IPv6 Network Construction and Operation in CNGI-CERNET2 member universities

APRICOT-APAN

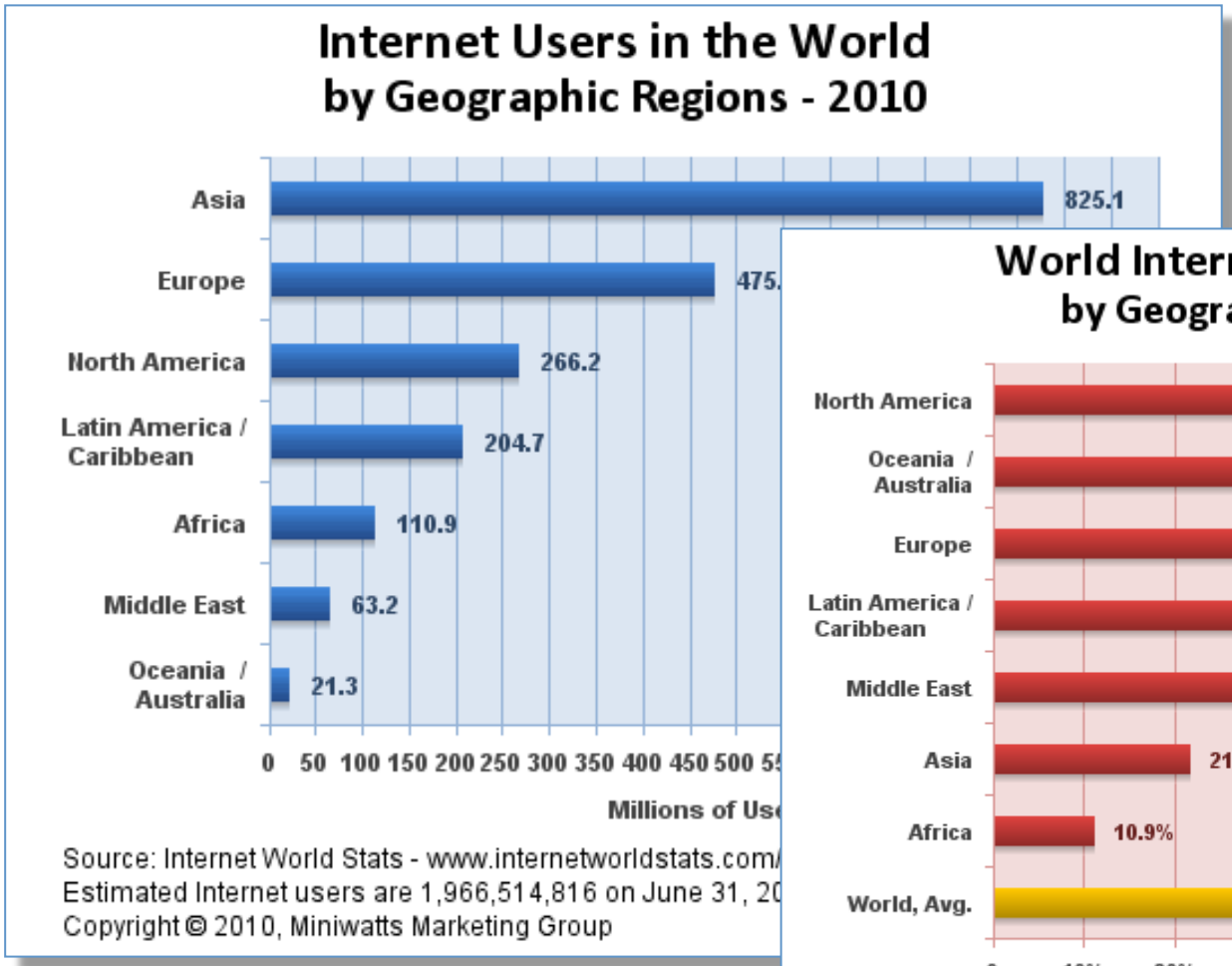
Hong Kong, 23Feb.2011

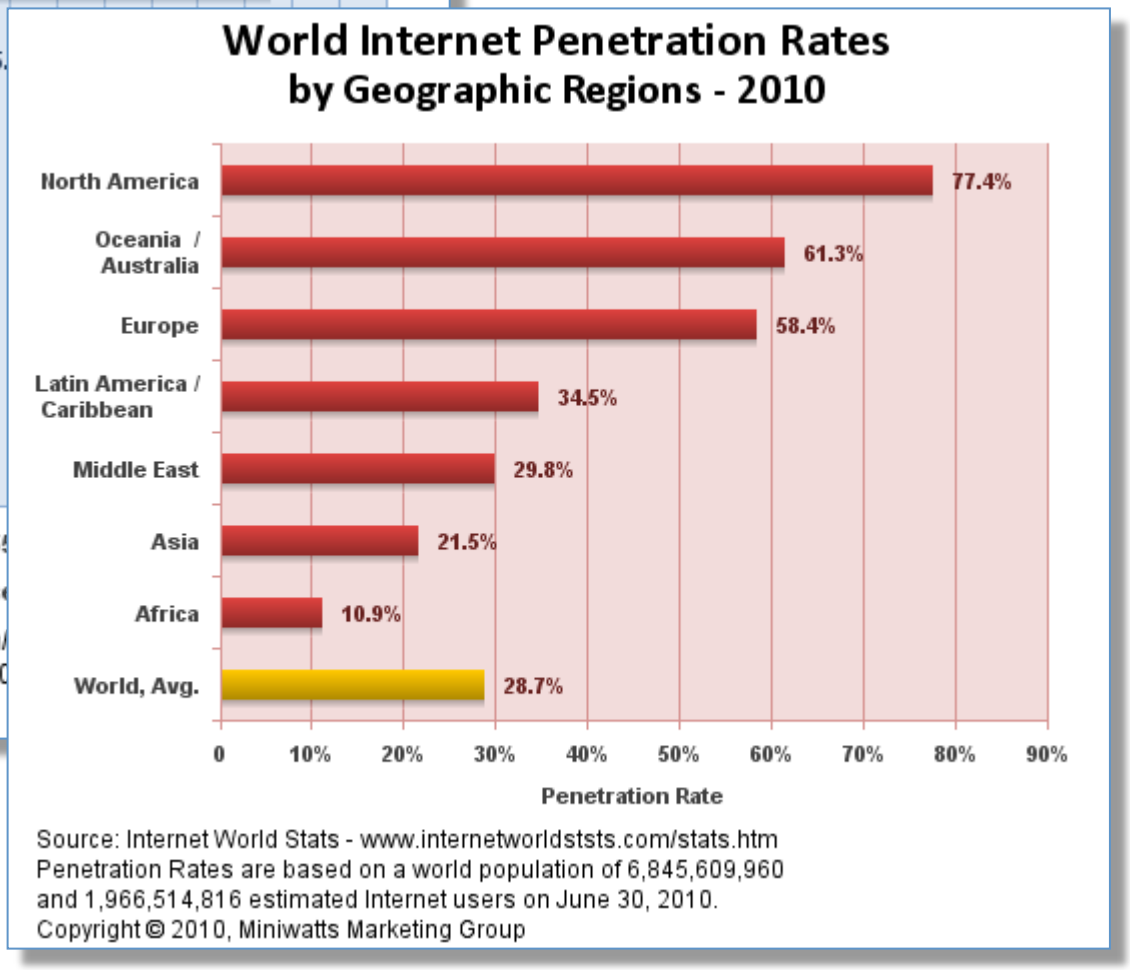
BUPT, Beijing

Agenda

- Internet growth and the requirement for IP address
- CNGI in China
- CNGI-CERNET2 construction and campus network operation

Asia Internet users compared with other region

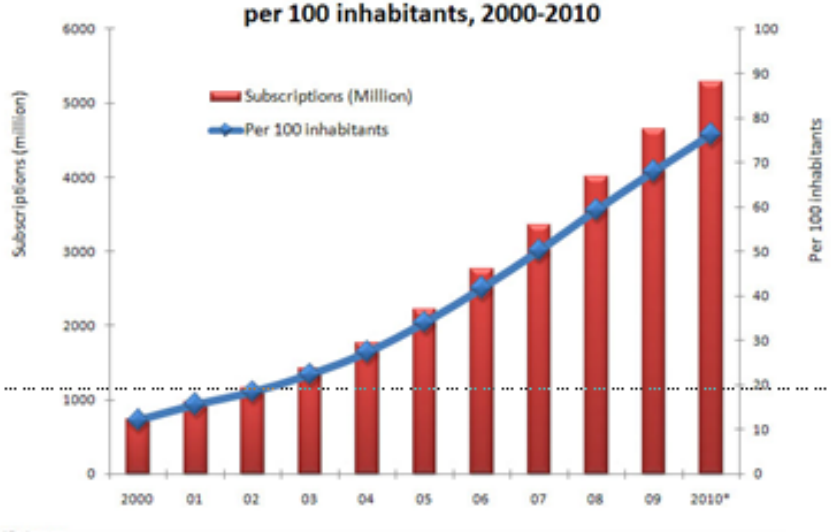




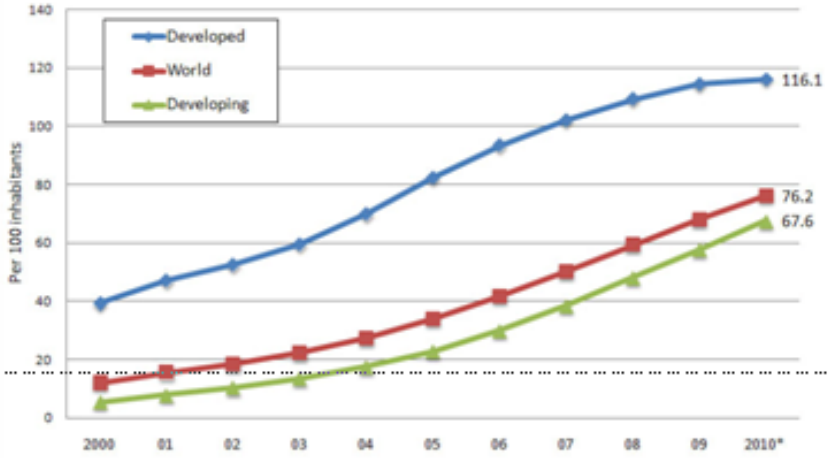
