Content Networks

Market Insights

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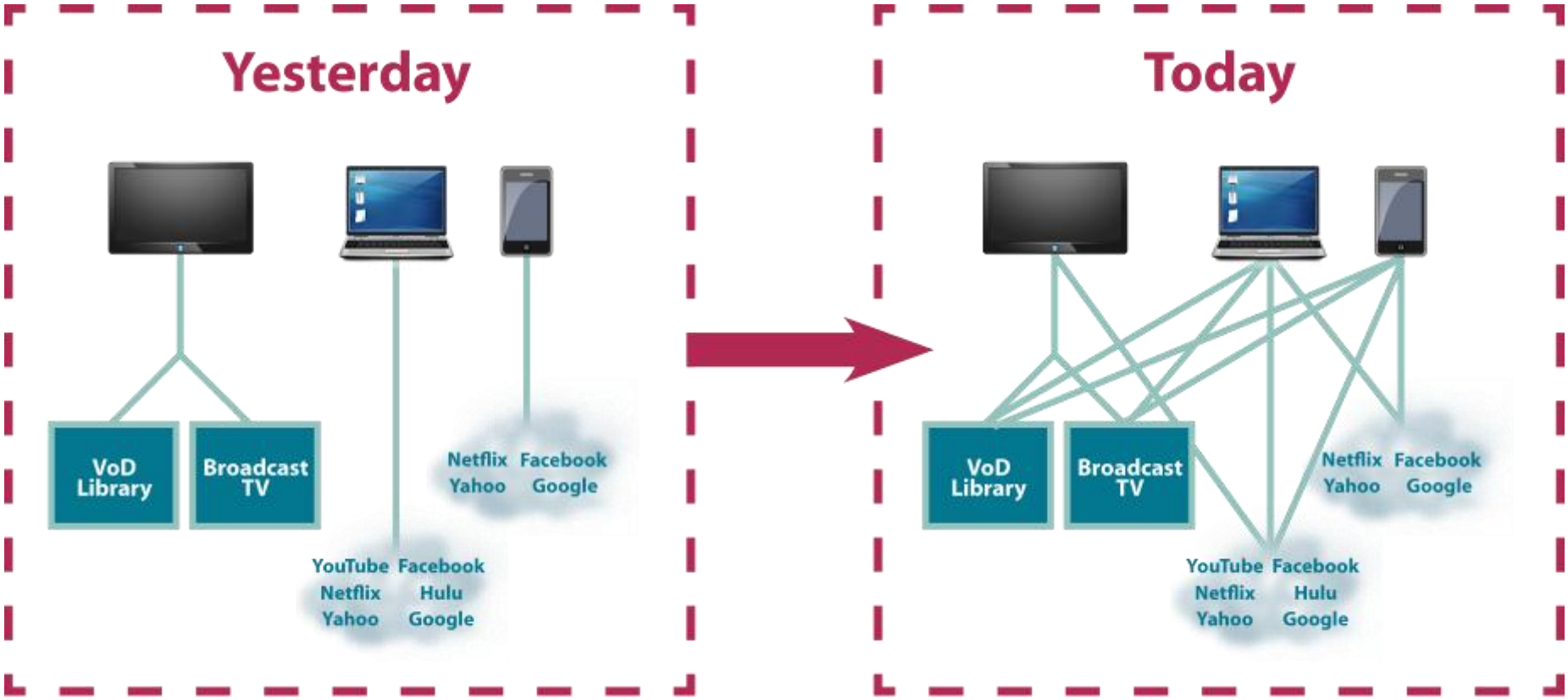
Peering Pressure:

Comcast vs. Level 3

Content Anywhere

Users now expect all content to be available on any device, at any time.



