



GRAND DUCHY OF LUXEMBOURG
Ministry of Foreign Affairs

Directorate for Development Cooperation



European Union Africa
Infrastructure Trust Fund

Regional IXP Policy and Regulation Best Practice

Regional Peering Policy Considerations



Session Objective

Outline the range of policies that encourage the presence of **external** network peers and content providers at IXPs. Highlight policy issues that discourage remote providers from peering locally.

Topics Covered

- How Content Distribution Networks (CDNs) work
- Requirements for international CDNs and ISPs to peer locally
- Scope of Policies and Regulations which encourage presence of international networks and CDNs

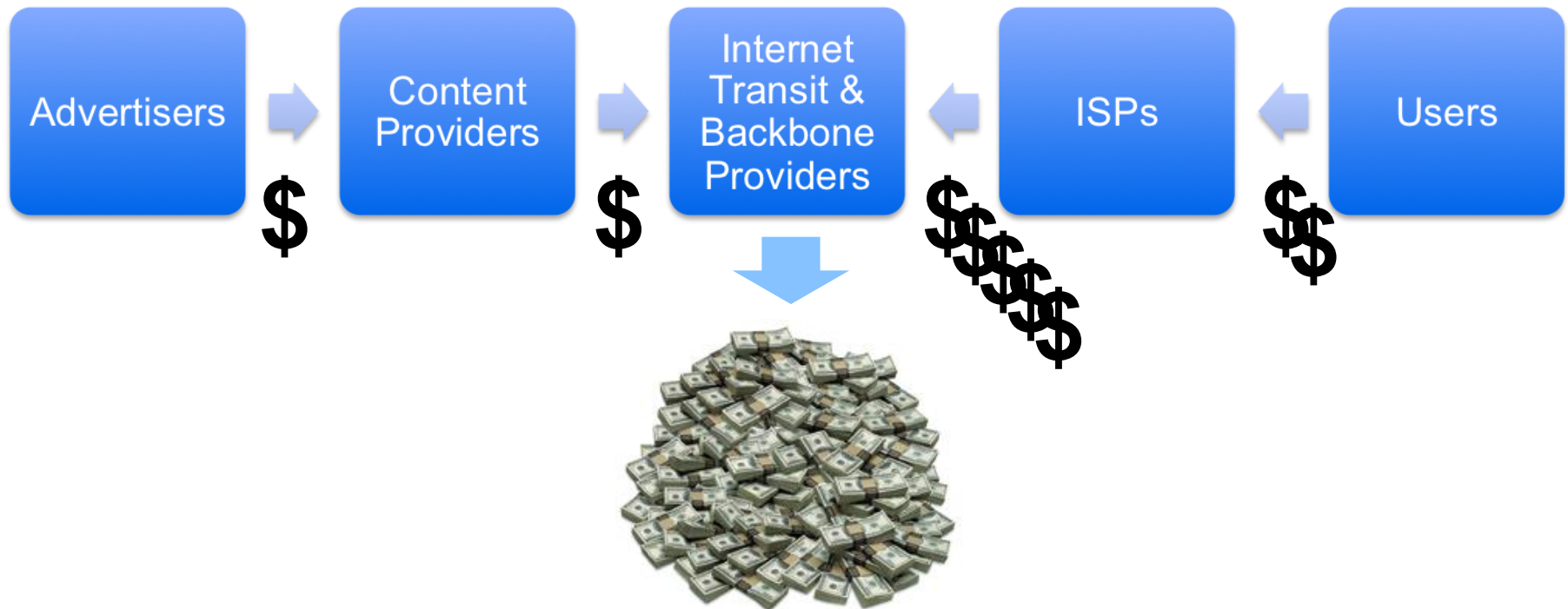
Why do we need remote content and networks to peer at a local IXP?