http://www.internetworldstats.com/stats.htm

Mobile Subscriber

Global mobile cellular subscriptions, total and per 100 inhabitants, 2000-2010

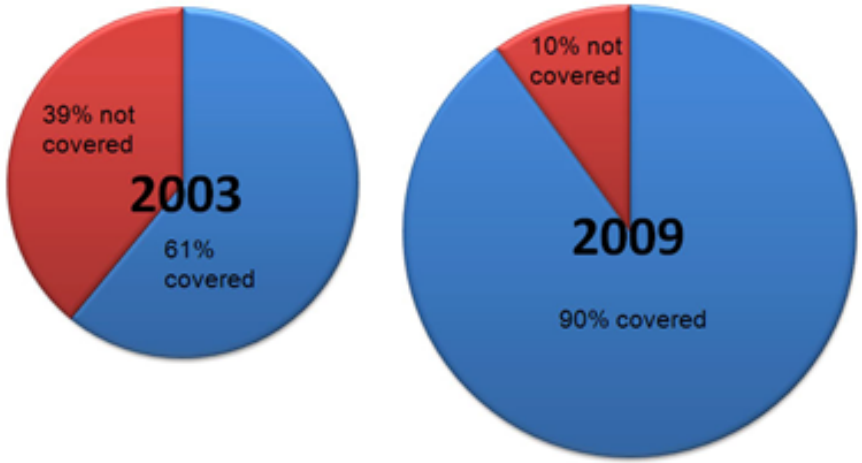


Mobile cellular subscriptions per 100 inhabitants, 2000-2010

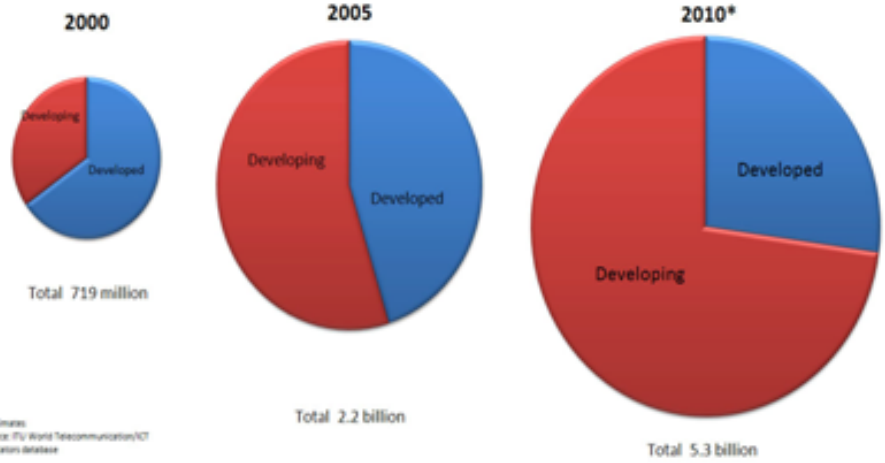


*Estimates
Source: ITU World Telecommunication /ICT Indicators database

Percentage of the world's population covered by a mobile cellular signal, 2003 compared to 2009