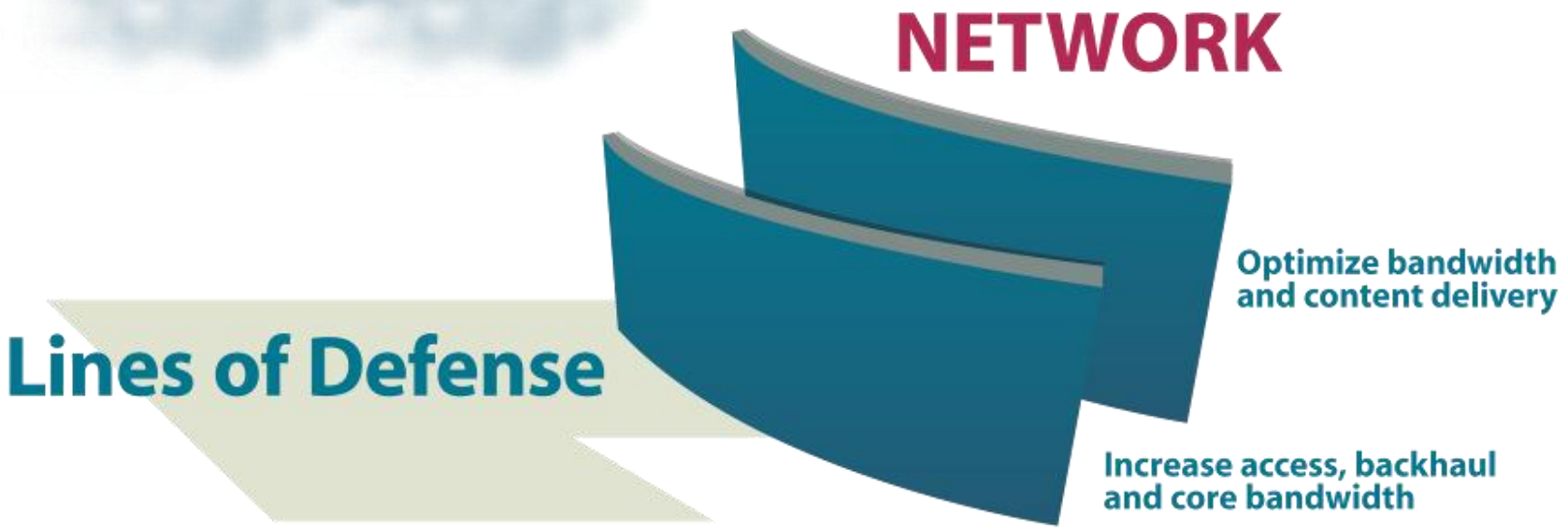
A Data Storm Is Raging

Close to **1 billion** smartphones in use in the world in 2012

Real-time entertainment is nearly **50%** of all Web traffic in North America*

More than half the U.S. citizens **watching video on their mobile phone** at least once a week are **streaming**

32% of those who watch **video on tablets** weekly are viewing **full-length** TV episodes and **full-length** movies



Source: Sandvine's Spring 2011 Global Internet Phenomena Report

Emerging OTT Video Service Models

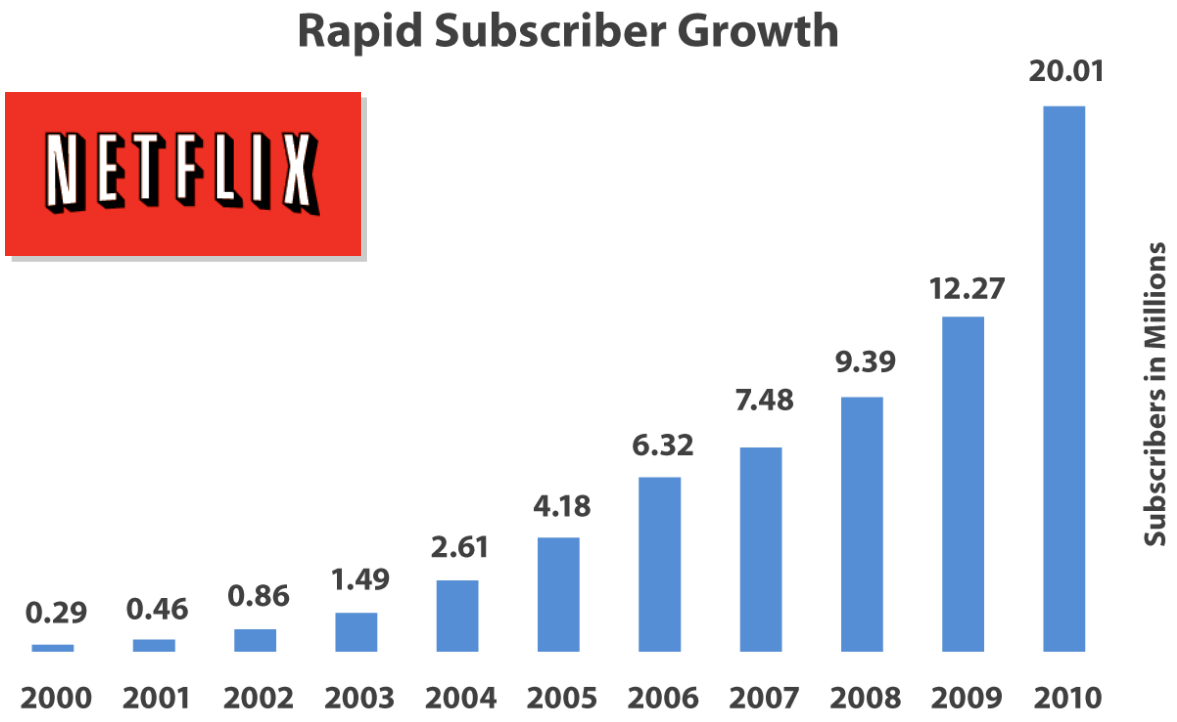
NETFLIX

- 25M Subs in North America
- $7.99 / Monthly Subscription
- Unlimited Movies / TV shows
- No Advertising
- Lack of premium content
- ~$3B Revenue (2011E)