- If a national IXP is to become regional it requires attaining a critical mass of peers and traffic
 - This in turn makes the IXP even more appealing to new out-of-country peers (virtuous cycle)
 - Requires IXPs to look beyond traditional local sources of peering members
- ==> But making an IXP attractive to non-traditional local and international members requires policy review at both the IXP and national level

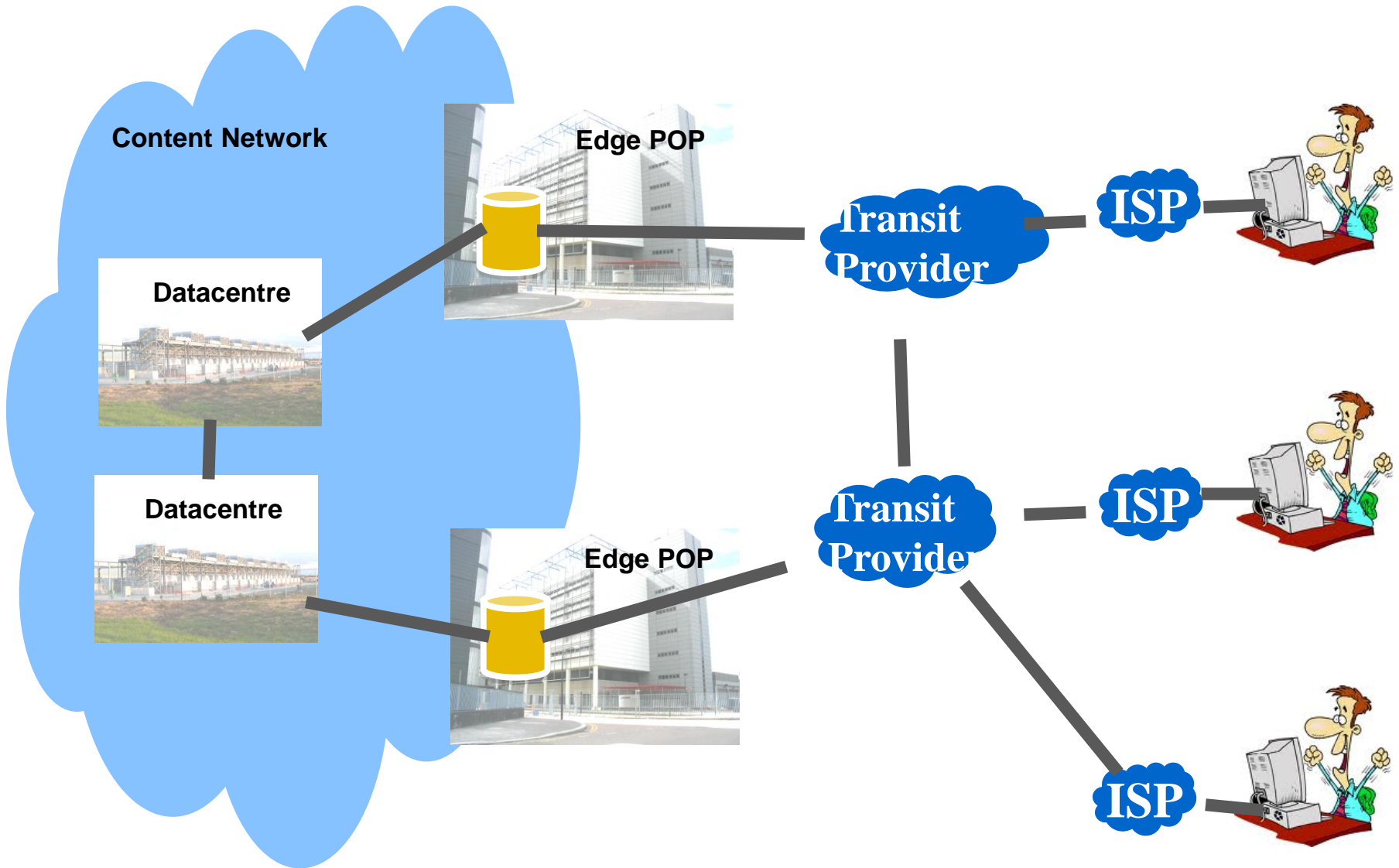
Old Style Economics of Internet Connectivity

The Internet is a “Two Sided Market”

