Concept of Internet Development in Armenia

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ABSTRACT

This paper presents a concept of Internet development in Armenia. It is based on the Internet Governance Forum recommendations. Armenia needs a drastic increase of Internet penetration. It can be met by the establishment of Internet community centers, expanding the number of schools connected to Internet, decreasing the cost of Internet access.

There is an urgent necessity in a nation-wide fiber optic network that will connect governmental and municipal organizations, schools and colleges.

Armenian Internet should become a reality. When country is disconnected from the global Internet people should still be able to communicate with each other to keep the communications within the country alive. It is a matter of strategic importance and country survivability. Yerevan Exchange should necessarily be established and all major service providers connected to it.

Armenian language content on the Internet should get government's attention and a special programme should be developed to enrich it.

One of the parameters characterizing county's advance is the broadband access penetration, which is very low in Armenia. Advanced countries are accepting programmes to provide 2 to 50 Mb broadband access to all households. It will make Internet TV available in households.

Special attention should be paid to IPv6 penetration and coming era of the "Internet of things"

Keywords
Internet, development, concept, information society, Internet penetration, digital divide, e-content, community center, broadband access, Internet exchange, national network.

0. Internet Governance Forum
Armenian Internet being a part of the global Internet is developing on the same principles. These principles are formulated by the Internet Governance Forum (IGF) [1], which was created several years ago on a WSIS meeting. IGF is a body where governments, business and society can discuss problems resulting in the development of Internet governance principles and plans.

WSIS and IGF assisted the cooperation between different stakeholders. There is an opinion that IGF will continue its operation after 2010 probably transforming into the World Internet Forum like World Economic Forum.

IGF is a meeting point for different stakeholders representing society, governments, education and business where they can discuss problems, proposals, visions and come to solutions that help to meet challenges of the life.
There is no IGF-like body in Armenia while it can be very useful.

The last IGF in Hayderabad drafted the following directions of the Internet development:
1. Internet for everyone
   - *Next billion*
   - *Accessibility*
   - *Affordability*
2. Internet security
3. Governance of critical Internet resources
4. Future of the Internet

The fourth IGF meeting [1], which is to take place on 15-18 November 2009 in Sharm El Sheikh, Egypt, suggested the "Internet Governance – Creating Opportunities for all" as the overall title of the meeting. The proposed agenda is as follows:
- Managing Critical Internet Resources:
  - Transition from IPv4 to IPv6;
- Security, Openness and Privacy:
  The discussion should cover practical aspects of the coordination needed to secure the network (e.g. to fight spam) and their relationship to issues pertaining to openness (e.g. ensuring the open architecture of the Internet).
    Issues to be discussed will include:
  - The respect for privacy as a business advantage;
  - Identity theft, identity fraud, and information leakage.
  - Web 2.0;
  - Social networks;
  - Cloud computing and privacy, e.g. control of one's own data and data retention;
  - Cultural and technical perspectives on the regulation of illegal Web contents;
  - Regulatory models for privacy;
  - Ensuring the open architecture of the Internet;
  - Net Neutrality;
  - Enabling frameworks for freedom;
  - Ethical dimensions of the Internet.
- Access and Diversity:
  Issues will include:
  - National and international regulatory issues;
  - National and regional backbones;
  - Infrastructure;
  - Interconnection costs;
  - Enabling Internet Exchange Points (IXPs ;)
  - Modes of access and regulatory challenges;
  - Safety and redundancy of access, e.g. cable cuts;
  - Issues in mobile access;
  - Multilingualism and IDNs;
  - Access for people with disabilities.
- Internet Governance in the light of the WSIS Principles.
- Taking Stock and Looking Forward – on the desirability of the continuation of the Forum.
- Emerging Issues: Impact of Social Networks

The impact of social networks will be discussed. This was also seen as a way to attract young people and bring them into the discussion, including through remote participation.

The agenda of Hayderabad and Sharm El Sheikh must be the subject of consideration for all local forces as it drafts general directions of Internet development.

