A introdução do IPV6 na Administração Pública
Lisboa, 9 Abril 2015

IPv6 transition in the Spanish government - The Spanish GEN6 pilot

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This project has received funding from the European Union's
European Commission

Spain - Context

- Organized in the form of "*Estado de las Autonomías*"
- One of the most **highly decentralized** countries in Europe
  - All Autonomous Communities have their own elected parliaments, governments, public administrations, budgets, and resources
  - Health and education systems among others are managed regionally
- Three levels of Public Administration, expected to work together to implement policies and provide services

National
(13 Ministries
> 130 Agencies)

Regional
(17 Autonomous
Communities)

Local
(> 8.000
municipalities)

GOVERNMENTS ENABLED WITH IPv6

Spanish governmental network – Red SARA

- Set of communications infrastructure and basic services (not just a telecommunications network)
  - E-signature validation, verification of identity and residence data, e-notification, etc.
- Allows the interconnection among the 3 levels of Spanish Public Administrations, facilitating the exchange of information and services
- Reliable, secure, capable and flexible
- Key tool e-government goals
  - All Regional Governments connected
  - 3.707 Local Councils
  - 90% population coverage
- Legally supported by 11/2007 Law
- Managed by MINHAP
- Connected to sTESTA

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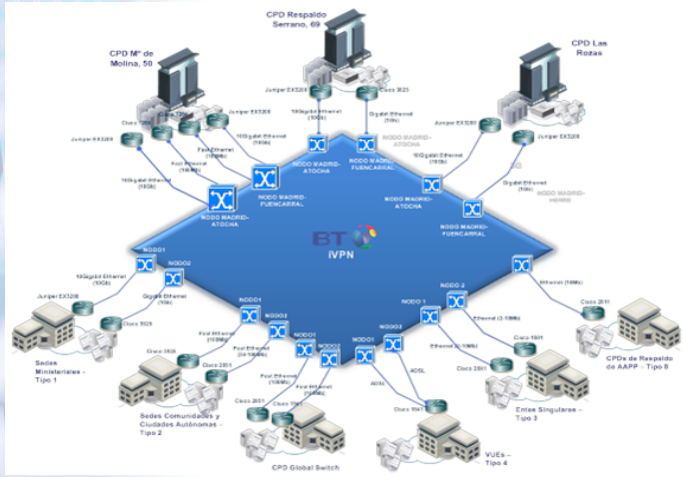
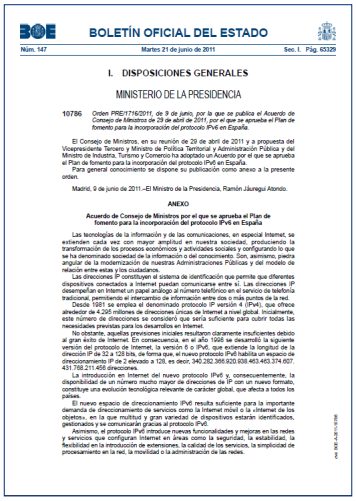
Spanish governmental network – Red SARA



GOVERNMENTS ENABLED WITH IPv6

Spanish National Plan to foster the deployment of IPv6

- High level political support
- Approved by the Government in **2011**
- The Plan aims to foster the adoption of IPv6 in Spain, responding to the tremendous growth of Internet and, hence, promoting the development of the Information Society, the deployment of new services and furthering technological innovation in Spain.
- The Plan is driven by the Ministry of Industry, Energy and Tourism (MINETUR), and in the aspects regarding the integration of IPv6 in Public Administration, by the Ministry of Finance and Public Administrations (MINHAP)
- 10 measures: prototypes, information portals, training, projects funding, working groups, studies for transition in administrative network (Red SARA), etc.
- But the Plan had not real goals and timelines for IPv6 adoption in public administrations



BOLETÍN OFICIAL DEL ESTADO
Núm. 147 Martes 21 de junio de 2011 Sec. I. Pág. 65329

I. DISPOSICIONES GENERALES

MINISTERIO DE LA PRESIDENCIA

16786 *Orden PRE/1716/2011, de 9 de junio, por la que se publica el Acuerdo de Consejo de Ministros de 29 de abril de 2011, por el que se aprueba el Plan de fomento para la incorporación del protocolo IPv6 en España.*

El Consejo de Ministros, en su reunión de 29 de abril de 2011 y a propuesta del Vicepresidente Tercero y Ministro de Política Territorial y Administración Pública y del Ministro de Industria, Turismo y Comercio ha adoptado un Acuerdo por el que se aprueba el Plan de fomento para la incorporación del protocolo IPv6 en España.