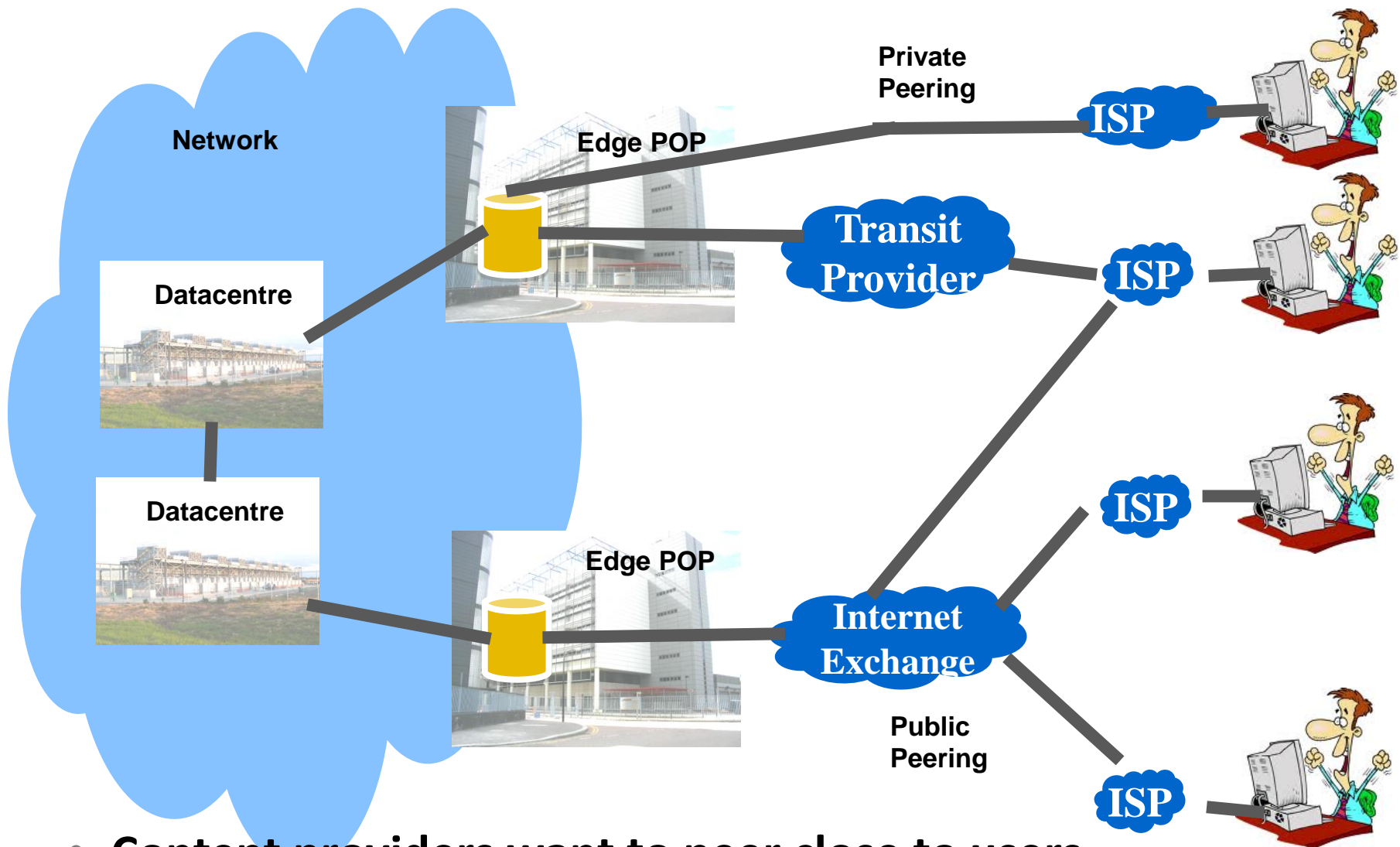
Money flows towards the middle – to the international carriers with the biggest investment in infrastructure



Content Provider Networks in the Past



Content Provider Networks Today



- Content providers want to peer close to users

International Content Networks and ISPs are attracted to Carrier Neutral Facilities with Multiple Transit Providers



What is a Content Network ?