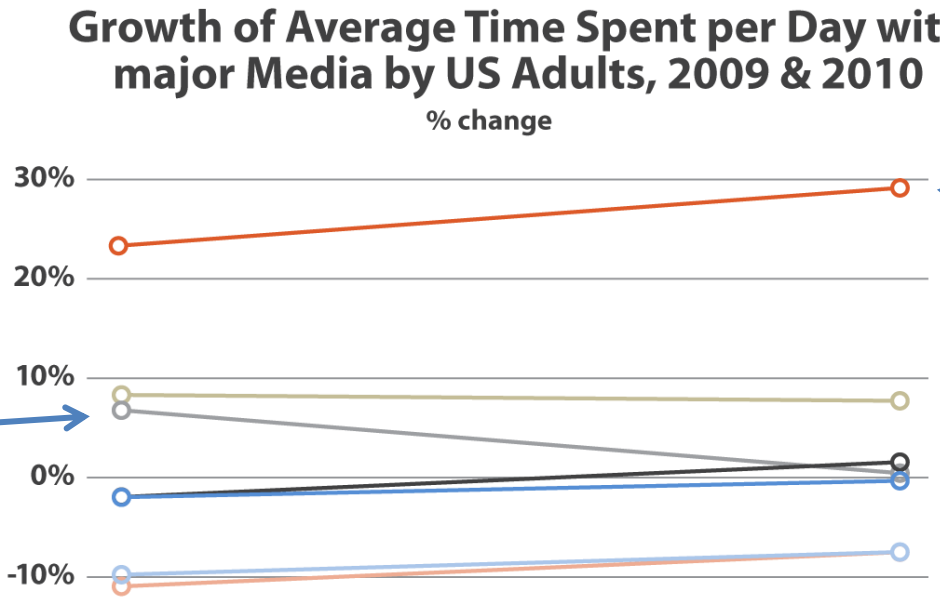
OTHERS…

hulu HBO GO amazon instant video YouTube Rentals

TV Everywhere



Change in Consumption Trends



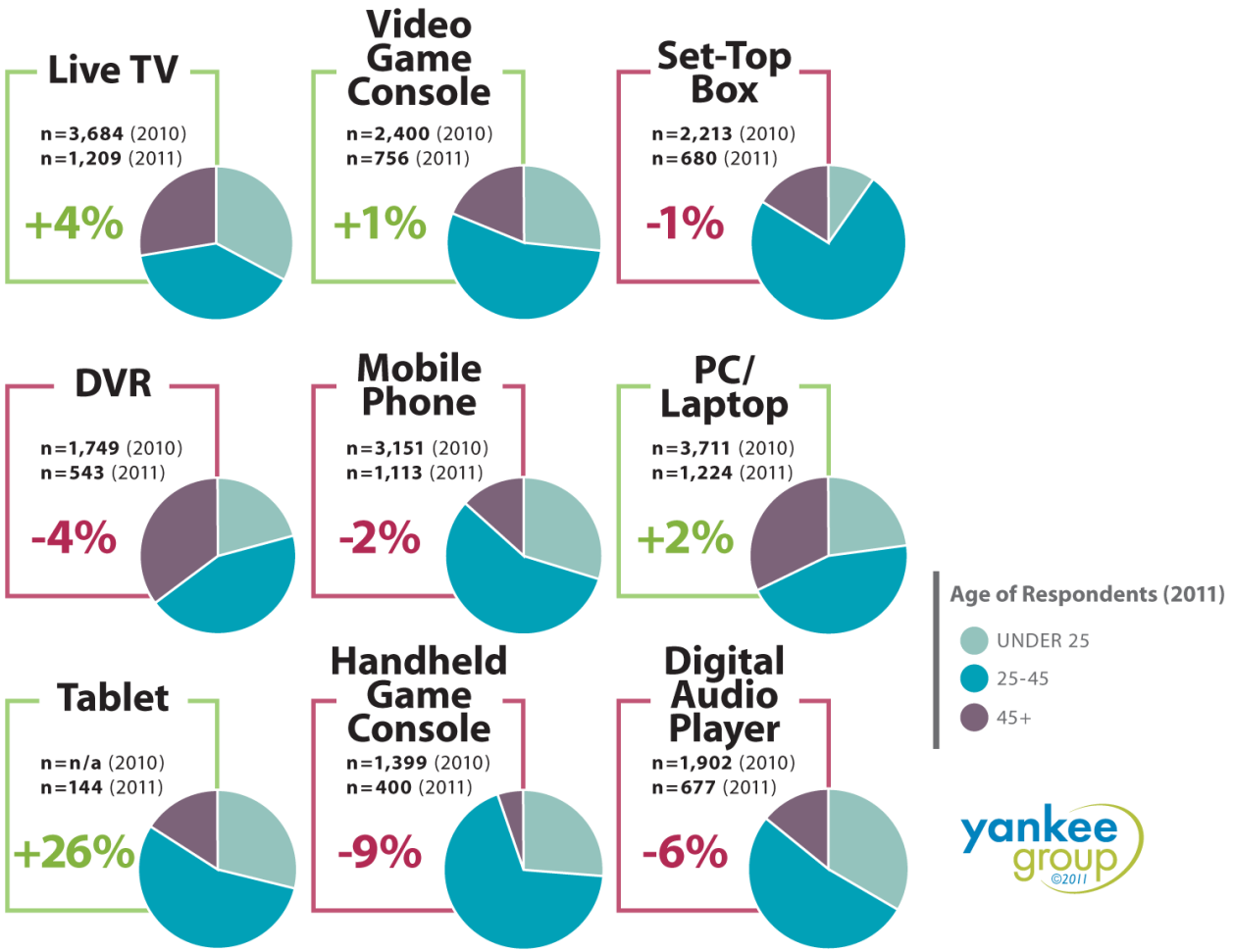
Consumption of video moving from broadcast TV to mobile

