

Procedure file

Basic information		
INI - Own-initiative procedure	2009/2224(INI)	Procedure completed
Internet of Things		
Subject		
3.30.06 Information and communication technologies, digital technologies		
3.30.25 International information networks and society, internet		
3.30.25.02 Information programmes and action plans		
3.50.08 New technologies; biotechnology		

Key players			
European Parliament	Committee responsible	Rapporteur	Appointed
	ITRE Industry, Research and Energy		17/12/2009
		S&D BADIA I CUTCHET Maria	
		Shadow rapporteur	
		PPE KOLARSKA-BOBIŃSKA Lena	
		ALDE KOCH-MEHRIN Silvana	
		Verts/ALE LAMBERTS Philippe	
		ECR TOŠENOVSKÝ Evžen	
	Committee for opinion	Rapporteur for opinion	Appointed
	CULT Culture and Education	The committee decided not to give an opinion.	
IMCO Internal Market and Consumer Protection		16/02/2010	
	Verts/ALE ENGSTRÖM Christian		
LIBE Civil Liberties, Justice and Home Affairs	The committee decided not to give an opinion.		
INTA International Trade		27/01/2010	
	EFD (THE EARL OF) DARTMOUTH William		
JURI Legal Affairs		14/12/2009	
	Verts/ALE LICHTENBERGER Eva		
European Commission	Commission DG Communications Networks, Content and Technology	Commissioner KROES Neelie	

Key events			

17/06/2009	Non-legislative basic document published	COM(2009)0278	Summary
17/12/2009	Committee referral announced in Parliament		
04/05/2010	Vote in committee		Summary
10/05/2010	Committee report tabled for plenary	A7-0154/2010	
14/06/2010	Debate in Parliament		
15/06/2010	Results of vote in Parliament		
15/06/2010	Decision by Parliament	T7-0207/2010	Summary
15/06/2010	End of procedure in Parliament		

Technical information

Procedure reference	2009/2224(INI)
Procedure type	INI - Own-initiative procedure
Procedure subtype	Initiative
Legal basis	Rules of Procedure EP 54
Other legal basis	Rules of Procedure EP 159
Stage reached in procedure	Procedure completed
Committee dossier	ITRE/7/01759

Documentation gateway

Non-legislative basic document		COM(2009)0278	18/06/2009	EC	Summary
Committee draft report		PE438.414	24/02/2010	EP	
Amendments tabled in committee		PE440.038	15/04/2010	EP	
Committee opinion	IMCO	PE439.302	28/04/2010	EP	
Committee opinion	INTA	PE439.317	30/04/2010	EP	
Committee opinion	JURI	PE439.863	30/04/2010	EP	
Committee report tabled for plenary, single reading		A7-0154/2010	10/05/2010	EP	
Text adopted by Parliament, single reading		T7-0207/2010	15/06/2010	EP	Summary
Commission response to text adopted in plenary		SP(2010)6508	27/10/2010	EC	

Internet of Things

PURPOSE: to present an action plan for Europe on the Internet of Things.

CONTEXT: the growth of the Internet is an ongoing process: only 25 years ago it was connecting about a thousand hosts and has grown ever since to link billions people through computers and mobile devices. One major next step in this development is to evolve from a network of interconnected computers to a network of interconnected objects, from books to cars, from electrical appliances to food, and thus create an Internet of things? (IoT). These objects will sometimes have their own Internet Protocol addresses, be embedded in complex systems and use sensors to obtain information from their environment (e.g. food products that record the temperature along the supply chain) and use actuators to interact with it (e.g. air conditioning valves that react to the presence of people). As this document describes, IoT is not yet a tangible reality, but rather a prospective vision of a number of technologies that, combined together, could in the coming 5 to 15 years drastically modify the way our societies function. The scope of IoT applications is expected to greatly contribute to addressing today's societal

challenges: health monitoring systems will help meet the challenges of an ageing society; connected trees will help fight deforestation; connected cars will help reduce traffic congestion and improve their recyclability, thus reducing their carbon footprint. This interconnection of physical objects is expected to amplify the profound effects that large-scale networked communications are having on our society, gradually resulting in a genuine paradigm shift. The paper shows that the IoT can help to improve citizens' quality of life, delivering new and better jobs for workers, business opportunities and growth for industry, and a boost to Europe's competitiveness. It conforms to the wider policy initiatives related to the Lisbon strategy and to the current thinking on post-2010 initiatives. The idea was first announced in the RFID (radio frequency identification) Communication (COM(2007)0096). It comes in response to the invitation made by the Council to deepen the reflection on the development of decentralised architectures and promoting shared and decentralised network governance for the Internet of things.