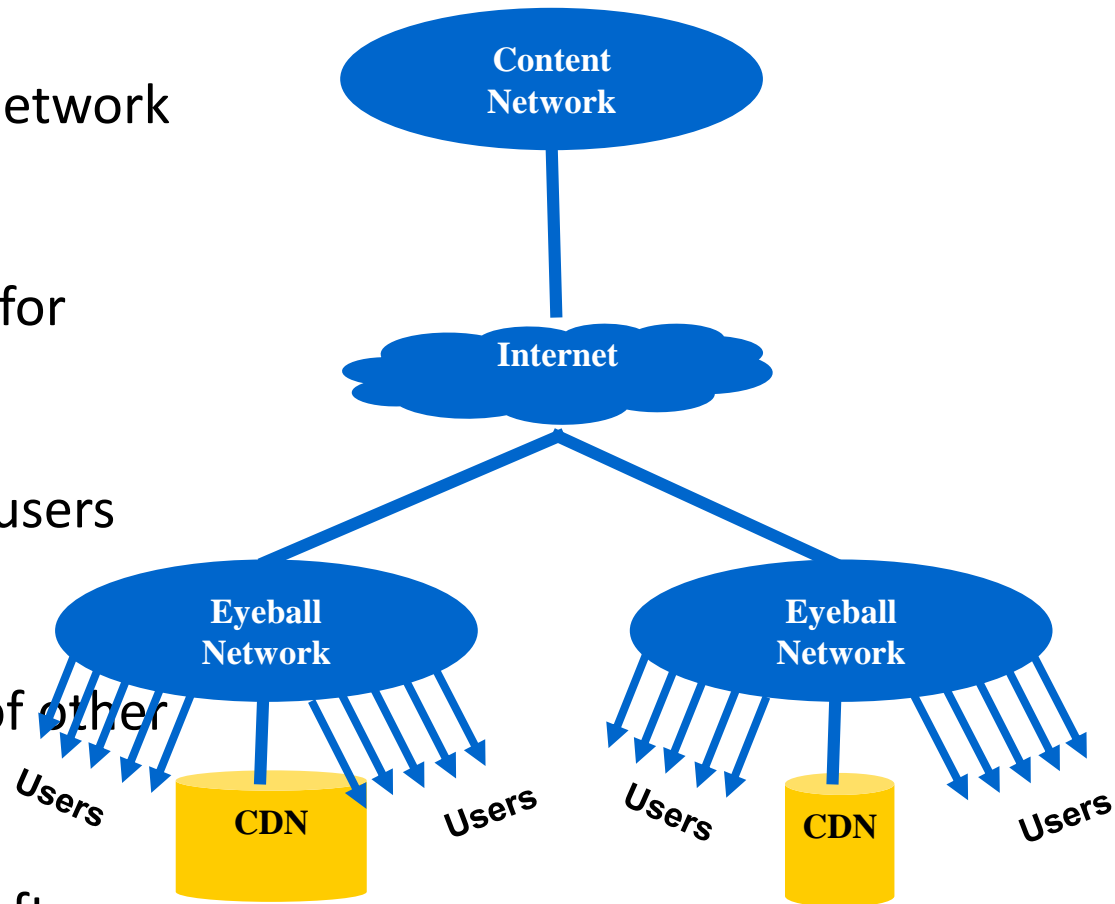
Content Distribution/Delivery Network (CDN)

