Deploying IPv6 Without Huge Costs A Case Study

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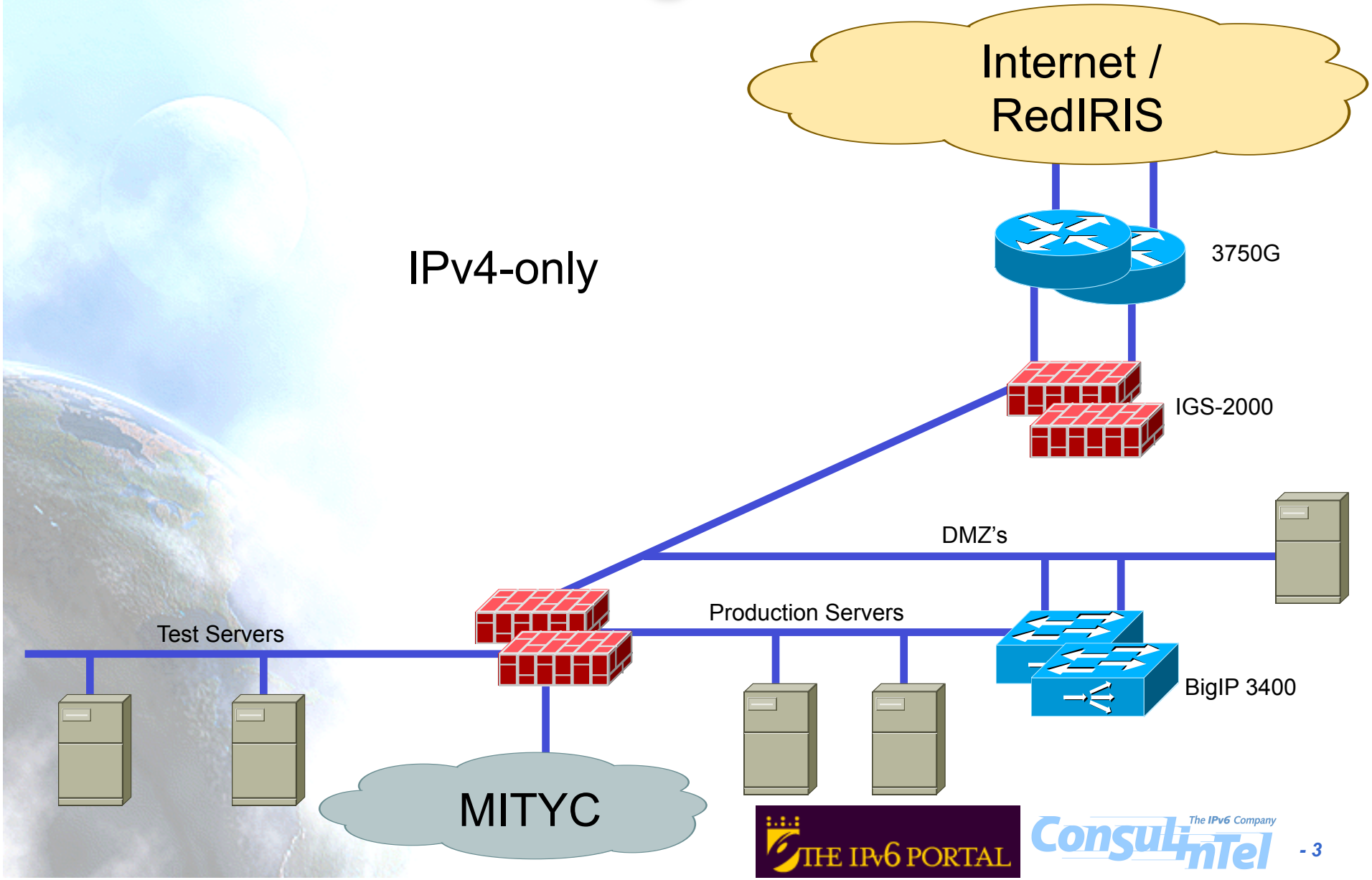
Spanish Ministry of Industry, Tourism and Trade (MITYC)