CONTENT: the Commission considers that by adopting a proactive approach, Europe could play a leading role in shaping how IoT works and reap the associated benefits in terms of economic growth and individual well-being, thus making the Internet of things an Internet of things for people. It proposes 14 lines of action to exploit the potential of these developments:

1. Governance: the Commission will initiate and promote discussions and decisions on: (i) defining a set of principles underlying the governance of IoT; (ii) setting up an 'architecture' with a sufficient level of decentralised management, so that public authorities throughout the world can exercise their responsibilities as regards transparency, competition and accountability.
2. Continuous monitoring of the privacy and the protection of personal data questions: the Commission recently adopted a Recommendation that provides guidelines on how to operate RFID applications in compliance with privacy and data protection principles. In 2010 it intends to publish a broader Communication on privacy and trust in the ubiquitous information society.
3. The 'silence of the chips': the Commission will launch a debate on the technical and legal aspects of the 'right to silence of the chips', which has been referred to under different names by different authors and expresses the idea that individuals should be able to disconnect from their networked environment at any time.
4. Identification of emerging risks: the Commission will follow the ENISA work mentioned above and will take further action as appropriate, including regulatory and non-regulatory measures, to provide a policy framework that enables IoT to meet the challenges related to trust, acceptance and security.
5. IoT as a vital resource to economy and society: should IoT grow to the importance it is expected to attain, any disruption might have a significant impact on economy and society. The Commission will therefore closely follow the development of IoT infrastructures into a vital resource for Europe, especially in connection with its activities on the protection of critical information infrastructure.
6. Standards Mandate: the Commission will assess the extent to which existing standards mandates can include further issues related to IoT or launch additional mandates if necessary.
7. Research and Development: the Commission will continue to finance FP7 research projects in the area of IoT, putting an emphasis on important technological aspects such as microelectronics, non-silicon based components, energy harvesting technologies, ubiquitous positioning, networks of wirelessly communicating smart systems, semantics, privacy- and security-by-design, software emulating human reasoning and on novel applications.
8. Public-Private Partnership: the Commission is currently preparing the setting-up of four public-private partnerships (PPP) where IoT can play an important role. Three of them, 'green cars', 'energy-efficient buildings' and 'Factories of the Future' were proposed by the Commission as part of the recovery package. The fourth one, 'Future Internet', aims at further integrating the existing ICT research efforts in relation to the future of the Internet.
9. Innovation and pilot projects: complementing the research activities listed above, the Commission will consider promoting the deployment of IoT applications by launching pilot projects through CIP. These pilots should focus on IoT applications that deliver strong benefits to society, such as e-health, eaccessibility, climate change, or helping to bridge the digital divide.
10. Institutional Awareness: the Commission will regularly inform the European Parliament, the Council, the European Economic and Social Committee, the Committee of the Regions, the Article 29 Data Protection Working Party and any other relevant stakeholders about IoT developments.
11. International dialogue: the Commission intends to intensify the existing dialogue on all aspects of IoT with its international partners, aiming to agree on relevant joint actions, share best practices and promote the lines of action laid down in this Communication.
12. RFID in recycling lines: as part of its regular monitoring of the waste management industry, the Commission will launch a study to assess the difficulties of recycling tags and the benefits and nuisances that the presence of tags can have on the recycling of objects.
13. Measuring the uptake: monitoring the introduction of IoT related technologies will provide information on their degree of penetration and allow the assessment of their impact on the economy and the society as well as the effectiveness of the related Community policies.
14. Assessment of evolution: it is important that a multi-stakeholder mechanism is put in place at European level to: (i) monitor the evolution of IoT; (ii) support the Commission in carrying out the various actions listed in this Communication; (iii) assess which additional measures should be undertaken by European Public Authorities. The Commission will use FP7 to conduct this work, by gathering a representative set of European stakeholders and ensuring a regular dialogue and sharing of best practices with other world regions.

By launching a number of actions and reflections, the Commission intends to be a driving force behind this effort and it invites the European Parliament, the Council and all concerned stakeholders to work jointly to achieve these ambitious yet achievable objectives.

Internet of Things

The Committee on Industry, Research and Energy adopted the own-initiative report drafted by Maria BADIA i CUTCHET (S&D, ES) on the Internet of Things (IoT).