Para general conocimiento se dispone su publicación como anexo a la presente orden.

Madrid, 9 de junio de 2011.–El Ministro de la Presidencia, Ramón Jáuregui Atondo.

ANEXO

Acuerdo de Consejo de Ministros por el que se aprueba el Plan de fomento para la incorporación del protocolo IPv6 en España

Las tecnologías de la información y de las comunicaciones, en especial Internet, se extienden cada vez con mayor amplitud en nuestra sociedad, produciendo la transformación de los procesos económicos y actividades sociales y configurando lo que se ha denominado sociedad de la información o del conocimiento. Son, asimismo, piedra angular de la modernización de nuestras Administraciones Públicas y del modelo de relación entre estas y los ciudadanos.

Las direcciones IP constituyen el sistema de identificación que permite que diferentes dispositivos conectados a Internet puedan comunicarse entre sí. Las direcciones IP desempeñan en Internet un papel análogo al número telefónico en el servicio de telefonía tradicional, permitiendo el intercambio de información entre dos o más puntos de la red.

Desde 1981 se emplea el denominado protocolo IP versión 4 (IPv4), que ofrece alrededor de 4.295 millones de direcciones únicas de Internet a nivel global. Inicialmente, este número de direcciones se consideró que sería suficiente para cubrir todas las necesidades previstas para los desarrollos en Internet.

No obstante, aquellas previsiones iniciales resultaron claramente insuficientes debido al gran éxito de Internet. En consecuencia, en el año 1998 se desarrolló la siguiente versión del protocolo de Internet, la versión 6 o IPv6, que extiende la longitud de la dirección IP de 32 a 128 bits, de forma que, el nuevo protocolo IPv6 habilita un espacio de direccionamiento IP de 2 elevado a 128, es decir, 340.282.366.920.938.463.463.374.607. 431.768.211.456 direcciones.

La introducción en Internet del nuevo protocolo IPv6 y, consecuentemente, la disponibilidad de un número mucho mayor de direcciones de IP con un nuevo formato, constituye una evolución tecnológica relevante de carácter global, que afecta a todos los países.

El nuevo espacio de direccionamiento IPv6 resulta suficiente para la importante demanda de direccionamiento de servicios como la Internet móvil o la «Internet de los objetos», en la que multitud y gran variedad de dispositivos estarán identificados, gestionados y se comunicarán gracias al protocolo IPv6.

Asimismo, el protocolo IPv6 introduce nuevas funcionalidades y mejoras en las redes y servicios que configuran Internet en áreas como la seguridad, la estabilidad, la flexibilidad en la introducción de extensiones, la calidad de los servicios, la simplicidad de procesamiento en la red, la movilidad o la administración de las redes.

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Spanish National Plan to foster the deployment of IPv6

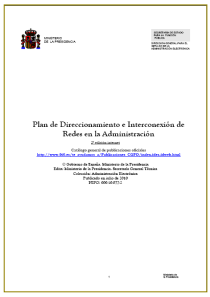
Measures for Public Administrations

- **Procurement**: MINHAP will foster the incorporation of IPv6 as a requirement in the public procurement of ICT products and services
  - **Procurement guide**
    - Recommended general clause: "Every system must be able to work fully according to the commercial standards for IPv6, keeping or improving the service, quality and confidence levels, with technical support for both protocols."
    - Specific recommendations depending on the different components: HW, SW, human resources, communications and connectivity
- **IPv6 promotion**: MINHAP will foster the incorporation of IPv6 in public administrations by means of the e-government cooperation bodies
  - Update of the Addressing and Networking Interconnection Plan of the Administration
  - Measures for incorporating IPv6 in Red SARA
  - Training for the people responsible for the Internet services of the administration

Administrative Addressing Plan

Art. 14, National Interoperability Framework (Royal Decree 4/2010)

"Public Administrations will apply the Addressing and Networking Interconnection Plan of the Administration, approved by the Higher Council of eGovernment, for its interconnection through the Communication Networks of Public Administrations."