1. Internet for everyone
1.1 Internet penetration
"Internet for everyone" slogan sets a goal to double the world internet penetration bringing it from 1 to 2 billion. Formally for Armenia it means to bring the Internet penetration from 6% (ITU data) to 12%. However it is not enough as Armenia is behind many

countries including its neighbors. When developing the concept it is necessary to consider the concept of other organizations working in the field, primarily the Concept of IT development of Armenia, CAPS concept, e-content association concept and others.

For example according to the IT development concept of the Ministry of Economics the following figures of Internet/PC penetration shoud be reached.

Basic data/year	2006	2013	2018
Household PC penetration	20%	50%	70%
PC penetration in educational organizations	10%	80-90%	100%
PC penetration in public sector	10%	80%	100%
Population Internet penetration	15%	70%	90%

As we see there is a disagreement between ITU and Mineconomy figures. It should be noted that Internet statistics of Armenia based on ITU data that is not up-to-date and often not correct. There is an urgent necessity to organize annual statistical surveys to have correct data that will be very useful for business too. National Statistical Service of the Republic of Armenia (**www.armstat.am**) should start providing information on Internet and PC penetration statistics.

Internet Penetration Rate in Armenia is far behind the European as the number of regular internet users in European Union (EU) reached 56% in 2008.

"Internet for everyone" slogan supposes Internet affordability for wide layers of population and bridging the digital divide between Yerevan and marzes. Expert estimation shows that the Internet traffic is divided between Yerevan and marzes in the proportion 80%/20%. It is obvious that such a divide should be diminished.

Accessibility is not a problem in Armenia now. Cornet (Comstar) and ICON companies are actively promoting WiMAX technology. Bee-line, Fibernet are promoting fiber connection to the regions of Armenia.

The continuation of this slogan is **"Internet for Seniors"**. A good example of careful approach to the aged people is the initiative of the Australian government (http://www.necseniors.net.au/) to provide free access to computers, broadband services and training to seniors. "If you are aged 50 years and over and are interested in learning new technology to stay in touch with friends and family, you are eligible to use the kiosk services free of charge. The kiosks will allow you to send and receive emails, swap files and photos and meet with other seniors who are venturing on to the internet for the first time. Kiosks may be located in community centers, retirement villages and clubs interested in participating in the *Broadband for Seniors* initiative. The supply of the computers and internet connectivity is free and after 3 years the computers become the property of the hosting community organization."

1.2 National broadband backbone network

Creation of the national wide high speed fiber optic network always remains one of the most demanded projects. The government has that project in its plans (Mineconomy IT development concept) [2].

ACTION	OUTCOMES
1. Rollout robust, scalable national ICT broadband backbone network, data centers, networks, systems & applications platforms	+ Develop world class ICT infrastructure + Promote & attract VC & FDI investors + Support IT sector & information society development + Drive e-Commerce, e-

	Government, e-learning and other electronic services

Another plan was proposed in Final Report to USAID/CAPS [3] under the name **?"Triple Play" Broadband Network:** Develop a single national "Triple Play" Broadband Network that will support both G2G Secure Government Network, as well as G2Business and G2Citizens. This will include the digital radio, voice and television services that will eventually take over from the analogue services during 2013/2014.

ICT Start-Up Telco Player – GNC Alfa – will be constructing a national 10Gits/Sec Broadband Fibre Backbone Network that will span Armenia from north to south, and eventually provide the foundations for high-speed wired & wireless regional & city networks too. Such initiatives will provide Armenia with the opportunity to significantly expand its eServices & eCommerce and eTrading applications worldwide, and establish the country as a regional hub for electronic trade, finance and business.