- Distributed delivery platform for content
- Serves content closer to end-users

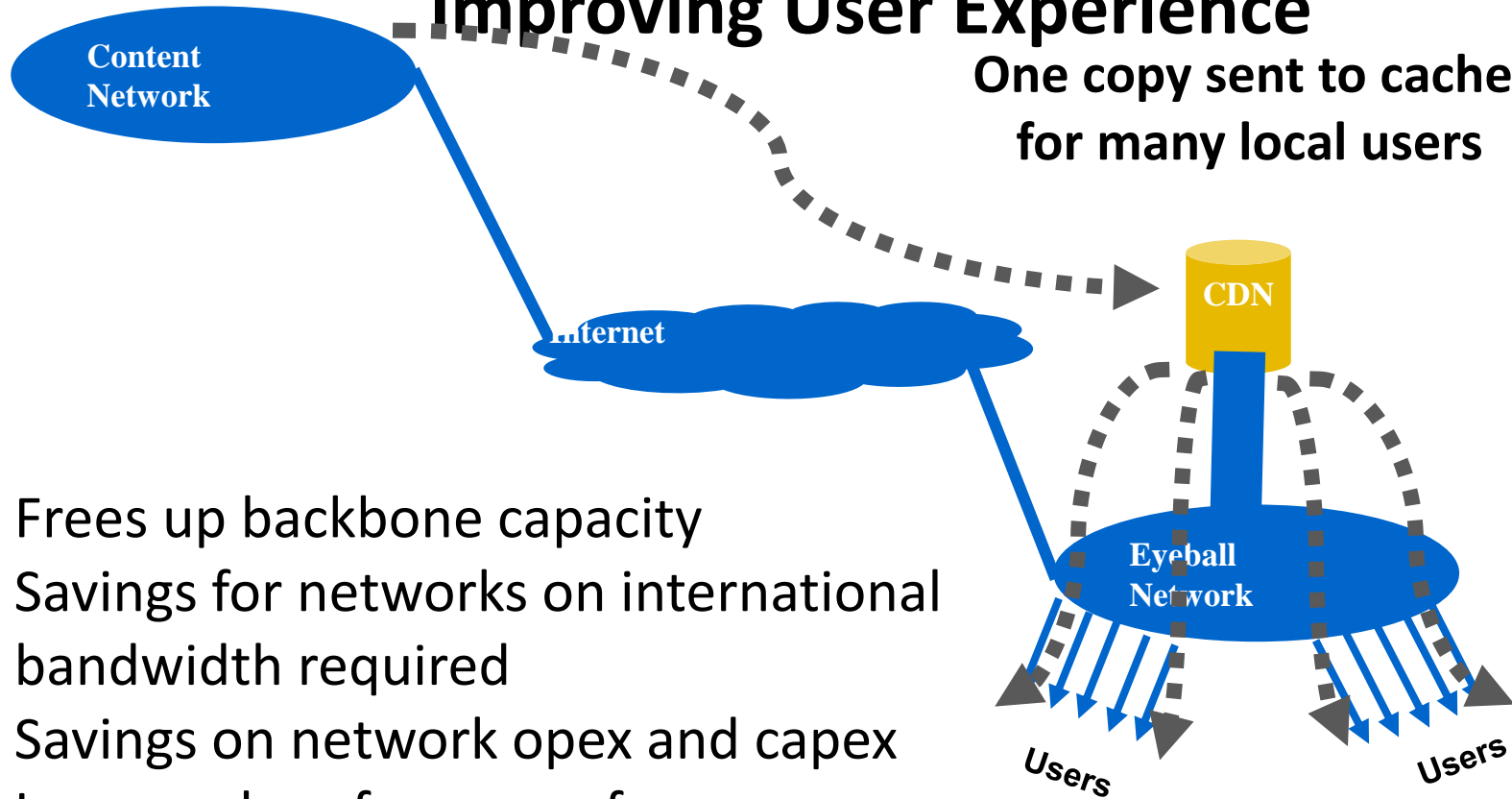
e.g Akamai, Limelight

distribute content on behalf of other content producers

- Google Global Cache, Microsoft distribute their own content



How CDNs Reduce Network Load & Costs While Improving User Experience