Plan de Direccionamiento e Interconexión de Redes en la Administración

Content

- **Table with the ranges** assigned to public bodies
  - Currently, IPv4 private addresses
- **Rules for the address assignment** in IP networks
  - Initial distribution of addresses by the Higher Council of eGovernment in a centralised way
  - Recommendations for the development of an own addressing plan inside the public body

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New Administrative Addressing Plan - Principles

- **Use of unique global addressing**
  - No range overlapping
  - Public, directly accessible (if desired) from Internet
  - Registration in the RIR (RIPE NCC) required
- **Common IPv6 addressing space** for all the Spanish Public Administrations
- **Red SARA / MINHAP** becomes **LIR** (Local Internet Register)
  - Registration process completed: **es.seap**
- **Addressing space large enough** for the current and future needs
  - Reference: / 26 assigned to Germany (/ 29 is what a standard LIR gets)
- **Distribution of addresses blocks** to the entities connected to Red SARA
  - In a centralised way by the Higher Council of eGovernment
  - Variable depending on the needs

New Administrative Addressing Plan - Status

- Initial calculation of addressing needs based on data from
  - National government : survey about the number of buildings in each ministry and agency
  - Regional and local governments: estimation of the number of buildings obtained from
    - Number of municipalities in every population range
    - Assumptions about the services required by municipalities of each population range
    - Assumptions about the organization of the regional governments
- Prefix greater than /29 -> According to RIPE it requires justification
- Several conversations with RIPE-NCC
  - Initial calculation as a first justification
  - Assessment of the initial calculation and later recommendations
- A deeper analysis requested by RIPE-NCC
  - Considering the 3 levels of the administration: national, regional, local
  - Based on the current architecture of the existing networks and the forecasted evolution
  - Detailed for a reduced number of ministries and regions, of different sizes, whose results can be extrapolated to the rest
- Agreement with RIPE on the method of analysis to be used in the justification
  - Based on the examples provided for a region (Castilla y León) and a ministry (Ministerio de Justicia)
- Currently working in preparing the remaining information, with collaboration from ministries and regions

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The Spanish GEN6 pilot

- Outside focus
  - To provide a **platform for general IPv6 accessibility** for eGovernment services
- Inside focus
  - To **test the interoperability** between IPv6-ready and IPv4-only Administrative units
- Leveraging the investment in the Red SARA network - core network for the interconnection of the Spanish Public Administrations
- Using a **shared service model**, building a bridge between IPv4 eGovernment services with native IPv6 Internet
- Participants
  - MINHAP
  - MINETUR
  - UMU

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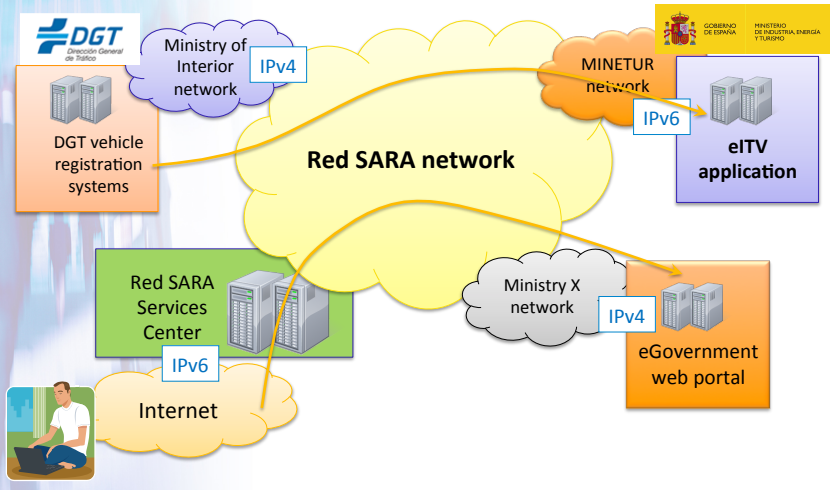