1.3 Broadband Internet access

Today it is not enough to have simply Internet access. Broadband Internet access is a must for all developed countries. In US broadband means 256/768Kb, in Britain 1/4Mb, in Japan and South Korea it is much higher reaching 70-90Mb on downloads. In Armenia the broadband is considered 64/256Kb (12,000AMD), 128/512Kb (20,000AMD) and 256/1024Kb (30,000AMD). The number of broadband subscribers is about 25,000 (experts' estimation), which is 0.78% of population. It includes DSL, WiMAX and fiber subscribers. It is, of course, incomparable with EU where half of all European households and more than 80% of European businesses have a fixed broadband connection, three quarters of them with average download speeds above 2 Mbps. Broadband Internet is available to 93% of the EU25 population.

1.4 Internet community centers

Due to the recent technology development it can be stated that there is no accessibility problem in Armenia but the affordability. Because of the low living standards of the population it can not afford even minimal Internet access prices. To make it possible it is necessary to establish regional Internet community centers in regions of Armenia where population can access Internet free of charge.

There are plans to establish community centers in regions of Armenia in the Mineconomy IT development concept [2]:

ACTION	OUTCOMES
2. Equip & operate (at least 100) Tele-Centers and internet centers per year in selected Armenia locations- minimum 500 centers in 5 years	+ Provide low-cost rural Internet access + Stimulate e-literacy, e-learning, and other e-services development

ISOC Armenia is also working to implement these plans. Recently ISOC AM being a Chapter of global ISOC helped a Vanadzor NGO to get a $10,000 grant to set up an up-to-date Internet community center. Together with financial help of ISOC AM, EIF and Microsoft Armenia it will reach $25,000. That is the real cost of establishment of one community center.

The goal pronounced by the government is very optimistic. The government should invest 500x25,000=$12,500,000 for implementing the plan.

What is more important there are preconditions for setting a community center, i.e. qualified personnel, trainers, organized community, etc. Otherwise the centers will not be sustainable.

Today Internet connection devices are not limited by computers. A lot of new devices like Smartphones, I-phones, I-pods, pocket

computers create huge new opportunities for Internet access. So when estimating the Internet penetration it should be taken into consideration.

Access to information helps the democratization, transparency of government decisions and introduction of the e-government. Without being informed the population can not realize its rights properly.

It is important to keep population informed about new Internet developments like social networks. Nowadays most of the mail traffic is moving to social networks. As population can not pay for training the government should care about organizing free of charge trainings.

1.5 Multilinguarism

"Internet for everyone" slogan also supposes multilinguarism. It concerns native language web content. Armenian language web content is developing very slowly. Probably there is no demand in the market. But the government should necessarily be concerned about that as it is a matter of a national priority. There is a necessity for Armenian language web content development project. A similar concept is developed by ELBA association. It is an NGO uniting Armenian web content developers and is aiming to expand Armenian web content.

Armenian government can play its positive role in the process by providing grants for web content development to ELBA association.

Armenian language content in the Internet can not be imagined without translators and spell checkers. It is a shame that there is no professional Armenian spell checker in the market. As for translators a good work has been done by the group of Edward Manukyan. The on-line version of the translator is on the www.translator.am web site. However he needs more financing to finish the job.

There is also a problem with localization of many free software applications. Although many software packages were localized by grants however each new edition of the software requiring some changes in the software are not done because of absence of financing. One of the examples is Open Office. No one seems to care about that. In other countries it is done by the community free of charge. There is a need to call community for such a support.

As for International Domain Names (IDN) in Armenian alphabet the Armenian Internet community considered that there is no such a need. However the government can have its own opinion on the problem.

1.6 Internet Exchange Point

An Internet Exchange Point (IXP) is a component of Internet infrastructure that can increase the affordability and quality of the Internet for local communities. IXPs enable local networks to efficiently exchange information at a common point within a country rather than needing to exchange local Internet traffic overseas. In many developing countries, for example, Internet messages need to be exchanged beyond their borders, adding significant costs, because of a lack of connectivity between domestic networks.

Simply put, IXPs enable a message on the Internet to reach a recipient in the same country more easily and efficiently. Furthermore, IXPs can be established with relatively minimal equipment and overhead costs [4].