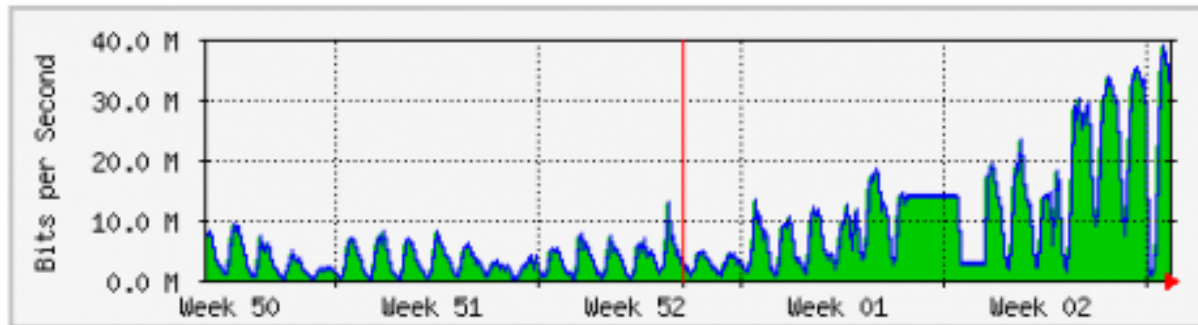


- Frees up backbone capacity
- Savings for networks on international bandwidth required
- Savings on network opex and capex
- Improved performance for users

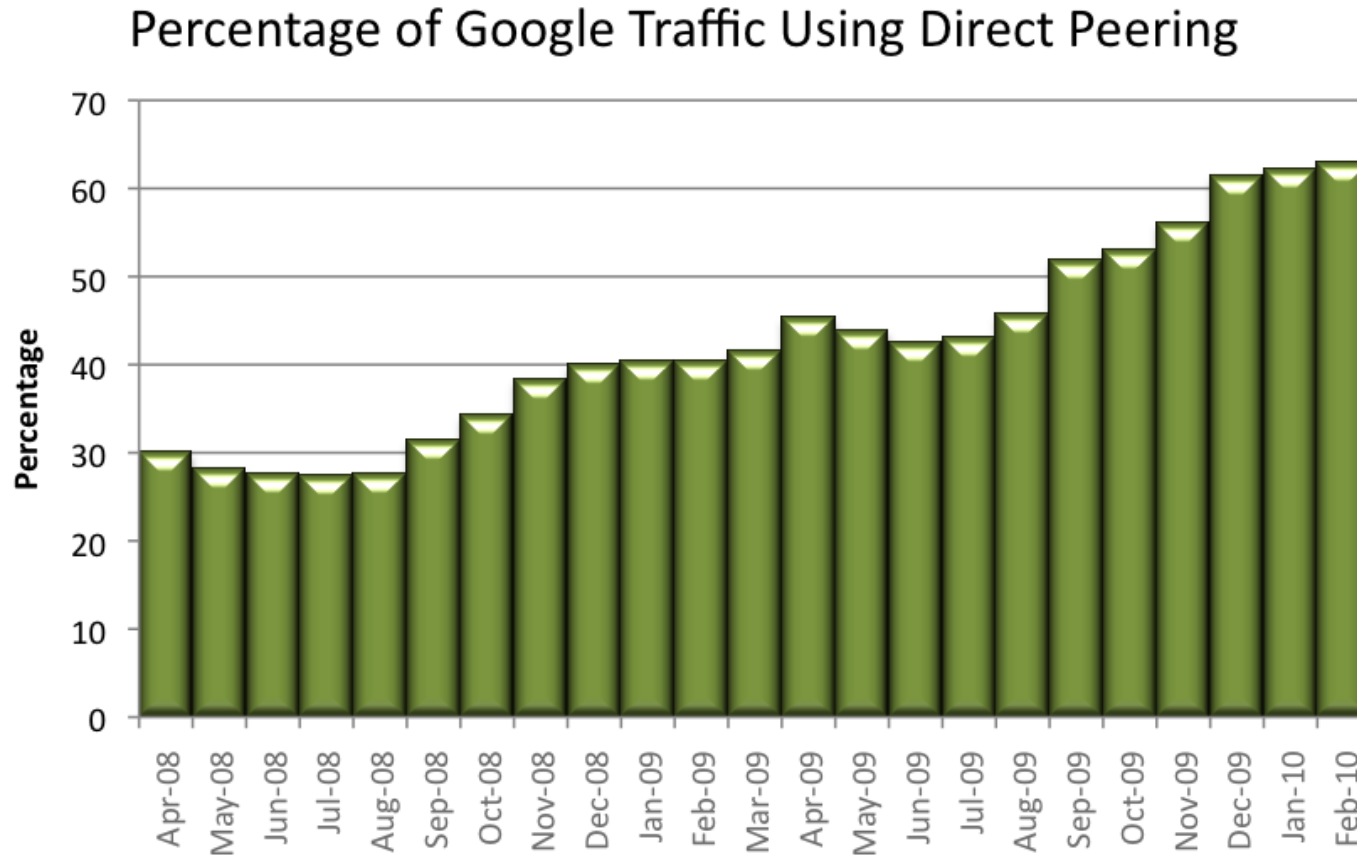
CDNs requires international transit for cache-fill and management