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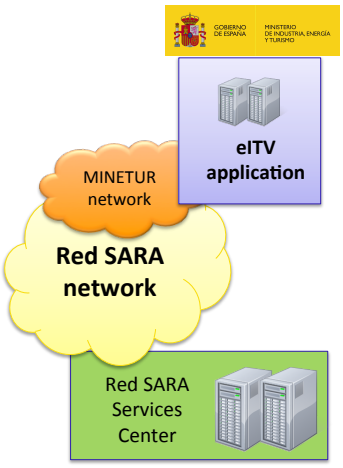
The Spanish GEN6 pilot

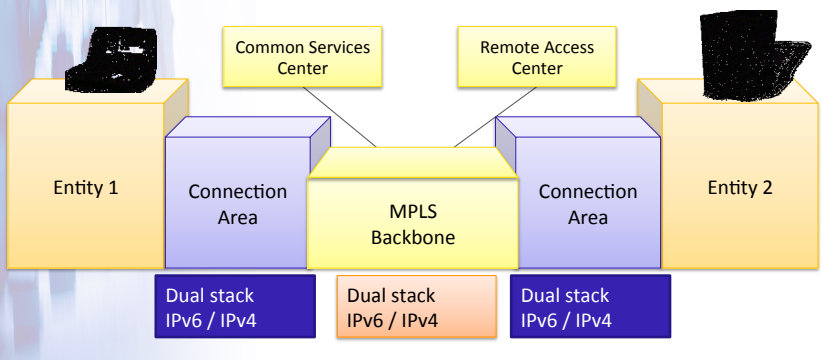
- Three complementary action lines
  1. The **upgrade of Red SARA** so that it can transport IPv6 natively, allowing therefore IPv6 communications between administrative units
  2. The implementation of a transition mechanism that allows Public Administrations to **offer online services accessible by means of IPv6**, based on a shared service approach
  3. The evolution of MINETUR network so that it can **provide native IPv6 services (eITV application) to be consumed by other administrative units** (DGT, Directorate General for Traffic)



GOVERNMENTS ENABLED WITH IPv6

Upgrade of Red SARA

- Native IPv6 transportation implemented in most of the backbone of Red SARA (pending some links to small sites)
- Most connection areas already updated to dual stack (Ministries)
- Difficulties to obtain a permanent IPv6 address space because of the delay in the Administrative Addressing Plan
  - Use of a temporary IPv6 address space given by the ISP



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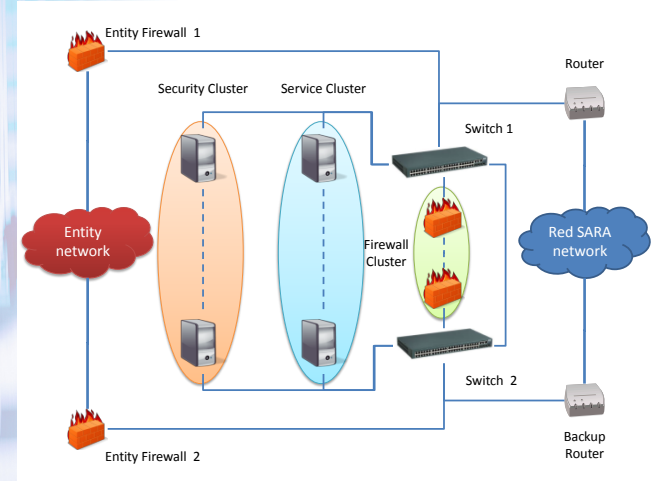