Traditional Broadcast video is in decline

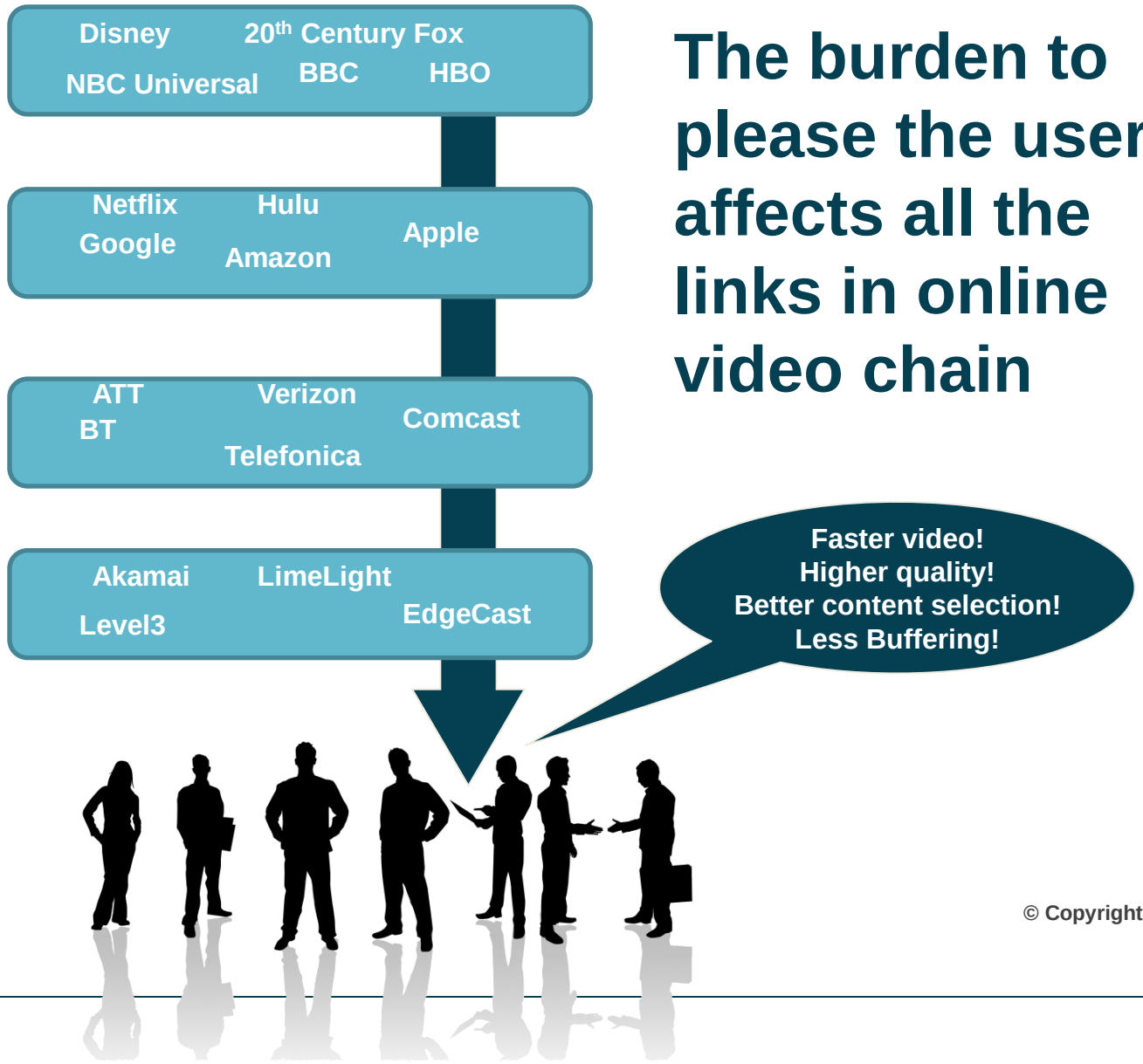
2009		2010
21.9%	Mobile	28.2%
6.6%	Internet	6.2%
5.1%	TV and video	-1.1%
-3.9%	Radio	-2.0%
-12.0%	Magazines	-9.1%
-13.2%	Newspapers	-9.1%
-4.2%	Other	0.0%