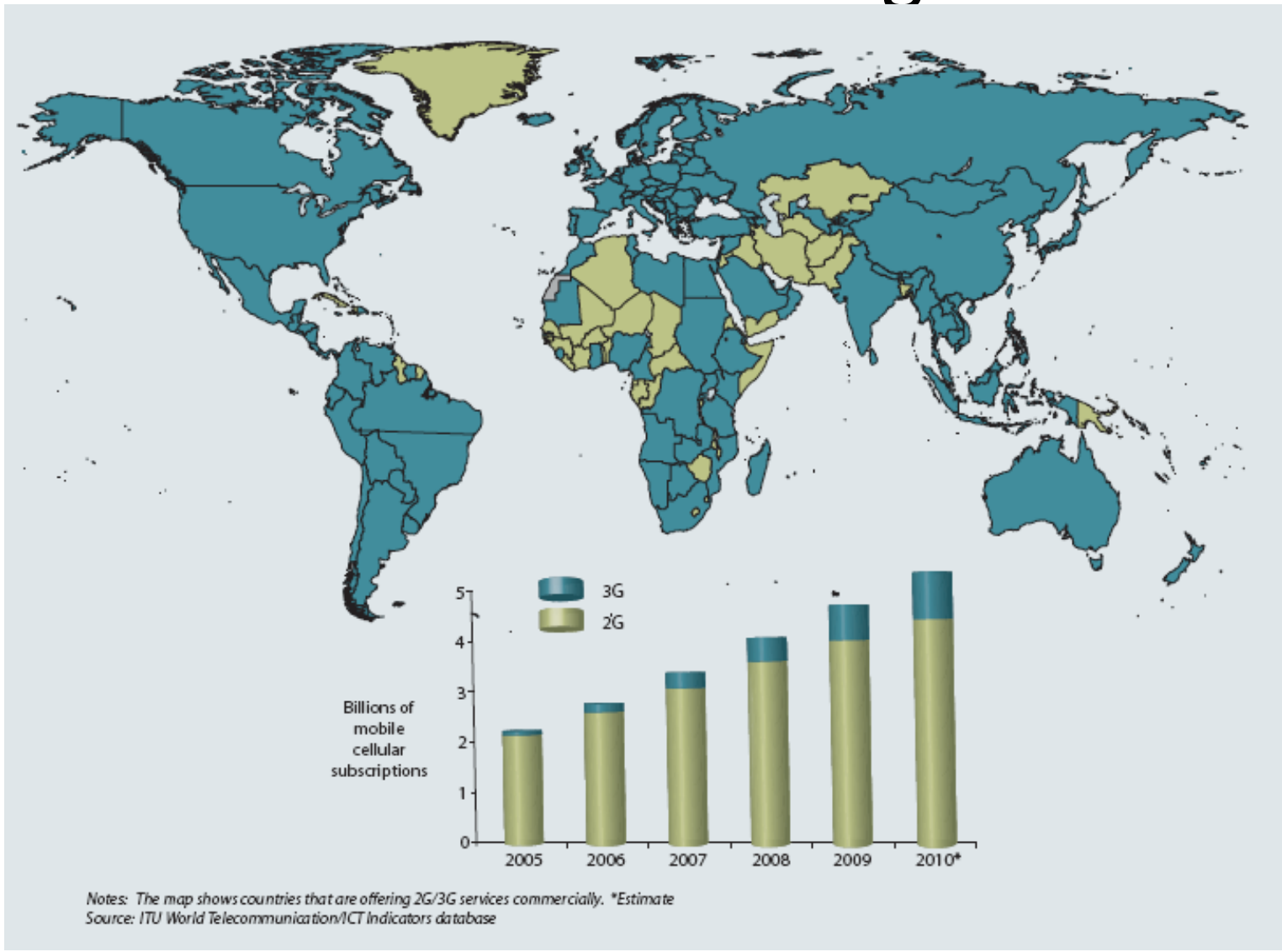


Mobile cellular subcriptions, by level of development

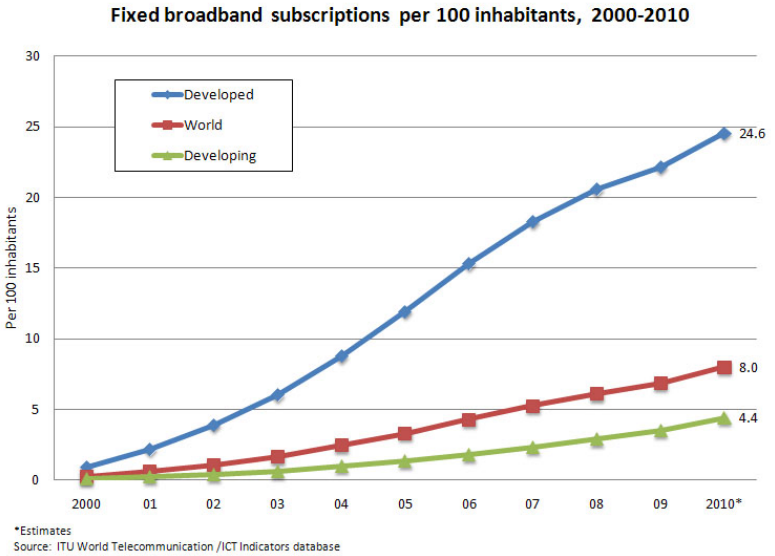


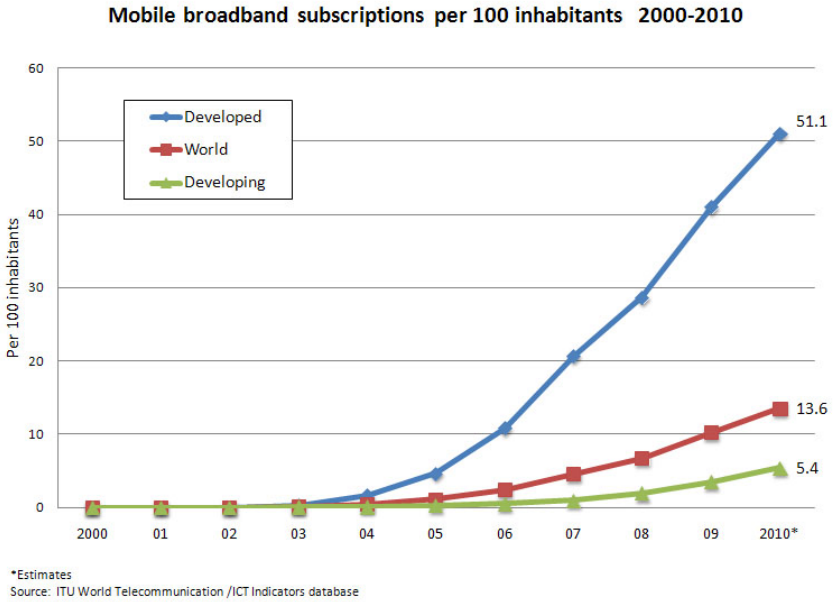
*Estimates
Source: ITU World Telecommunication/ICT Indicators database