CDN Effects on Local Internet Exchanges

- More traffic
- More peers
- Peers upgrade their connections to the IXP
- Helps develop local Internet Ecosystem



Content Networks Are Peering More and More of Their Traffic



Plus traffic volume is massively increasing at the same time

Currently A Very Small Percentage of International Content is Hosted within Africa

e.g. From Tanzania:



USA



USA

WIKIPEDIA
The Free Encyclopedia



USA



USA



USA



USA



Europe!

Google, Facebook, Akamai, Yahoo,

Microsoft are >50% of fixed network traffic

Google, Facebook, Twitter are >40% of all mobile network traffic

Africa is not the first place to face this problem

European Internet Circa 1995



Then Internet Exchanges in Europe Emerged



As the European Internet ecosystem developed, local content developed

Aside from the emergence of IXPs, deregulation in the telecom sector encouraged building of multiple affordable European fibre networks, removing “tromboning/hair-pinning” problems

So US networks and trans-Atlantic links became less important...

Result: Now > 50% of European traffic peered at European exchange points (with the rest delivered on European transit providers)

Key attractions for remote CDNs and Networks

- Access to national or regional aggregation of traffic via well functioning IXPs
- Carrier neutral data centre facilities with many networks present
- Competing or Open access/non discriminatory submarine cable landing stations
- Multiple, competitive national & cross-border fibre networks
- Friendly regulation

Strategies to Increase Local Content Distribution and Emergence of Regional IXPs

Reduce the barriers for content providers and ISPs to come nearer to their user bases. i.e Ensure presence of enabling policy environment to:

- Improve National, Regional and International Connectivity
- Encourage the building of hosting & content creation platforms for development and delivery of content
- Minimise regulatory constraints for CDNs and ISPs
- Create Incentives for Content Development
- Build Demand from Local Users

Improving Local and International Connectivity For Data Centres & IXPs

- Ensure Data Centres and IXPs have access to sufficient and affordable national and international capacity (at least two physically independent routes provided by competing operators)
- Support healthy local Internet Exchange Points with maximal operators present to exchange traffic locally

The key:

Reduce costs of transit and improve reliability by ensuring open markets for multiple competing national, regional and international backbones.

Without these, content designed for a region or all of Africa will continue to be hosted off-continent (easiest to reach location for all users in the catchment area)

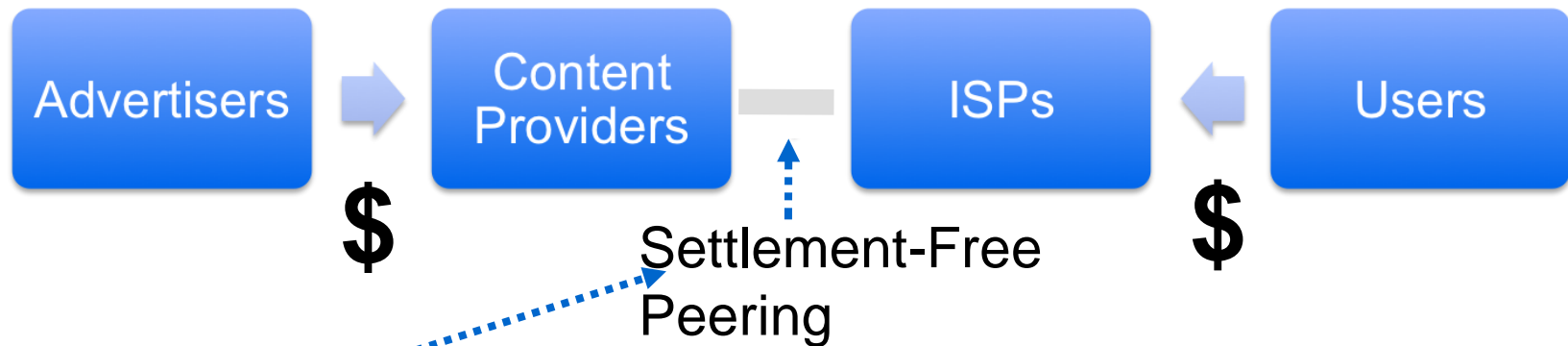
Ensuring a Friendly Environment for International Content Providers and ISPs