Consumers Increasingly Watch Video on Non-TV Screens

Respondents Who Watch Video on the Device at Least Once a Week
(**Percentage Change Between 2010 and 2011**)

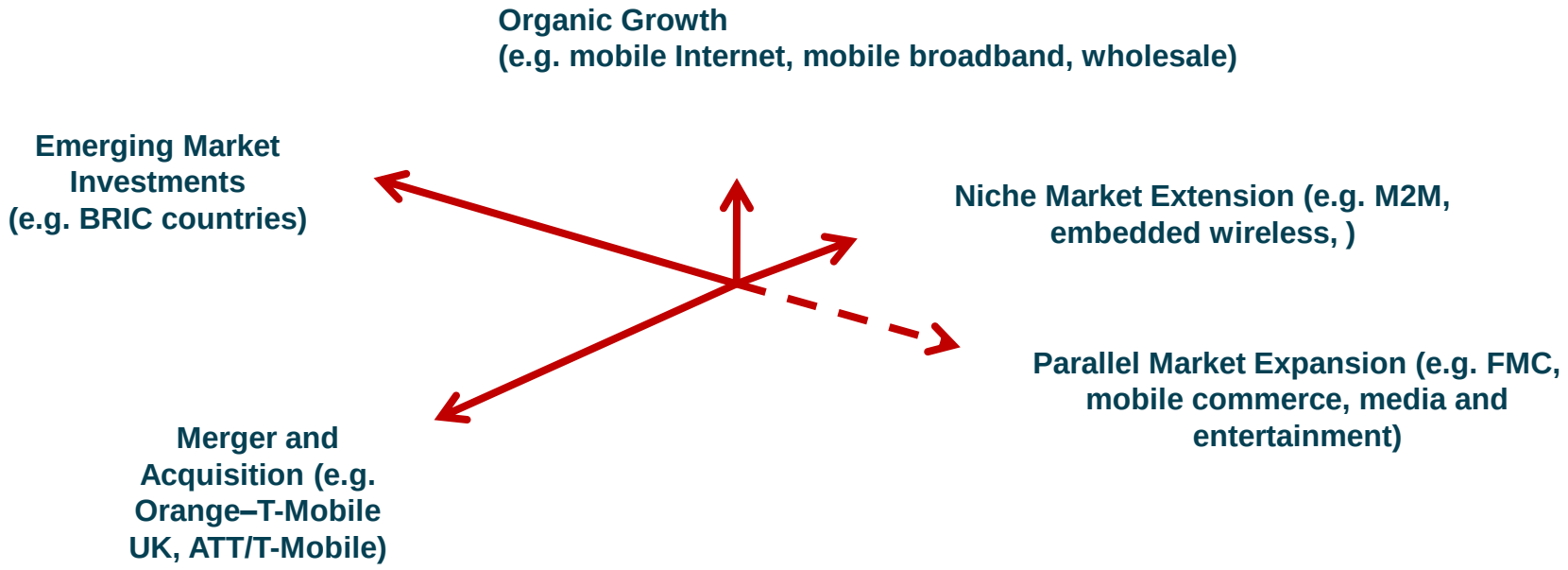


User Desire Creates Ripples Through Content Ecosystem



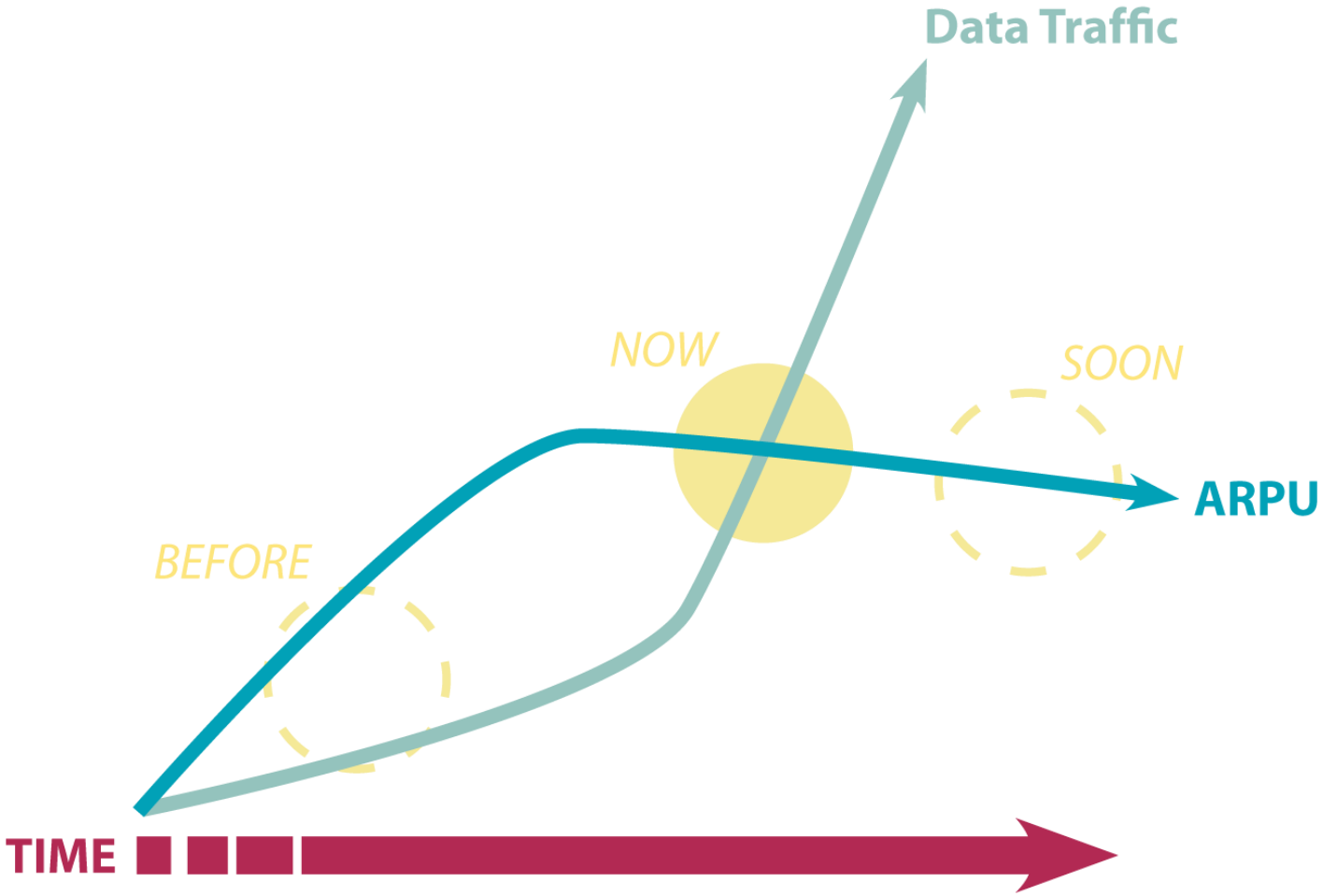
The burden to please the user affects all the links in online video chain

