

New Technologies Towards Future Internet

Athanassios Liakopoulos (aliako@grnet.gr)
Greek Research & Technology Network

4th International Conference on Broadband
Athens, 20th May 2009

Outline

- ▶ Challenges & Opportunities
- ▶ IPv6 into the Scene
- ▶ IPv6 Common Grounds
- ▶ IPv6 as Innovation Driver
- ▶ Focusing on Greece
- ▶ Conclusions

Challenges & Opportunities of the Internet

▶ Internet of Things

- Connect everything, such as computers, smartphones, sensors, machines, vehicles, *people*
- Scalability, flexibility, heterogeneity, robustness, resilience, openness,
- Autonomic Principles – Addressing complexity – Self(configuration/optimisation/healing/protection)
- The *network* become the spine of the human (virtual) environment

▶ Mobility & Ubiquity

- The new “norm” of internet users
- Seamless mobility across different wireless networks
- Still challenge how to improve User Experience

Challenges & Opportunities of the Internet (2)

▶ Virtualisation

- Dilution of the “server” – Cloud computing (Paravirtualisation & Clustering)
- “Segmentation” of the network – Network slices
- Consolidation of infrastructures – Economies of scale

▶ Richer Media Content

- End Users are *the producers* of data, media, information, such as in Youtube, blogs, wikis, etc
- Applications combine technology and human/social needs
- Challenging how to provide access to vast amounts of information

Challenges & Opportunities of the Internet (3)

- ▶ Web 2.0
 - Internet Users *exercise control* over the data
 - Information sharing, collaboration, social networking
 - Transformed our approach for social relations
 - More to come ... Science 2.0, Enterprise 2.0
- ▶ Security
 - Basic requirements remain the same but communication models proliferate
 - Built a trusted networking environment

IPv6 into the Scene

▶ Internet of Things



▶ Mobility & Ubiquity



▶ Virtualisation



▶ Richer Media Content

▶ Web 2.0



▶ Security



IPv6 Common Grounds

- ▶ IPv6 technology is now mature
 - Connect everything, autoconfiguration, bidirectional secure communication, e2e, better mobility, etc.
 - Provides an *evolutionary path* towards future
- ▶ Wide deployment is not achieved
 - Chicken – egg problem
 - Time is running out! But, there is no “D–day”
 - Though, 300% increase in routing entries in 2 years
- ▶ European Commission Target
 - 25% penetration by 2010

IPv6 as Innovation Driver

- ▶ New design mentality is necessary – Innovation
 - Still developing applications taking into consideration IPv4 functionality or limitations
 - Improve simplicity and openness
- ▶ Business plans are still missing
 - Evaluate the benefits/costs of *taking* or *not taking* action
 - Functionality vs Performance vs Complexity vs Cost

Some Applications

- ▶ Facility Management / Building Automation
 - Air conditioning, status of elevators, temperature cameras, electricity monitoring consumption, etc
- ▶ “Olympic” Applications
 - Surveillance and sensor system, IPv6 lightning system, etc
- ▶ Specific purpose software
 - MS Direct Access, Vidder, etc.

ファイル(E) 編集(E) 表示(V) 履歴(S) ブックマーク(B) ツール(I) ヘルプ(H)

http://www.esprdragon.jp/espgeneral/

最新ニュース NIKKEI NET (日経...) ソーシャル・ネット... Google

東京大学 THE UNIVERSITY OF TOKYO

施設 部門 グループ 機器 帳票 設定

ESP Dragon CNXX

すべての機器データ表示中

表示順 電力(kW) | CO2 | 電力料金(¥) | 電力量(kWh) | 稼働率

1 | 工学部2号館 > P-R-2空調動力盤 [23.9%]

本日稼働環境 過剰負荷 0% | 稼働 0% | 待機 0% | 停止 0%

単位: kW | 昨日: 616.5kWh | 本日現在: 281.7kWh

表示期間 48時間 2008/07/10 00:00 - 2008/07/11 23:59

2 | 工学部2号館 > P-10-1空調動力盤 [10.6%]

本日稼働環境 過剰負荷 0% | 稼働 0% | 待機 0% | 停止 0%

単位: kW | 昨日: 382.8kWh | 本日現在: 125.5kWh

表示期間 48時間 2008/07/10 00:00 - 2008/07/11 23:59

3 | 工学部2号館 > EXL10-1-2実験盤 [10.6%]