Cluster: DNS, mail, antivirus, Web, proxy, NTP, intrusion detection, monitoring

GOVERNMENTS ENABLED WITH IPv6

IPv6 enablement of Public Administrations Web Portals

- **IPv6-IPv4 gateway as a shared service**
  - Bridge between the current IPv4 e-government applications and the IPv6 Internet
  - Takes advantage of the IPv6 connection facilities of Red SARA
  - Efficient approach to allow a quick IPv6 access by the citizens to e-government services
  - Minimum impact on the service provider (DNS changes only)
  - IPv6 to the outside, IPv4 to the inside
- Architecture
  - ALG as transition mechanism
  - Reverse-proxy + NAT64 (Squid with dual stack)
  - IPv6 DNS servers of Red SARA
- Current use
  - Several Web Portals from the MINHAP have been made IPv6 enabled using this solution
  - Difficulties in the past in involving other Ministries, but interest regained
  - Some portals from the Ministry of Justice made IPv6 available in May 2014
  - Portals from Ministry of Defense in testing stage
  - Conversations with the Ministry of Health, Social Policy and Equality
  - Interest also shown by some regions

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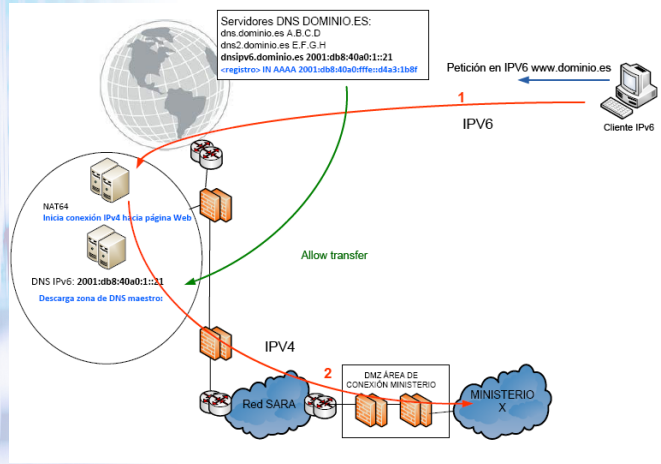
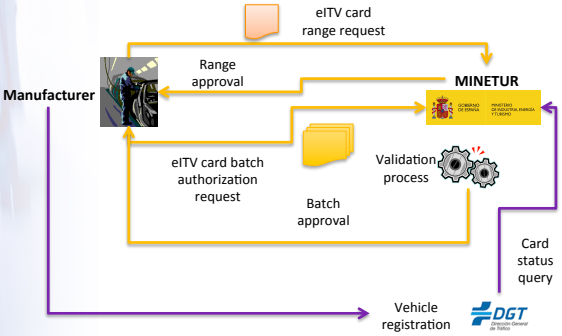
IPv6 enablement of Public Administrations Web Portals



Adaptation of MINETUR services and networks to IPv6

- eITV application allows managing the process of registering a vehicle by electronic means
- Three types of users: external users (automotive industry), internal users (from the Ministry) and other users of another Ministry (DGT users).
  - External users access the eITV application through the Internet
  - DGT users access through SARA network
  - Internal users make use of a wireless network that provides IPv6 addressing to access the eITV application with IPv6 through the Internet.
- IPv6 production and preproduction environments have been deployed and tested



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GEN6 results and learned lessons

- GEN6 has helped Spain to go far beyond the Plan to foster the deployment of IPv6
  - From studies to reality: Upgrade of Red SARA
  - From prototypes to widely used services: Extension of the IPv6 available e-government portals
  - Providing valuable input for the development of an IPv6 National Addressing Plan for Administrations
- Main lessons learned
  - Technical issues are not a problem
    - We expected more incompatibility with IPv6 in HW and SW than we found, no costly investments were required
  - The main barriers are organizational
    - Lack of receptiveness in other administrative units to the need of transition
    - Make things easy for them (simple solutions: IPv6 gateway)
  - Addressing may be a headache
    - We did not expect such a cumbersome process in defining the IPv6 National Addressing Plan
      - RIPE demands justification if size is larger than /29
      - Agreement required among national, regional and local administrations
        - » But this may be subject to the particularities of Spanish territorial organization