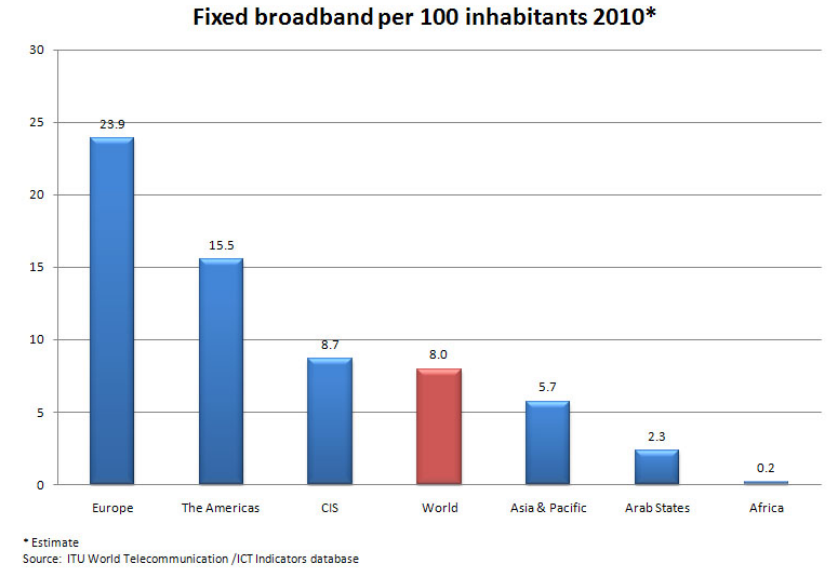
Who need IP address:
Global 3G subscriber growth

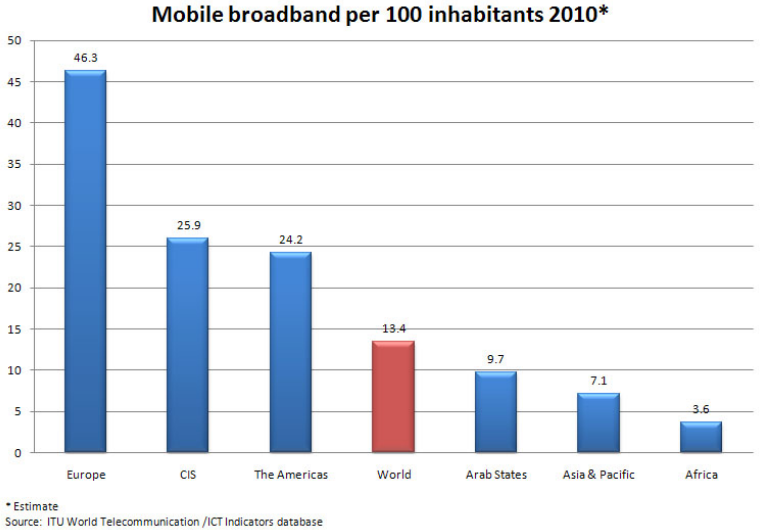


Growth of Broadband Subscribers





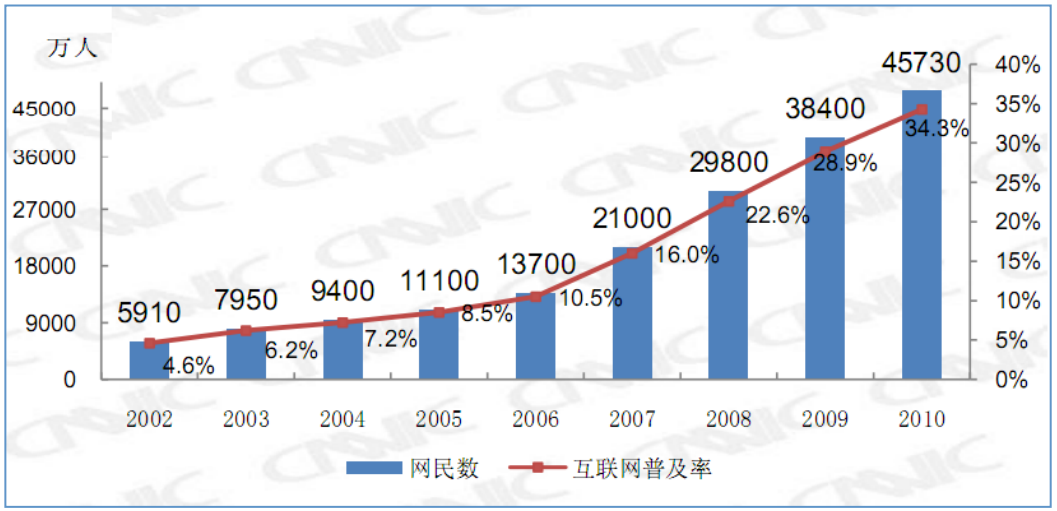




Internet in Mainland China

- CNNIC releases Internet survey every half-year
- By Jan. 2011, 457 million network users
- 203 million users use mobile phone to visit Internet
- The largest Internet user community
- We also meet many challenges

Source: CNNIC, July, 2010



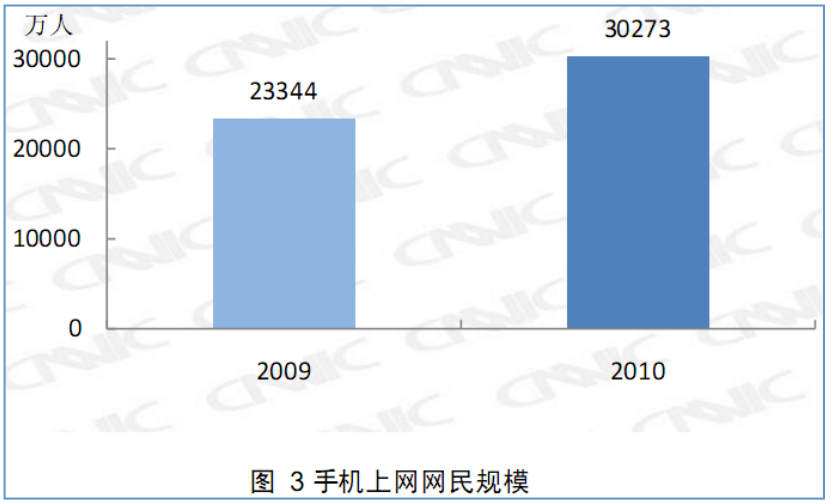


图 3 手机上网网民规模

penetration rate of Internet

- 34% penetration rate
- Due to infrastructure and economic condition
- Still big diversity
- More IP addresses needed
- Also opportunity