Telco Growth Opportunities are Varied

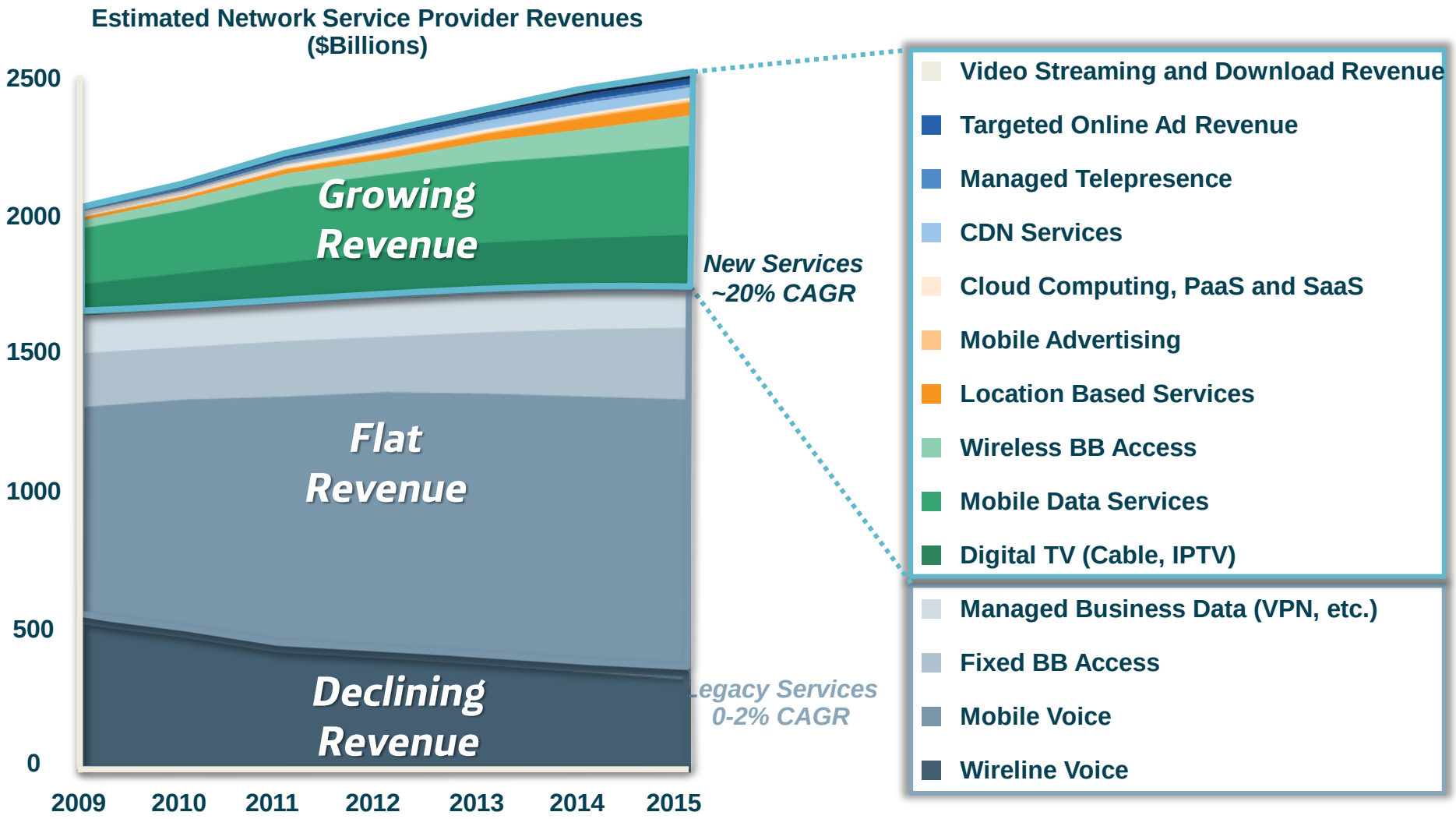


- Variety of growth opportunities exist
- Each presents distinct challenges in tactics and strategy
- Strategies are inter-related e.g. parallel markets build off mobile broadband