- As part of a National IPv6 Deployment Plan
- Thousands of online services need to support IPv6
- This Ministry is responsible for the plan, so a pilot is required to be used as a case study for the rest of the Public Administration
- Balance between lower cost and non-disruption of services
- 6DEPLOY provided a training to the staff

MITYC Original Network

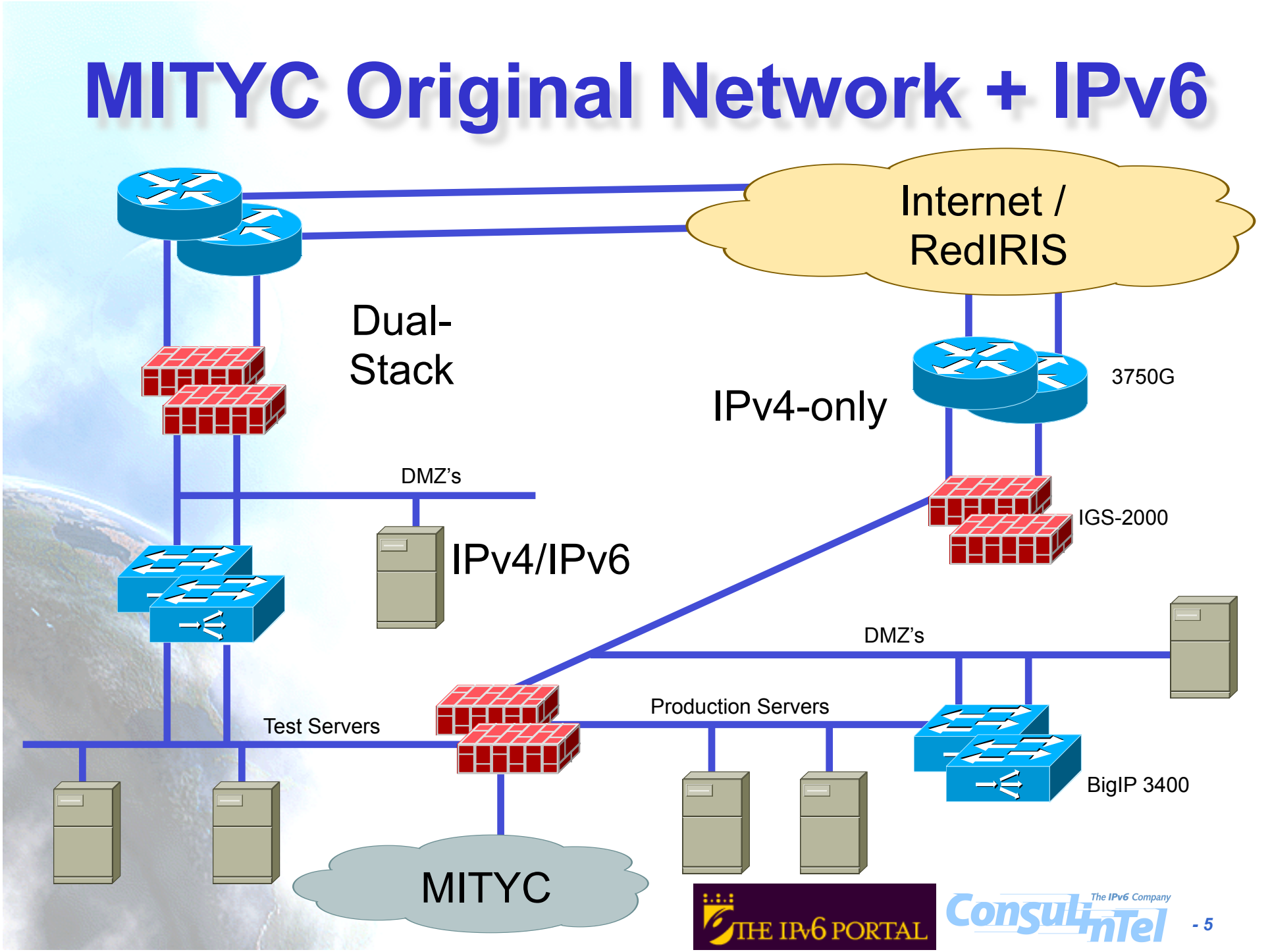


MITYC Network Plans

- Before the IPv6 setup, it was planned to update:
  - Firewalls
  - Load Balancers