The following text from this document is brought to show clearly the benefits of IXP.

"The benefits from establishing an IXP are numerous. IXPs can significantly lower the Internet access costs for end users by decreasing the operating costs of Internet Service Providers (ISPs). This can help make the Internet more affordable for a greater portion of the society. IXPs can lower the operating costs of ISPs and ensure that local traffic (such as that from a local sender to a local recipient) uses only the relatively very cheap local connections rather than expensive international links. The cost saving can be

significant – easily amounting to 20% or more – since local traffic often makes up a significant portion of overall Internet traffic. The presence of an IXP can also attract telecommunication operators that may wish to establish a point of presence at an in-country IXP in order to sell services to potential customers located at the exchange, as all parties are reachable at a lower collective cost than they might be individually. In this respect, IXPs can help to encourage the development of infrastructure (such as national and international fibre cables).

IXPs can also improve the quality of access to the Internet for local users. Experience shows that access speeds for local content may improve as much as ten-fold with an IXP in place. Access speed for international content may also improve, although less considerably, since with IXPs, local traffic no longer needs to transit the international connection, reducing congestion and freeing up bandwidth on the international link. The level of stability and continuity of access can also improve since, if there is a breakdown in international connectivity, IXPs make it possible for local traffic to continue flowing within country. (For more detailed information on IXP set-up issues, please see the Internet Society Report *Promoting the Use of Internet Exchange Points: A Guide to Policy, Management and Technical Issues*. Moreover, thanks to the possibility of placing mirror root servers at IXPs, even the major international sites can remain accessible to the local users when the international link is unavailable, contributing to business and service continuity and an improved Internet experience.

Finally, IXPs encourage the development of local content and applications. Once an IXP is established, it becomes a natural location to host a variety of other services that reduce bandwidth requirements and improve the speed and reliability of Internet access for local users. The improvement of the access speed for local content often gives incentives for local developers to produce local content and applications. Moreover, it often encourages international content providers to establish themselves in the country. For example, after Kenya and Argentina acquired their national IXPs, Google started hosting its services in those countries. This not only created employment opportunities in those countries, but also improved access speed to Google's services. The development of local content and applications will also make the Internet more relevant to the local population, which makes it more socially and economically beneficial to the country.

The Internet Society has been contributing its share in promoting the development of IXPs by organizing workshops on best practices for IXP development at the regional level but also at major international forums such as the Internet Governance Forum (IGF). It has also prepared educational materials on IXPs to raise the awareness of the Internet community and governments. The Internet Society is also currently undertaking an IXP initiative to help establish IXPs in developing regions and provide training on IXP operations and management issues.

The establishment of an IXP requires the collaboration of many actors, not least of which are the Internet Service Providers (ISPs) and other data providers that will be exchanging traffic at the IXP. While some ISPs may express initial reluctance to collaborate with potential competitors, the Internet Society believes that experience to date in establishing IXPs clearly demonstrates that with proper institutional policies established for the IXPs, there is significant upside to working cooperatively to minimize traffic routing costs. These policies can ensure that there is a fair distribution of the benefits amongst the participating ISPs and can alleviate competitive concerns (*For example, payment for the cost and management of the link between the network and the IXP (including a redundant link if required) is usually the responsibility of the member of the IXP. However, some IXPs have adopted policies to smooth these costs so that each member pays the same amount to access the IXP. This helps to ensure that commercial operators who happen to be located in the same building as the IXP do not have an unfair advantage).*

Financially, the cost of the equipment required to establish an IXP is generally minimal, which often makes the establishment of an

IXP an affordable local project. Furthermore, the monthly operating costs can often be covered by the ISPs that benefit from using the IXP through a sustainable funding model.

External assistance in the form of set-up advice and training may be desirable in many instances, especially at the initial phase, and the Internet Society stands ready to assist stakeholders in developing countries that wish to set up an IXP.