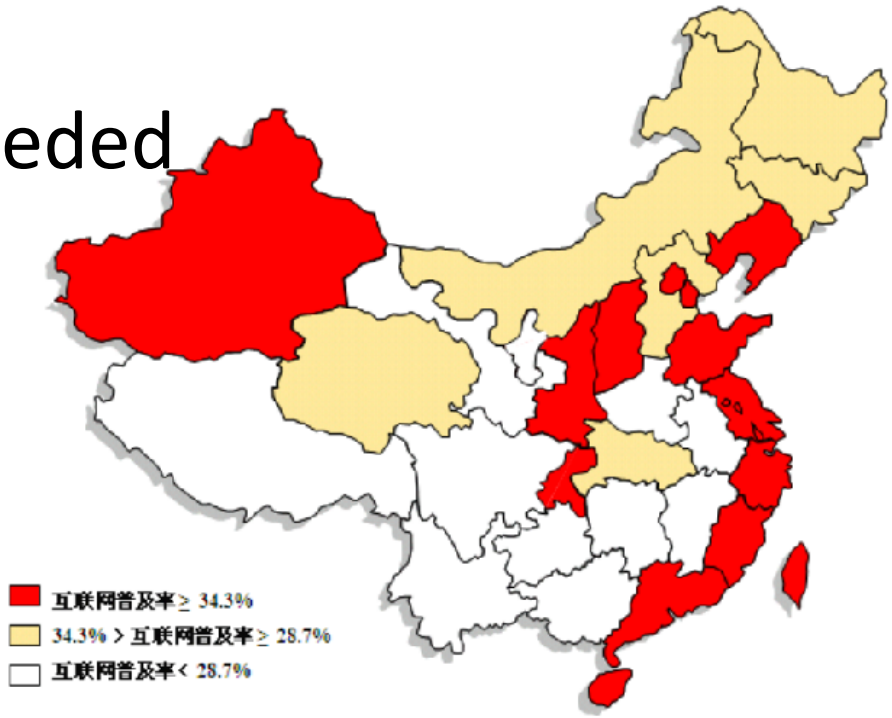
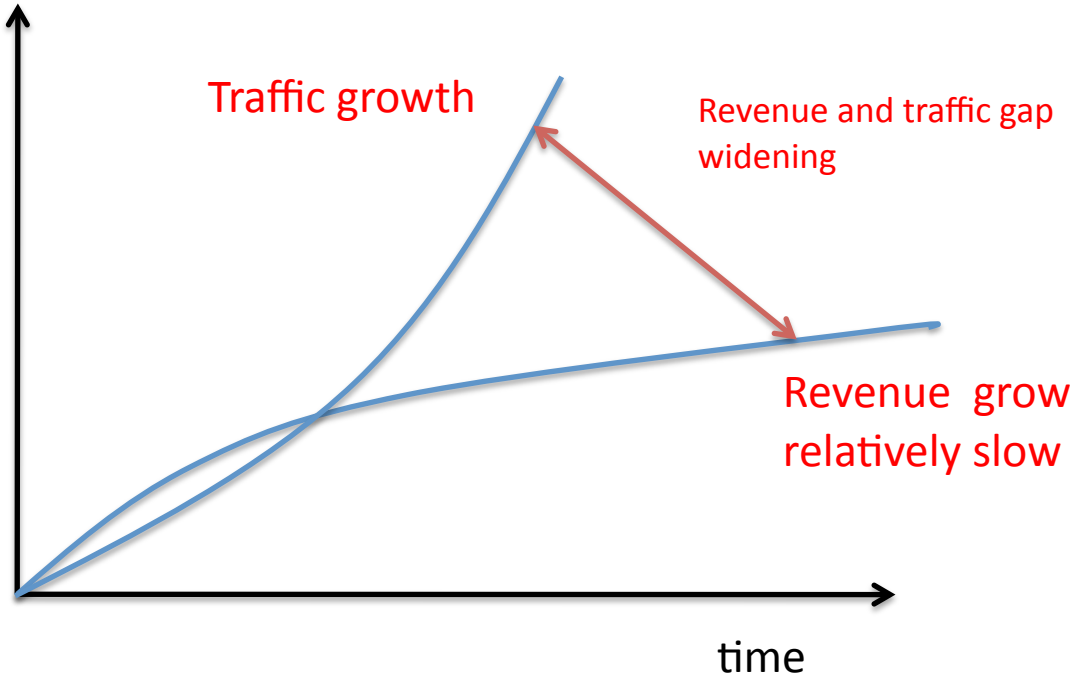


图 4 2010 年中国各省互联网发展状况

Source: CNNIC, July, 2010

Concern of service providers: Traffic vs. Revenue

- Traffic： Increasing 10 times in next 5 years
- Revenue： Increasing 100% in next 5 years
- What will happen in the IPv6 era? More investment?
- Operator still consider the point when to start v6 deployment

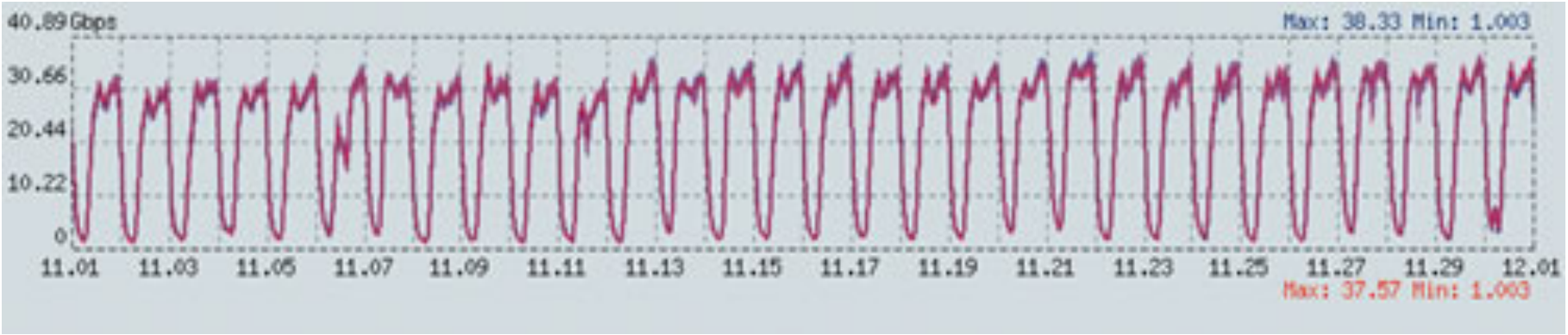


CNGI –
China Next Generation Internet project

- Initiated in 2002, it is one of the efforts to address the sustainable Internet development , approved by government in 2003
- Leaded by National Reform and Development Committee
- Joint with MST, MOE,CAS, MII ,NSFC,CAE, …
- Main objectives
  - Research project on next generation technologies
  - CNGI Backbone: nation wide, 40 Giga POPs and 300 campus networks, international network links
  - Build advanced applications
  - Transfer successful results to information industry
- All National Service Providers have involved in this project
  - CERNET, China Telecom and other national Internet service providers
- 2011年2月21日中央政府发布《国务院关于培育和发展战略性新兴产业的决定》，在“十二五”规划中全面推动IPv6的部署，明确指出以IPv6作为下一代互联网首选。