本日稼働環境 過剰負荷 100.0% | 稼働 0.0% | 待機 0.0% | 停止 0.0%

単位: kW | 昨日: 265.2kWh | 本日現在: 123.7kWh

表示期間 48時間 2008/07/10 00:00 - 2008/07/11 23:59

4 | 工学部2号館 > サーバ-室盤 [10.4%]

本日稼働環境 過剰負荷 100.0% | 稼働 0.0% | 待機 0.0% | 停止 0.0%

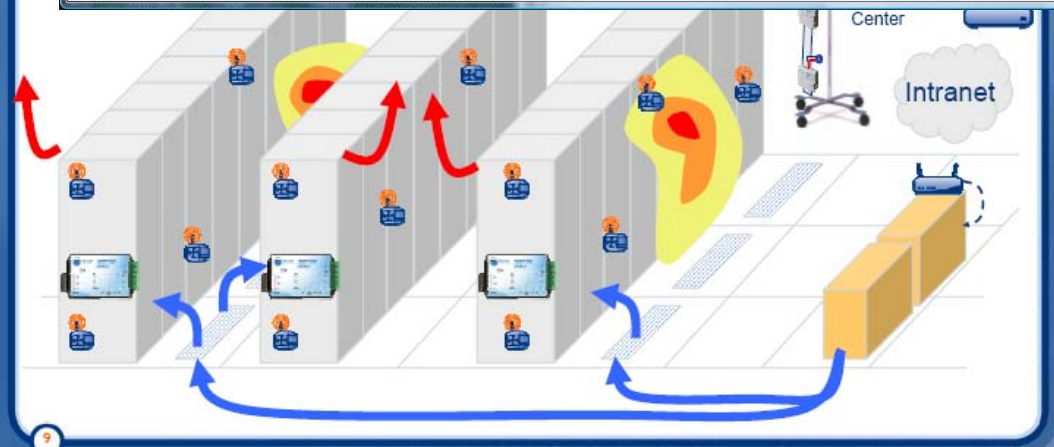
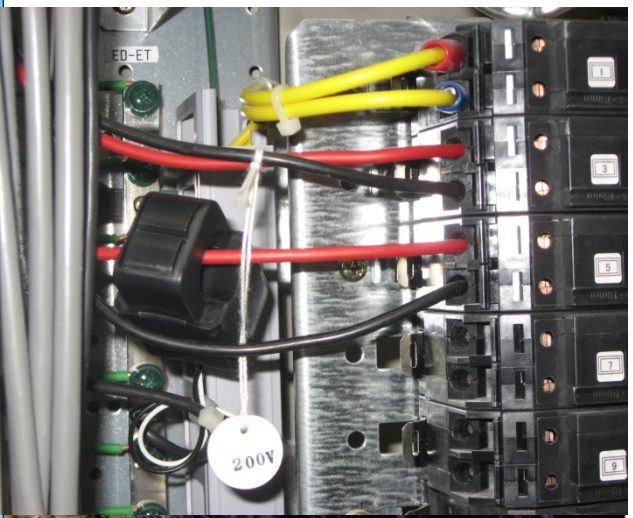
単位: kW | 昨日: 265.1kWh | 本日現在: 122.5kWh

表示期間 48時間 2008/07/10 00:00 - 2008/07/11 23:59

5 | 工学部2号館 > P-R-3空調動力盤 [9.0%]

6 | 工学部2号館 > サーバ-室外機 [4.8%]

完了



Focusing on Greece



- ▶ Greek Research & Technology Network
 - IPv6-enabled backbone – Interconnection to GEANT
 - Online storage, multicasting, video streaming, video conferencing, access to Google, tunnel broker, etc.
 - Research on autonomic principles & IPv6
- ▶ Greek School Network
 - Large scale IPv6 broadband deployment
- ▶ Hellenic IPv6 Task Force
 - Two ISPs revealed that do have plans
 - Companies gradually acquire experience



www.ipv6-taskforce.gr

Conclusions

- ▶ Internet is a commodity and necessity
- ▶ The network is now the *service*
- ▶ New challenges and new opportunities for innovation in the Internet
- ▶ IPv6 is a key technology for future Internet
- ▶ Adequate progress in Greece

Thank you!

Athanassios Liakopoulos

(aliako@grnet.gr)