Clearly, there is no-one-size-fits-all model approach to implementing an IXP – different organizational models have been used by different IXP operators with varying degrees of success. In many developing countries, collaborative, not-for-profit partnership models have proven to be particularly beneficial and effective. This approach seeks to foster cooperation amongst all stakeholders in the initial establishment process, the development of IXP policies, and in ongoing operations, and often includes the participation of local ISPs, data providers, and government.

The Internet Society believes that governments and ICT policy and regulatory agencies play an important role in facilitating and encouraging the establishment and seamless operation of IXPs. In particular, governments can 1) signal support for the development of IXPs within their country as a general ICT policy objective, 2) encourage competitive access to leased lines and wireless connections that will help lower costs associated with connecting to an IXP, 3) abstain from imposing onerous licensing requirements on IXPs and mandating peering and other operational IXP policies, 4) discourage and restrain attempts by large carriers to block the development of IXPs, and 5) provide general assistance and support to organizations seeking to establish collaborative IXPs in their country.

In conclusion, the Internet Society believes that the deployment of IXPs can have a considerable positive impact on the economic development, business and societal wellbeing of a nation while contributing to the overall global development of the Internet. It also enables a more efficient use of national infrastructure resources and encourages communications growth. We believe that it is of paramount importance that governments and other stakeholders of countries that do not have IXPs work together for their establishment. "

Because of the absence of the YIX a lot of internal Armenian Internet traffic exchange goes through the world creating unnecessary traffic and expenses. It is very clearly seen when Armenia external communications are down for some reason. If you want to browse an Armenian web site obviously situated on an Armenian server you get a response that it can be reached.

To overcome this drawback it is necessary to create a YIX. It will permit to create an Armenian Internet that will function even if there is no connection to the world. It will also increase the speed of data exchange between local organizations.

It is possible to create a government network exchange point within the YIX project later connecting schools and hospitals.

At the same time despite numerous benefits of YIX it will be very difficult to implement it in Armenia. Right now because of the absence of YIX major Armenian ISPSs are connected each to each directly creating a mesh of unnecessary connections. Each new emerging ISP is meeting with a headache how to connect to all major ISPs. ISPs had already invested money in these connections and are unwilling to make any change and would be very reluctant even if forced to do that. For smaller ISPs it is an unsolvable problem forcing them to rent Internet channels from major ISPs and not directly from channel providers. There should be a government decision obliging ISPs to connect to a new YIX and financial help to cover the expenses. The obligation can be written in the ISP license by government or regulation commission.

YIX can be created as a non-profit organization working in cooperation with Internet Society of Armenia. A good YIX project can be funded by an international grant.

1.7 Training centers and portals

- There is a necessity to set up more training centers and educational portals and distant/e-learning centers.
- Expand application of ICT in medicine (telemedicine)

1.8 eGovernment

eGovernment public services should be expanded and provided to population. The goal is to reach Europe in eGovernment penetration. Europe has made fast progress in the supply and use of the 20 benchmarked online public services. The supply of fully available services to citizens has increased to 50% in 2007 and for businesses to 70%. One third of European citizens and almost 70% of businesses in the EU use eGovernment services.

Action plan:
1. *Create Armenian IGF involving all interested stakeholders in the discussion of the future of Armenian Internet*
2. *Strengthen the links between government and NGOs working in the field of information technologies*
3. *Create national fiber backbone network*
4. *Set the goal to double Internet penetration in Armenia during the last two years*
5. *Increase broadband penetration*
6. *Continue the establishment of the Internet community centers in regions of Armenia*
7. *Organize free of charge lectures for population on the following topics:*
   - *computer and Internet literacy*
     - e-government services and how to use them,
     - aims and opportunities of social networks (Facebook, LinkedIn, LiveJoural, odnoklassniki, Twitter, etc)
8. *Organize free of charge lectures for seniors (over age 50) on using the Internet*
9. *Organize surveys supported by the government and IT NGOs in order to get real figures of Internet and PC penetration, broadband subscribers and other having in view to correct the statistics of Armenia*
10. *National Statistical Service of the Republic of Armenia (www.armstat.am) should start providing information on Internet and PC penetration statistics.*
11. *Together with ELBA association develop a plan for enrichment of the Armenian language web content*
12. *Call Armenian Internet Governance Forum and discuss the necessity of Armenian IDN*
13. *Find an organization responsible for localization of free soft applications*
14. *Develop a professional Armenian spellchecker adopted as a standard by the government*
15. *Develop a translator adopted as a standard by the government*
16. *Establish Yerevan Internet Exchange. Apply to international donor organizationsfor financing the project.*
17. *Expand using Internet in education and medicine.*