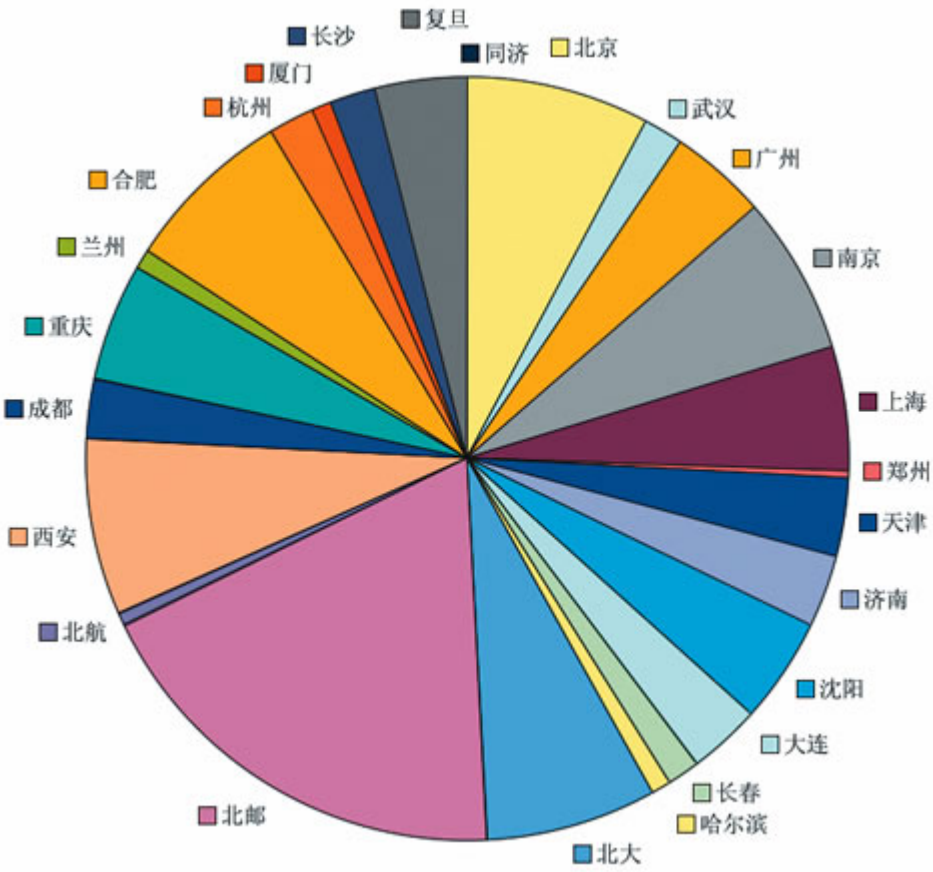
Traffic report from 6NOC of CNGI-CERNET2

- More than 200 Universities built their IPv6 enabled campus network
- CNGI-CERNT2 backbone traffic keeps increasing
- 35Gbps in Peak hour