Members welcome the communication from the Commission and endorse in principle the broad outlines of the action plan to promote the Internet of Things. They take the view that the expansion of the Internet of Things may bring tremendous benefits for EU citizens if it respects security, data protection and privacy.

Protection of privacy and personal data: the report endorses the Commission's focus on safety, security, the protection of personal data and privacy and governance of the Internet of Things, because respect for privacy and the protection of personal data, together with openness and interoperability, is the only way IoT will gain wider social acceptance. It calls on the Commission to encourage all European and international

stakeholders to tackle cyber security-related threats. Members firmly believe that protection of privacy constitutes a core value and that all users should have control over their personal data. They call therefore for the adaptation of the Data Protection Directive to the current digital environment.

Infrastructure issues: Members call on the Commission to conduct an assessment of the impact of using the current 'internet' network infrastructure for IoT applications and hardware, in terms of network congestion and data security. They take the view that the development of the Internet of Things and related applications will have a major impact on the daily lives of Europeans and their habits in the years ahead, leading to a broad range of economic and social changes. The Commission's communication does not give enough consideration to these issues, which should ideally be dealt with before the Internet of Things is further developed.

Ethical and cultural aspects of the IoT: Members stress the importance of studying the social, ethical and cultural implications of the Internet of Things, in the light of the potentially far-reaching transformation of civilisation that will be brought about by these technologies. They call on the Commission to set up a panel of experts to carry out an in-depth assessment of these aspects and propose an ethical framework for the development of related technologies and applications.

Quiet and unobtrusive technologies: pointing out that RFID (radio frequency identification) technology and other IoT-related technologies for the intelligent labelling of products and consumer goods can be used anywhere and in practice are quiet and unobtrusive, Members call for such technology to be the subject of further, more detailed, assessments by the Commission, covering in particular:

- the impact on health of radio waves and other means of enabling identification technologies;
- the environmental impact of the chips and of their recycling;
- user privacy and trust;
- the increased cyber security risks;
- the use of smart chips in specific products;
- the right to 'chip silence?', which provides empowerment and user control;
- guarantees for the public as regards protection during the collection and processing of personal data;
- developing an additional network structure and infrastructure for IoT applications and hardware;
- ensuring the best possible protection for EU citizens and businesses from all kinds of online cyber attacks;
- the development of open technological standards and interoperability between different systems.

According to Members, the consumer has the right to privacy by opt-in and/or privacy by design, notably through the use of automatic tag disablement at the point of sale. They call on manufacturers to secure the right to 'chip silence' by making RFID tags removable or otherwise easily disabled by the consumer after purchase. They stress that the consumers must be informed about the presence of either passive or active RFID tags. RFID application operators are called upon to take all reasonable steps to ensure that data does not relate to an identified or identifiable natural person.

Strengthen security: Members stress the need for the highest possible level of device security and secure transmission systems to be included in all IoT technologies in order to prevent fraud. Particular attention should be paid to security measures ensuring that only authorised users can access data. The report states that consumers and the assigning authorities should be able to check the readability of data and the functioning of the system. It considers it a priority to ensure a global regulatory framework and specific timescales at European level in order to encourage and facilitate public and private investment in the field of the Internet of Things and in smart networks needed to support the development of new technologies. Members call on the Commission to monitor possible new threats presented by the vulnerability of highly interlinked systems

Considerable volume of data: noting that the Internet of Things will lead to the collection of truly massive amounts of data, Members call on the Commission to submit a proposal for the adaptation of the European Data Protection Directive with a view to addressing the data collected and transmitted by the IoT. A general principle should be adopted whereby IoT technologies should be designed to collect and use only the absolute minimum amount of data needed to perform their function, and should be prevented from collecting any supplementary data.

Building consumer trust: Members consider that the development of new applications and the actual functioning and business potential of the IoT will be intrinsically linked to the trust European consumers have in the system, and point out that trust exists when doubts about potential threats to privacy and health are clarified. They stress that this trust must be based on a clear legal framework, including rules governing the control, collection, processing and use of the data collected and transmitted by the Internet of Things and the types of consent needed from consumers.

Cost reduction: Members stress that transparency of follow-up costs is needed for the consumer, for example in relation to the electricity consumption of the application and deployment of things. It is also necessary for the Commission to explore the possibility of further reducing data roaming costs. Members believe that the IoT requires broad information campaigns to explain to citizens the purpose of their implementation.

Cutting edge development of internet technologies: pointing out that other parts of the world, in particular Asia, are developing faster in this sector, Members stress that, in order to revive the European economy, investment must be made in this area in order to facilitate economic growth. They emphasise that Europe should be at the cutting edge of the development of internet technologies and propose that the EU's ICT research budget be doubled and that the budget for ICT take-up be multiplied by four in the next Financial Perspective.