2. Internet security

Today we are witnessing a lot of attacks and security breaches by cyber criminals. It is phishing, denial of services, Trojans, viruses, worms, security holes exploits etc. to this child pornography, credit card data stealing, different type of injections using software holes, intellectual property rights breaches etc.

We also witnessed attacks on the national ICT infrastructure. Recently there were attacks on the DNS system, which is the most important part of the Internet. In a reaction to these attacks a DNSSEC system was designed. Its implementation is a matter of urgency.

Antivirus activity in Armenia should start with installation of licensed antivirus programs in organizations. The losses from viruses are much more than the cost of antivirus and IT budget planning should necessarily include antivirus software.

Trojans are also dangerous as criminals can steal confidential data with their help. Antispyware program should be the instrument on the network to prevent spyware intrusion.

The security problem started to be discussed in Armenia but it was not enough and the activity should be expanded.

The new methods of checking the country preparedness to cyber attacks like US's Cyber Storm must be introduced. That exercise simulated a coordinated cyber attack on information technology, communications, chemical, and transportation systems and assets. It simulated a crash of the US and international telephone system which in turn caused problems for top level domains such as .com, .net and .gov. Crisis managers had to identify, evaluate and respond to more than 1,800 malware incidents. These included botnet, phishing, and denial of service attacks. Some were "white noise". These were relatively harmless events designed to mask or confuse more serious attacks on the systems

Cyber Storm participants do the following:

- Examine organizations' capability to prepare for, protect from, and respond to cyber attacks' potential effects;
- Exercise strategic decision making and interagency coordination of incident response(s) in accordance with national level policy and procedures;
- Validate information sharing relationships and communications paths for collecting and disseminating cyber incident situational awareness, response and recovery information; and
- Examine means and processes through which to share sensitive information across boundaries and sectors without compromising proprietary or national security interests.

Cybersecurity plan was also suggested in the CAPS report:
Cybersecurity: Implement a Cybersecurity Commission to Audit, and Upgrade information security, computer & software systems through the 18 Ministries & other State Bodies. eServices will only be trusted for trade, business and investment if the supporting network is fully secure, with embedded security software at every point of the eGovernment infrastructure, coupled with security policies and relevant training. [3] The concrete proposal was made within the context of the ITU (International Telecommunications Union – Geneva) documented "Best Practice" for cybersecurity in developing countries according to the well respected ITU Security Standards X805. There are several related and complimentary security frameworks that include the well known ISO2700X series that links well with the ITU X805 standards. Together they provide a comprehensive operational security framework for the management of all eServices, including those deployed within the context of interactive Web2.0 applications on mobile devices. Dr. Probert also mentioned "the extremely useful security framework that is updated every 2 years by the Information Security Forum – www.securityforum.org. Their complete 372 page downloadable Standard for Security Good Practice (November 2007) spans every aspect of Security Management including: Critical Business Applications, Networks, and Systems Development, Computer Installation, and the End-User Environment. The IT Service Management (ITSM/ITIL) Model for Best Practice, with supported Certification is also relevant to the Armenian ICT Environment in order to boost the professional service support and management for Government ICT Operations."