Data Business Models: Breaking Fast



TELECOM REVENUE SHIFT



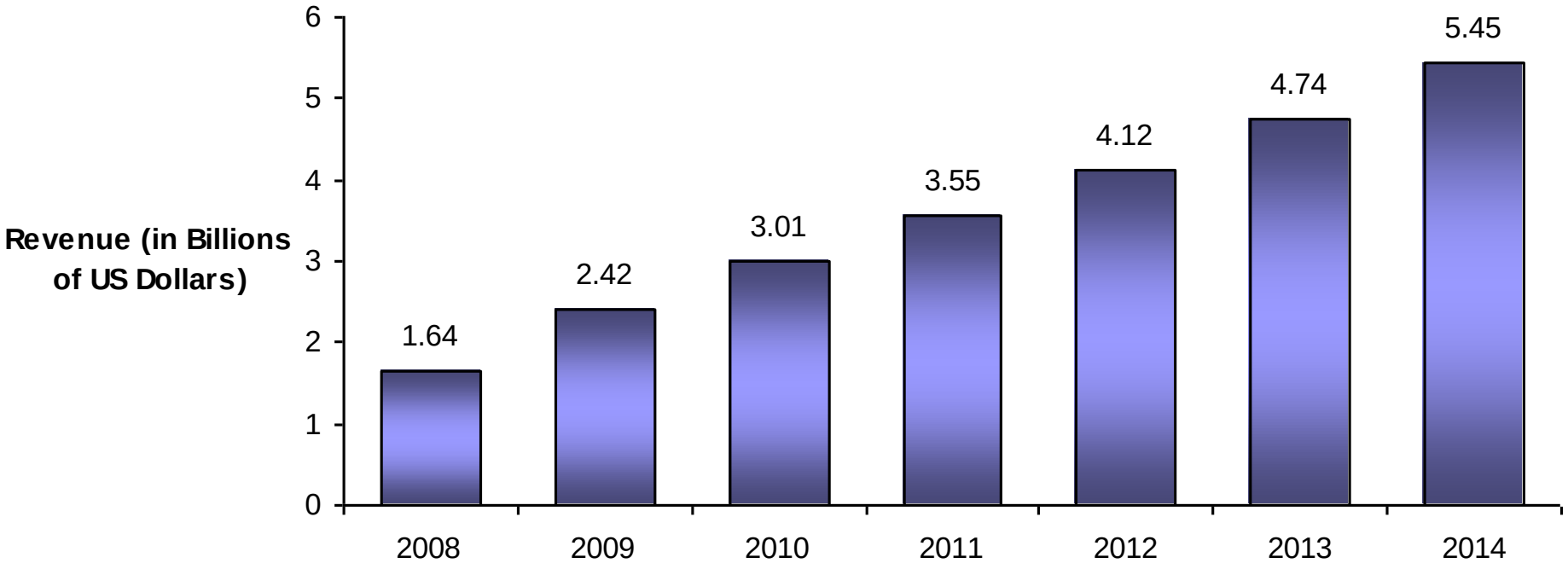
Sources: Yankee Group Dec 2008, emarketer, April 2009, growth projections Juniper estimates