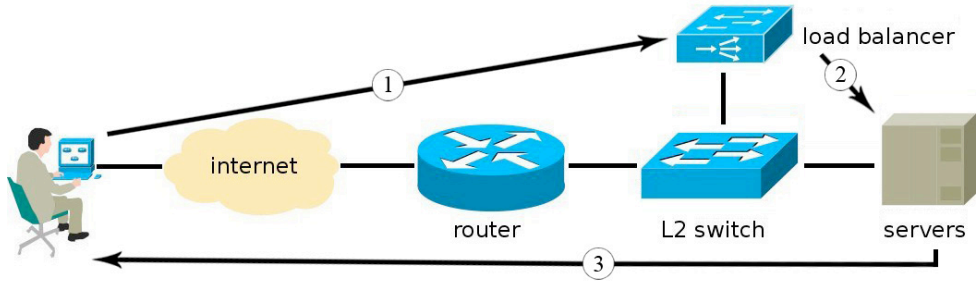
- Not planed upgrade:
  - Routers (Layer 3 – Switches)

MITYC Original Network + IPv6

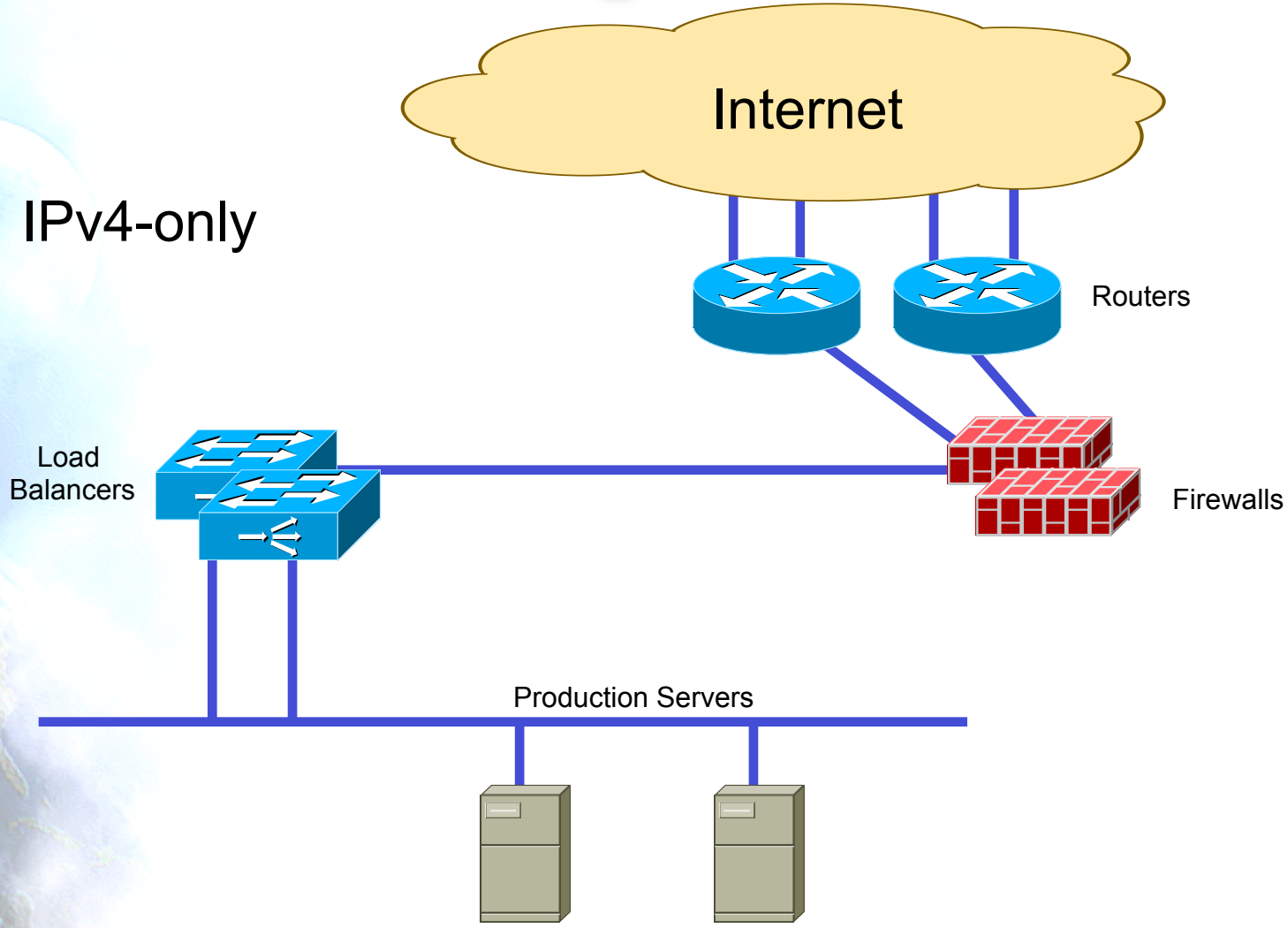


Spanish leading publisher

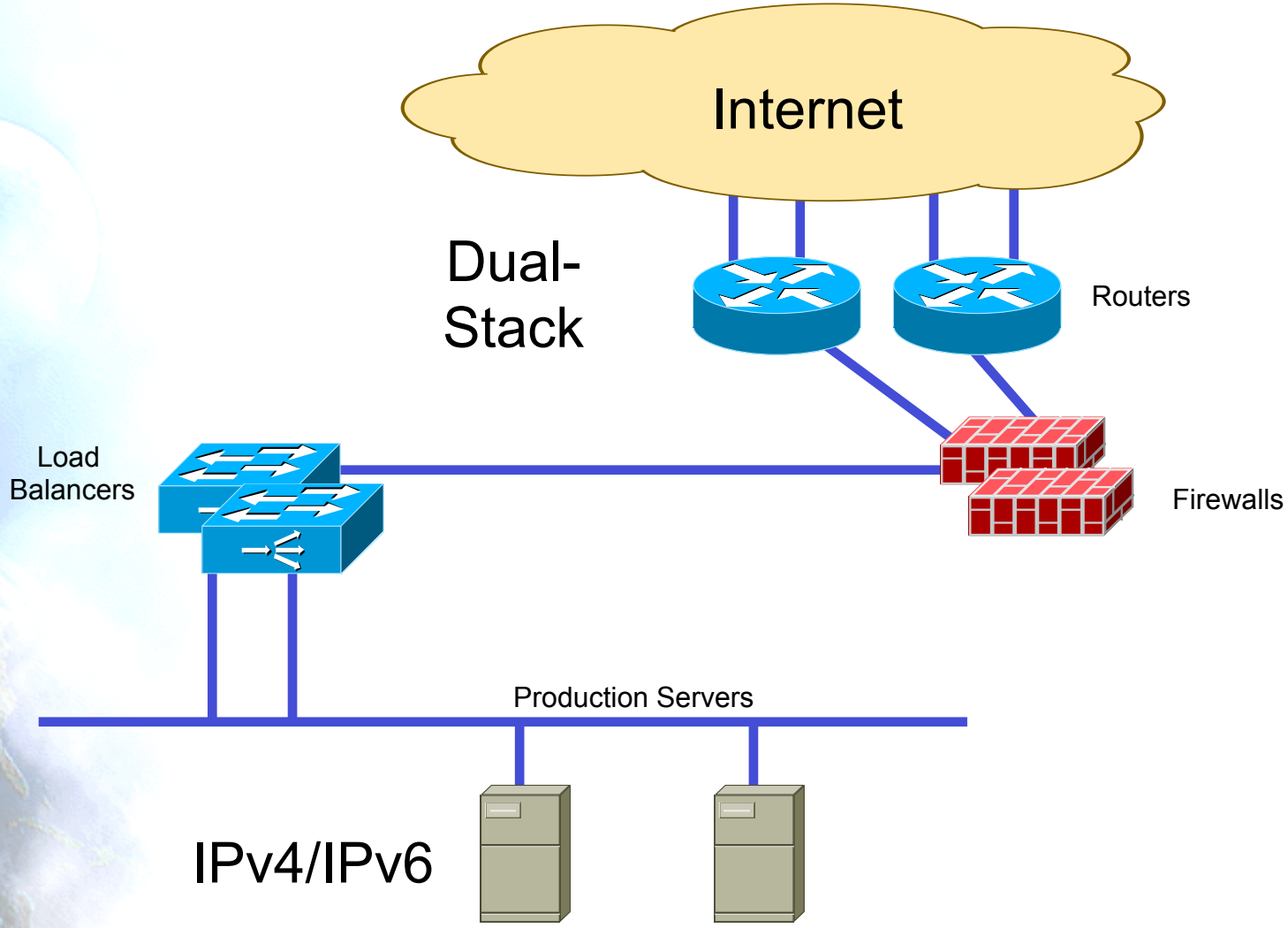
- Willing to participate in the World IPv6 Day
- Aim to “stay”, not just a 24 hours test
- No budget available, but need external support on IPv6
- Using Load Balancing with DSR (Direct Server Return)