Action plan:
1. *Obligate government and educational organizations to use licensed antivirus software with automated updates from network servers. Insist on using the software update service.*
2. *Obligate systems administrators to report each attack on their network to the national security center (CERT AM)*
3. *Install DNSSEC software on the AMNIC*

4. *Expand system administrators' participation in CERT.AM operations*
5. *Introduce Cyber Storm type national exercises to check the country preparedness for cyber attacks*

3. Governance of critical Internet resources

Critical Internet Resources (IPv6)

- IPv4 addresses will expire in 2012
- Counter on the IPv6forum counts the number of IPv4 addresses left

IP Addresses throughout the World Today
- **When to Deploy IPv6?**
  RFC 5211: Internet Transition Plan for ISPs
- **2009** Preparation Phase:
  ISPs deploy a parallel IPv4+IPv6 service.
  ISPs and end users enable IPv6 access to their various servers.
- **2010** Transition Phase
  As users turn up IPv6, raise price of IPv4-only and IPv4+IPv6; introduce lower-price IPv6-only service.
- **2012 or Later** Post-Transition Phase
  Turn down IPv4 when economics warrant.
- **Enterprise implication:**
  Presume your ISP is doing this and act accordingly.
- **Service provider planning for the IPv6 Internet**

RIRE IPv4 "end-of-life" policy proposals
- RIPE - Final /8 ("Global policy for the allocation of the remaining IPv4 address space")
- New and existing LIRs will only be given the minimum allocation even if their requests justifies more

Organizations need to put the integration of IPv6 at the top of their technology agenda today, and ensure that they are prepared when the last IPv4 addresses are handed out in 2011.
When organizations make a firm decision to deploy IPv6, the process is fairly straightforward:
- Staff need to be trained,
- management tools need to be enhanced,
- routers and operating systems must be updated and
- IPv6-enabled versions of applications must be deployed.

All of these steps take time. Many have already deployed IPv6 in their networks; for those who haven't, the time to deploy is now.

RIPE recommends that service providers make their services available over IPv6. RIPE urges those who will need significant new address resources to deploy IPv6. RIPE encourages governments to play their part in the deployment of IPv6 and in particular to ensure that all citizens will be able to participate in the future information society. RIPE urges that the widespread deployment of IPv6 be made a high priority by all stakeholders."

IPv6 offers simpler and more resource efficient infrastructure management and routing, for example removing the need for services like Network Address Translation (NATs), that add costs and complexity to the network.

These resources became more critical in view of coming "Internet of Things", when every subject will have its RFID and IP address.

Action plan:

1. Introduce the Internet Transition Plan for ISPs and follow RIRE

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IPv4 "end-of-life" policy proposals
2. Establish an IP6 transition working group with representatives from major ISPs, Communication providers and NRENs
3. Organize workshops, trainings, meetings between vendors and providers
4. Organize workshops for hosting providers to guarantee their readiness to continue the operations without interruptions

4. Future of the Internet

Future of the Internet is considered as "Internet of Things" and "Intelligent Web".

4.1 Internet of Things

If all objects like cans, books, shoes or parts of cars it the future will be equipped with identifying devices, our daily life will undergo a transformation. Theft will be forgotten as we will know where a product is at all times. The same applies to parcels lost in the post. If all objects of daily life will be equipped with radio tags, they can be identified and managed by computers. The next generation of Internet applications (IPv6 protocol) would be able to identify more objects than IPv4 which is currently in use. This system would therefore be able to identify any kind of object.
The Internet of objects should encode billions of objects and follow the movement of those objects. Every human being is surrounded by 1,000 to 5,000 objects.

To be ready for the Future of the Internet it is necessary to organize a conference on the matter.

4.2 Intelligent Web

Web 2.0 is about social networking and mass collaboration Web 3.0 is based on "intelligent" web applications using:

- Natural language processing
- Machine-based learning and reasoning
- Intelligent applications

The goal is to tailor online searching and requests specifically to users' preferences and needs.

Action plan
1. Organize a conference on "The Future of the Internet"
2. Organize a conference on "Web 3.0"

Reference:

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