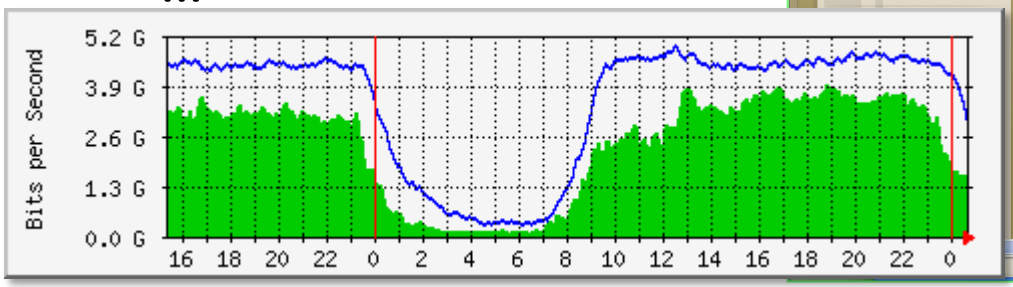
IPv6 Traffic distribution

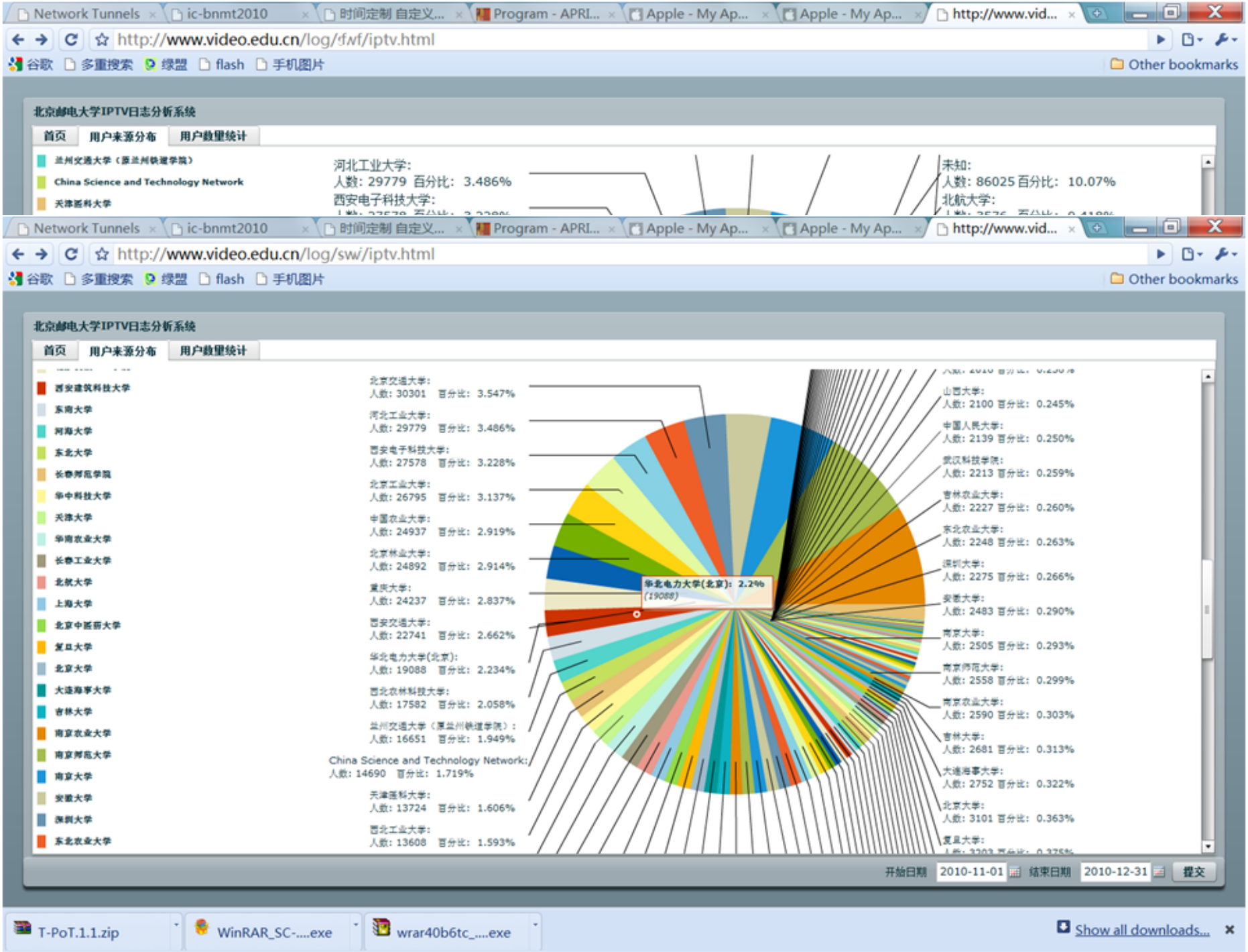
- Counted by backbone nodes
- BUPT keeps the top one for the last 2 years
- Backbone nodes in Xi'an, PKU, Hehei, BJ and Nanjing follows



Sample applications:
Concert via IPv6 live streaming transmission

- Many applications
- Multicast extended video streaming from backbone into campus networks
- P2P File sharing
- IoT applications
- Virtual reality
- Cloud computing
- …