Publisher Original Network



Publisher Dual-Stack Network



Conclusions

- Training & expertise are key
- Planning is key
- It may be inexpensive

DEVELOPMENT PLAN FOR THE DEPLOYMENT OF INTERNET PROTOCOL VERSION 6 (IPv6) IN SPAIN

29th April 2011

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Plan Approval and Objective

- **Agreement of Council of Ministers.** The Council of Ministers approved today the Development Plan for the Deployment of Internet Protocol version 6 (IPv6) in Spain.

- **Plan Objective**. The Plan aims to streamline the integration of Internet Protocol IPv6, responding to the tremendous growth of Internet and promoting technological innovation and deployment of new services in the field of Information Society (strengthening information security and connectivity and facilitating network management).

- **The Plan is driven**, in general, by the Ministry of Industry, Tourism and Trade, and in the aspects regarding the integration of IPv6 in Public Administration, by the Ministry of Territorial Policy and Public Administration.

IP addresses: IPv4

- **IP (Internet Protocol) addresses** identify the different devices connected in the network and allows them to communicate.
  - ✓ *The IP addresses play a role analogous to that phone number are in the telephone service, allowing the exchange between two or more points in the network.*

- Internet **IP addressing is handled globally** by ICANN (*Internet Corporation for Assigned Names and Numbers*), which distributes large blocks of address to the five RIRs (Regional Internet Registry) which make the worldwide distribution. RIRs make final allocations to operators, universities, etc.

- Since 1981, we used the so-called Internet protocol IPv4, which offers over 4.295 million unique Internet addresses worldwide.
  - ✓ *However, this addressing space has been insufficient due to the great success of the Internet.*

Final allocation of IPv4 addresses and start of only-IPv6 addresses allocations

- **ICANN assigned the remaining IPv4 addresses of the central pool** to the five Regional Internet Registries (RIR) in **February 2011**.

- **In Europe** the forecast from the relevant RIR, RIPE NCC (*RIPE Network Coordination Center*), is to exhaust their IPv4 pool **before end of 2011**.

- When IPv4 availability is exhausted, **future allocations** from the Regional Internet Registries (RIRs) **will be only-IPv6 addresses**.

Internet Protocol version 6 (IPv6)

- **Internet Protocol version 6 (IPv6)** expands the length of the addresses from 32 to 128 bits, considerably increasing the number of available IP addresses. So we move from 4.295 millions of IPv4 addresses to over **340 sextillions** in IPv6 (1 sextillion = 10^{36})
  - ✓ *The introduction of IPv6 protocol is a globally relevant technological evolution, affecting all the countries.*
  - ✓ *IPv6 will allow the development of "Internet of things" and introduces enhancements in terms of security, easiness of connectivity and network management.*

- Already assigned IPv4 addresses will continue working and **both protocols, IPv4 and IPv6, will coexist during several years**.