- International networks are unlikely to be interested in peering locally if they are required to have a network operator's license even if they are not selling in-country services
- The policy change at regulatory and IXP levels should also be able to accommodate international networks without local legal presence – I.e no business license requirement
- By the same token, the local non-traditional members should be able to join the IXP, such as Government networks, VOIP providers, gaming service providers, content providers, research and education networks

The New Economics of Internet Connectivity

The Internet is still a Two-Sided Market

But usually international Content Providers and local ISPs have no financial relationship



Why is peering free?

- Peering is a mutually beneficial relationship
- Content Providers need Eyeball Networks
- Eyeball Networks need Content Providers

Reducing Content Regulation Constraints

- Ensure easy content licensing:
 - Ensure regulations allow content distribution without restrictive licensing burdens
- Provide supportive policy on content liability:
 - Legislation protecting intermediaries (CDNs and ISPs) against liability for content which infringes local laws

Fiscal Measures to Improve Local Interconnection

- Eliminate import duties on equipment and connectivity services needed to deploy networks and set up data centres
- Ensure a business friendly tax regime for local ICT services (no luxury taxes on services)
- Provide tax incentives to encourage facilities operators to establish data centres
- Consider 'off-shore/free trade zones' where international services can be tax free

Increasing Local Demand for Content (1)

- Reduce barriers to usage by creating an enabling policy environment for provision of affordable pervasive access (Day 2 session)
- Build awareness of benefits and information literacy of the public (ability to use)
- Invest in and create incentives for development of locally relevant content – tax incentives, training, iHubs, public-private partnerships

Increasing Local Demand for Content (2)

- Exclude local traffic from usage caps and throttling
- Make high-bandwidth content only available to locally peered users (where the alternative is the content is not available at all) e.g BBC iPlayer

Creates a virtuous circle, encouraging further locally hosted content

Conclusions

- Currently there is little locally-hosted content in Africa
- Increased content hosting will help to increase local interconnectivity and reduce dependence on international links
- Can be achieved through:
 - local content hosting
 - distribution of global content through CDNs and caching
- Encouraging usage of locally hosted content helps create a virtuous circle of increasing local content, leading to higher usage.
- Strong IXPs and an open market for backbone connectivity will attract both CDNs and international ISPs

Summary of the Benefits of Getting Closer to Local Networks and Their Users

Benefits for Networks:

- Savings on international bandwidth required
- Savings on network Opex and Capex
- Improved customer perception of service, increasing its use and driving up revenue growth

Benefits for users:

- Lower latency
- Faster downloads
- Improved service quality

Benefits for Internet Exchange Points:

- Increased traffic on IXP, providing value to member ISPs
- Availability of content locally increases attractiveness of Internet Exchange, encouraging other ISPs to join
- Improves performance for both CDN content and all locally exchanged traffic, benefiting all users in a country

Summary of Priority National Policy Measures to Maximise Presence of International Networks (1)

- Open markets for multiple competing national and international backbones
- No business license or network operator's license requirements at business or IXP level for networks not selling in-country services
- Regulations that allow content distribution without restrictive licensing burdens
- Supportive legal framework protecting intermediaries networks against liability for content which infringes local laws
- No import duties on equipment and connectivity services needed to deploy networks and set up data centres

Summary of Priority National Policy Measures to Maximise Presence of International Networks (2)

- Business friendly tax regime for local ICT services (no luxury taxes on services)
- Tax incentives to encourage facilities operators to establish data centres
- Enabling policy environment for provision of affordable pervasive access
- Strategies to build awareness of benefits and information literacy of the public (ability to use)
- Investment and incentives for development of locally relevant content – tax incentives, training, iHubs, private sector collaboration



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