Network Tunnels
ic-bnmt2010
时间定制 自定义...
Program - APRI...
Apple - My Ap...
Apple - My Ap...
http://www.vid...
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谷歌
多重搜索
绿盟
flash
手机图片
Other bookmarks
北京邮电大学IPTV日志分析系统
首页
用户来源分布
用户数量统计
河北工业大学:
人数: 29779 百分比: 3.486%
未知:
人数: 86025 百分比: 10.07%
北京交通大学:
人数: 30301 百分比: 3.547%
西安电子科技大学:
人数: 27578 百分比: 3.228%
北京工业大学:
人数: 26795 百分比: 3.137%
中国农业大学:
人数: 24937 百分比: 2.919%
北京林业大学:
人数: 24892 百分比: 2.914%
重庆大学:
人数: 24237 百分比: 2.837%
西安交通大学:
人数: 22741 百分比: 2.662%
华北电力大学(北京):
人数: 19088 百分比: 2.234%
西北农林科技大学:
人数: 17582 百分比: 2.058%
兰州交通大学（原兰州铁道学院）:
人数: 16651 百分比: 1.949%
China Science and Technology Network:
人数: 14690 百分比: 1.719%
天津医科大学:
人数: 13724 百分比: 1.606%
西北工业大学:
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山西大学:
人数: 2100 百分比: 0.245%
中国人民大学:
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武汉科技学院:
人数: 2213 百分比: 0.259%
吉林农业大学:
人数: 2227 百分比: 0.260%
东北农业大学:
人数: 2248 百分比: 0.263%
深圳大学:
人数: 2275 百分比: 0.266%
安徽大学:
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吉林大学:
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大连海事大学:
人数: 2752 百分比: 0.322%
北京大学:
人数: 3101 百分比: 0.363%
华北电力大学(北京): 2.2%
(19088)
开始日期
2010-11-01
结束日期
2010-12-31
提交
T-PoT.1.1.zip
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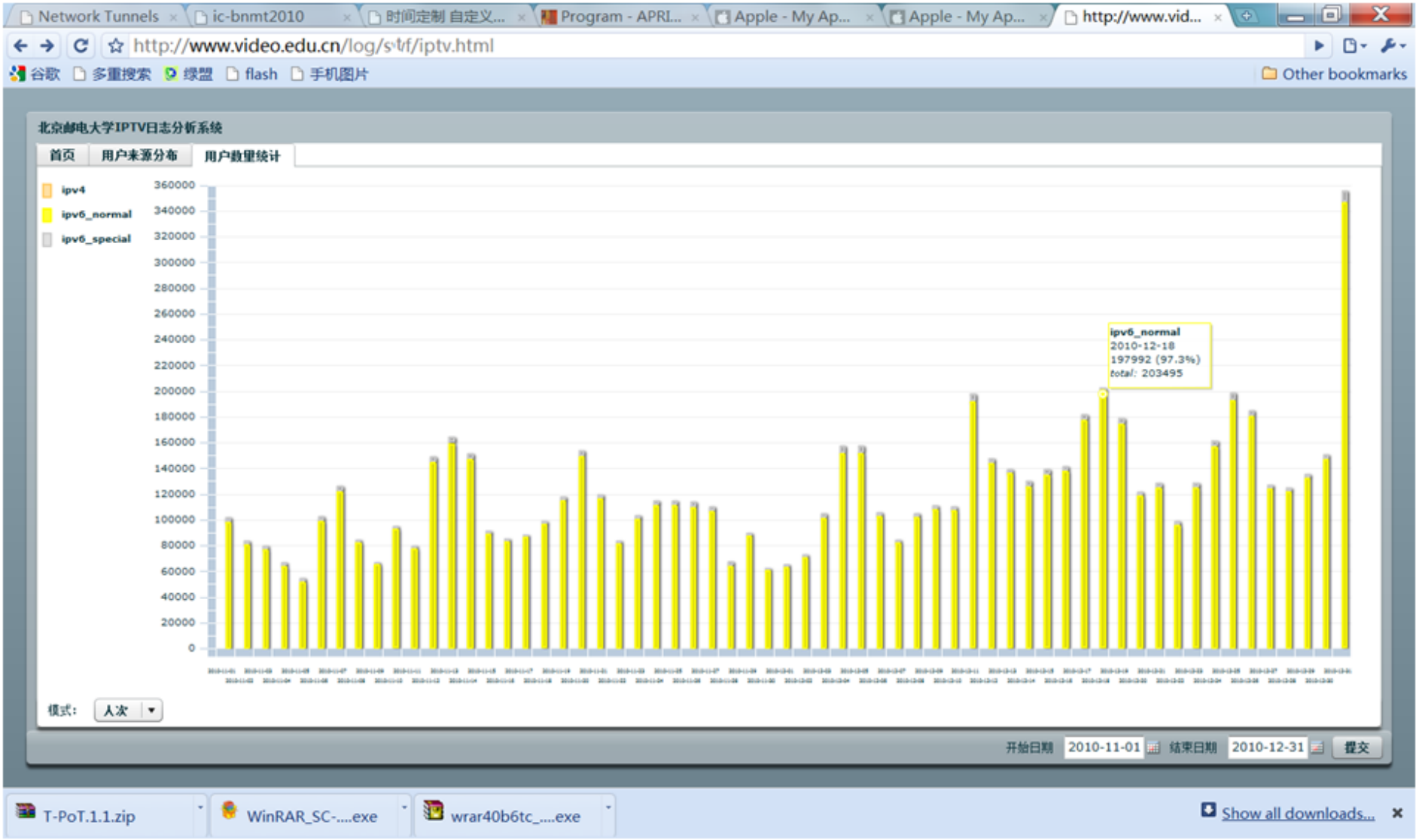
wrar40b6tc_....exe
Show all downloads...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时间定制 自定义...
Program - APRI...
Apple - My Ap...
Apple - My Ap...
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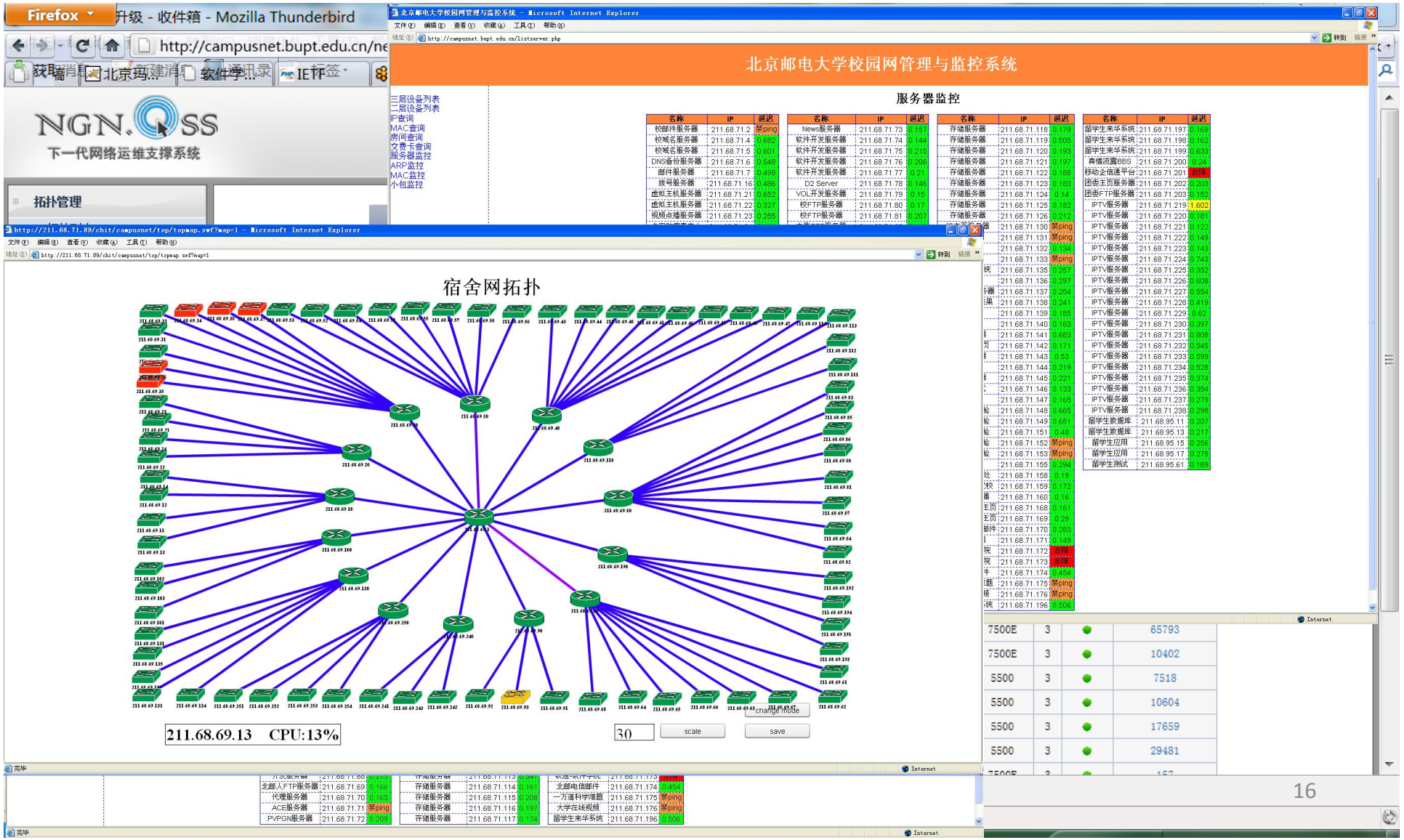
http://www.video.edu.cn/log/stf/iptv.html
谷歌
多重搜索
绿盟
flash
手机图片
Other bookmarks
北京邮电大学IPTV日志分析系统
首页
用户来源分布
用户数量统计
ipv4
ipv6_normal
ipv6_special
360000
340000
320000
300000
280000
260000
240000
220000
200000
180000
160000
140000
120000
100000
80000
60000
40000
20000
0
ipv6_normal
2010-12-18
197992 (97.3%)
total: 203495
模式:
人次
开始日期
2010-11-01
结束日期
2010-12-31
提交
T-PoT.1.1.zip
WinRAR_SC-....exe
wrar40b6tc_....exe
Show all downloads...

Network management system developed



Issues be tackled

- More operation efforts involved
  - Maintain two routing tables
  - Maintain two ACLs
  - Maintain dual stacked server
  - Identify the network/service problem caused by IPv4 or IPv6
  - Miss configured DNS, network devices, client and server side
  - Trainings

Future works

- Take actions and Keep eyes closely on security
- Different level of trainings
- Porting and developing applications
- Accounting system
- Migration technology research and deployment
- Collaboration among interested parties
- Looking into future technologies

Let’s working together for a better IPv6 world !