Main actors in the deployment of IPv6

- **Internet service and content providers**, such as web sites, need to upgrade their offer of services to IPv6 (including eGovernment services).
- **Application providers,** such as commercial enterprise management software, need to provide solutions supporting IPv6.
- **Communication equipment vendors** must integrate capabilities to support and manage IPv6 traffic in their product for backbone and access networks.
- **Internet access providers** (ISPs) must offer IPv6 connectivity to both, residential and corporate customers.
- **Telecomm operators** must forward IPv6 traffic.
- The adoption of the **appropriate technical transition mechanisms** by the main actors, each in their own area, allows **Internet users continue to enjoy regular and non-disrupted use of the Network**.

Relevant International Organizations supporting the IPv6 deployment

- The **International Telecommunications Union** (ITU-T) has called for the deployment of IPv6 in the Public Administrations and the development of the IPv6 adoption.

- The communication from the **European Commission** COM/2008/0313 established an Action Plan for the IPv6 protocol deployment with the objective of boosting the innovation in Internet.

- The **European Digital Agenda** from the European Commission establishes that Member States must make eGovernment services fully interoperable and supporting IPv6.

- The Declaration of the **Council of Ministries of Telecommunications**, 29th September 2010, remarks the need for the deployment of IPv6 in the public sector, together with the encouragement and promotion of the deployment in the private sector.

Actions in the deployment Plan

The Plan includes initially the following ten actions:

1. **Pioneer IPv6 deployment in eGoverment services:** online services of the Ministry of Industry, Tourism and Trade, and the 060 portal (www.060.es).
2. **Internet Didactic Portals about IPv6 protocol**: www.ipv6.es and the Electronic Administration Portal (www.administracionelectronica.gob.es).
3. **IPv6 training:** one-day workshops and funding within the scope of the "Avanza 2 Plan".
4. **Development of public-private cooperation.**
5. **Funding in technical projects to deploy IPv6:** "Avanza 2 Plan".
6. Complete support of **IPv6 in the ccTLD ".es".**
7. Setup of the **"*Working Group for the deployment of IPv6*".**
8. **Deployment of IPv6 in Public Administration.**
9. **IPv6 a must in public acquisitions**.
10. Follow up of **European and International IPv6 initiatives**.

Details regarding actions in the deployment Plan (I)

Details regarding to some of the actions:

- **Pioneer IPv6 deployment in eGoverment services:** online services of the Ministry of Industry, Tourism and Trade will incorporate IPv6 in June 2011.

- **Internet Didactic Portals about IPv6 protocol**: the dissemination portal with explanatory and didactic information regarding IPv6 (www.ipv6.es), offered by the Ministry of Industry, Tourism and Trade is available since today.

- **IPv6 training:** 20 free of cost, one-day theoretical and hands-on workshops about IPv6, are being organized starting in June 2011 up to end of this year in all the country, covering the capitals.

  Also have been articulated already, by the calls in progress in the context of “Avanza 2 Plan”, support for IPv6 training of ICT engineers in SMEs.

Details regarding actions in the deployment Plan (II)

- **Funding in technical projects to deploy IPv6:** already been articulated by the calls in progress, support for technical projects for the introduction of IPv6 in the context of "Avanza 2 Plan".

- Complete support of **IPv6 in the ccTLD ".es"**: An IPv6 workshop is already being organized in June 2011 with the domain name registrars, together with the setup of a pilot.

  Furthermore, in May 2011, the tools for the management of ".es" domains will support IPv6, together with a dual-stack infrastructure for the ***".es"*** **domain**.

- Setup of the **"*Working Group for the deployment of IPv6*":** will contribute to the coordination of actions regarding IPv6 in Spain.
  The main actors will be the associations representing the ICT sector and user associations (AMETIC, RedTel, ASTEL, A-NEI, AUI, AI, Asociación Usuarios de la Comunicación, etc).
  The first meeting is tentatively happening on May 24th 2011.