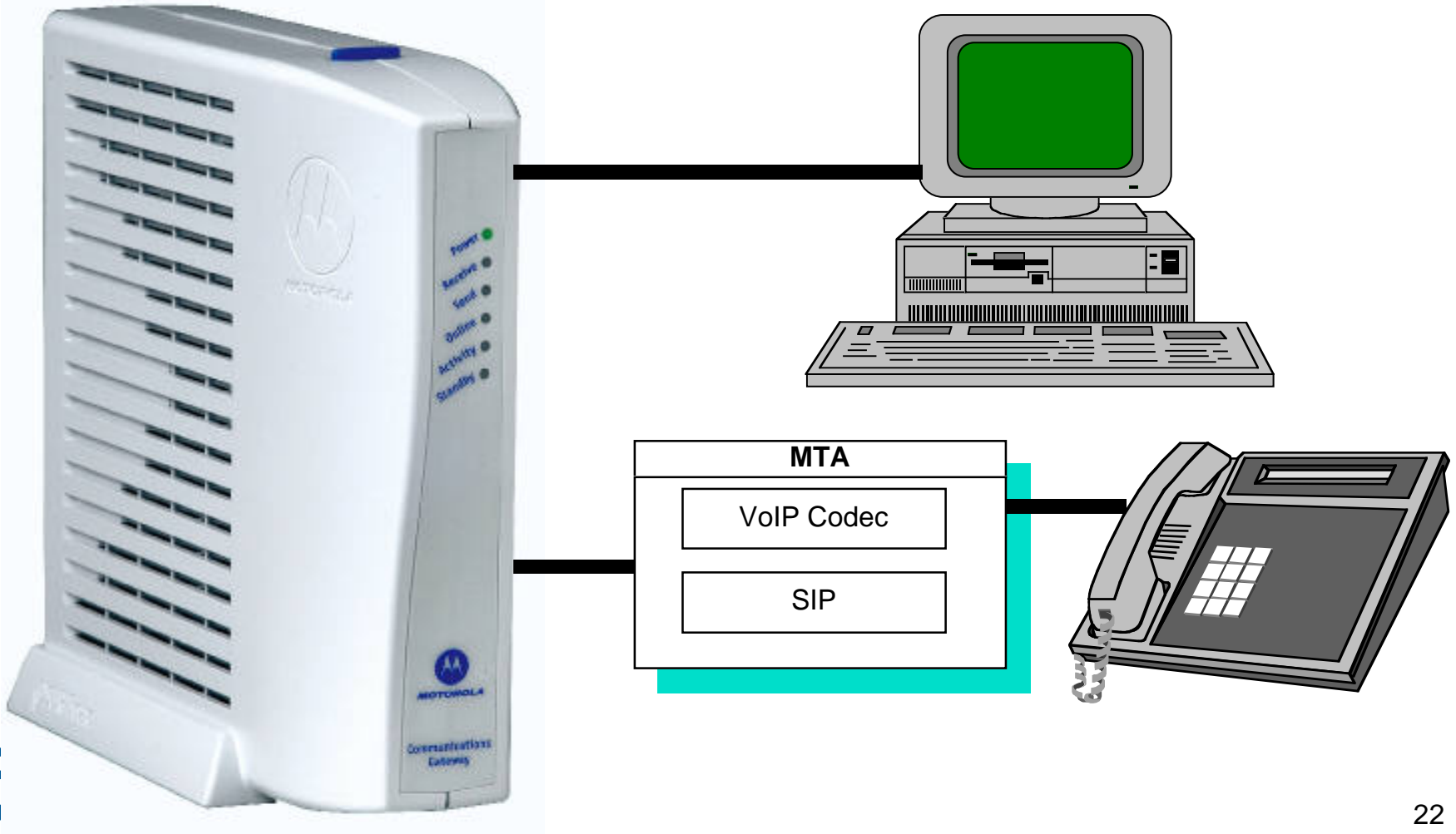
With multiple TV outlets, computers, and telephones; home networks now make sense.

- Candidates include HomePNA, 802.11, and PLC.



Drivers of Change and Opportunities Voice Telephony Services

Once a QoS managed IP infrastructure is in place, to provision telephony requires little more than a VoIP multimedia terminal adapter (MTA).



Summary and Conclusions

With little additional incremental investment the cable industry is now positioned to offer a variety of new services that will generate high margin incremental revenues at the same time defending against encroachment by DBS and LEC competition.

- **Expanded program offerings**
- **Video on demand**
- **Interactive TV and video commerce**
- **Electronic content delivery**
- **Voice telephony**
- **Value added internet services**
- **Home networking**
- **WiFi hotspots**