Global, CDN-market-entry strategies by operator

Operator	Entry strategy	CDN provider or acquisition
AT&T	Own-build	n/a
Bell Canada	Resale	Limelight
BT Wholesale	Own-build	n/a
Deutsche Telekom	Own-build	n/a
Deutsche Telekom ICSS	Partner	Edgecast
France Telecom	Own-build	n/a
Global Crossing	Resale	Edgecast, Limelight
Internap	Acquisition	Vitalstream
Interoute	Acquisition	Virtue Media Services
KPN	License agreement	Jet Stream
Level 3	Acquisition	Savvis
NTT Communications	Own-build	n/a
Pacnet	Own-build	n/a
PCCW Solutions	Own-build	n/a
Reliance Globalcom	Resale	Internap
TATA Communications	Acquisition	BitGravity
Telecom Italia Sparkle	Partner	CDNetworks
Telefonica International Wholesale Services	Own-build	n/a
Telenet	Managed service	Jet Stream
TeliaSonera International Carrier	Resale	Multiple providers
Verizon	Managed service	Velocix
Ziggo	License agreement	Jet Stream

Sources: Companies, Informa Telecoms & Media

Total CDN Revenue Forecast



Networks can no longer focus on just the ends of the network (as in a phone call) - they now need to consider the information and nuanced interactions inside it.

We need networks that:

- Support seamless, mobile, and wireless computing
- Self-organize using any available resource, device, or channel;
- Push content while anticipating and inferring people's needs.

Content-centric networking shifts the focus from transmitting data by geographic location, to disseminating it via named content.

The Benefits of Content-Centric Networking

- Simplifies network use
- Provides a seamless, ubiquitous experience
- Reduces congestion and latency
- Improves network performance while reducing operating costs
- Increases network reliability
- Eliminates many security problems
- Supports new and emerging applications
- Empowers the user

SWOT analysis of CDN.

Strength	**Weakness**
- Scalable - Service level guarantees - Comprehensive service package - CP's network not strained	- Relatively expensive - CDN servers concentrate traffic around them, which strains the links connected to the servers - CPs cannot control where and who has access to the data
Opportunity	**Threat**
- Network effect may produce dominant CDN - As an overlay, works on any network; IP or something else	- Network effect may cause smaller CDNs to go out of business - Consolidation of CDN market may raise prices

SWOT analysis of CCN.

Strength	**Weakness**
- Scalable - Content centric - User friendly - Networks not strained - Less delay - Cheap	- Flooding to find content may cause problems if no caches are found nearby - Less control - No simple means to collect usage data or other statistics
Opportunity	**Threat**
- CCN can work as an overlay, thus functions on any network - Reduced off-net traffic for IAPs, thus IAPs may be interested in investing	- No deploying incentive - Other information networking architectures - Large enough CDN may offer the same level of service as CCN - Copyright protection; may or may not be managed well - Value not in transferring bits anymore, where is it then?

Comparison ased on the SWOT analysis.

Criteria	CDN	CCN
Cost for CP	High	Low
Cost for ISP	Low	Medium/High
Scalability	High	High
Delay	Medium	Low/Medium
Network Congestion	Around CDN servers	When flooding for non-cached item
QoS Levels Available	High	Low
Accessibility of Service	High	High/Medium/Low
CP's Control over Content	Medium	Low
Copyright Protection	Medium	Low

What Future for the Internet?

Isolation
Disconnection
and Frustration


Win
The
Future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