The Commission is called upon to continue and increase its funding for projects under the Seventh Framework Programme (FP) in the field of the Internet of Things in order to bolster the European ICT sector. The report endorses the use of the Competitiveness and Innovation Framework Programme (CIP) to promote its expansion. It calls, especially, for the development of pilot projects that may have an immediate positive effect on the everyday lives of European citizens in the areas of e-Health, e-Learning, etc).

Review the harmonisation of spectrums: Members endorse the Commission's intention to continue to monitor and assess the need for additional harmonised spectrums for specific IoT purposes, taking into consideration the different characteristics and capabilities of various electromagnetic frequency bands. They call on the Commission, when setting the Union's coordination and harmonisation objectives through the Multiannual Radio Spectrum Policy Programmes, to take into account the needs of the Internet of Things. They stress that such spectrums should remain publicly owned, and that their use should be regulated in such a way as to encourage and help fund more technological research and development in this field. They believe that unlicensed spectrum should allow the use of new technologies and services (wireless networking) to emerge so as to foster innovation. In parallel, Members call for the establishment of common international norms for the standardisation of RFID and other IoT technologies and their applications, with a view to facilitating interoperability and an open, transparent and technologically neutral infrastructure.

Strengthen social dialogue: the Commission is asked to initiate a social dialogue regarding the Internet of Things, and to provide information on the positive and negative effects of the new technologies on everyday life. A proactive consultation with the European industry sector should be engaged. SMEs should be involved in this dialogue. Lastly, the governance of the IoT must keep 'red tape' to a minimum and involve all relevant stakeholders in the decision-making process. Members call therefore for proper and adequate regulation at EU level.

Internet of Things

The European Parliament adopted by 606 votes to 18, with 17 against, a resolution on the Internet of Things (IoT).

Overall, Parliament welcomes the communication from the Commission and endorses in principle the broad outlines of the action plan to promote the Internet of Things. It takes the view that the expansion of the IoT may bring tremendous benefits for EU citizens if it respects security, data protection and privacy.

Protection of privacy and personal data: Parliament endorses the Commission's focus on safety, security, the protection of personal data and privacy and governance of the Internet of Things, because respect for privacy and the protection of personal data, together with openness and interoperability, is the only way IoT will gain wider social acceptance. It calls on the Commission to encourage all European and international stakeholders to tackle cyber security-related threats. Members firmly believe that protection of privacy constitutes a core value and that all users should have control over their personal data. It calls therefore for the adaptation of the Data Protection Directive to the current digital environment.

Infrastructure issues: Parliament calls on the Commission to conduct an assessment of the impact of using the current 'internet' network infrastructure for IoT applications and hardware, in terms of network congestion and data security. It takes the view that the development of the IoT and related applications will have a major impact on the daily lives of Europeans and their habits in the years ahead, leading to a broad range of economic and social changes. The Commission's communication does not give enough consideration to these issues, which should ideally be dealt with before the Internet of Things is further developed. Parliament calls on the Commission to coordinate its work on the Internet of Things with its overall work on the digital agenda.

Ethical and cultural aspects of the IoT: Parliament stresses the importance of studying the social, ethical and cultural implications of the Internet of Things, in the light of the potentially far-reaching transformation of civilisation that will be brought about by these technologies. It calls on the Commission to set up a panel of experts to carry out an in-depth assessment of these aspects and propose an ethical framework for the development of related technologies and applications.

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Strengthen security: Parliament stresses the need to prevent fraud. Particular attention should be paid to security measures ensuring that only authorised users can access data. The resolution states that consumers and the assigning authorities should be able to check the readability of data and the functioning of the system. It considers it a priority to ensure a global regulatory framework. The Commission is called upon to monitor possible new threats presented by the vulnerability of highly interlinked systems. In addition, Parliament calls on the Commission to make further efforts to ensure that IoT-related technologies include user requirements (e.g. a traceability de-activation option). It calls on the Commission to monitor closely the implementation of the European regulations already adopted in this area and to present, by the end of the year, a timetable for the guidelines it intends to propose at EU level for improving the safety of the Internet of Things and of RFID applications. It also considers it vital to analyse aspects relating to Wi-Fi security systems.

Considerable volume of data: noting that the Internet of Things will lead to the collection of truly massive amounts of data, Parliament calls on the Commission to submit a proposal for the adaptation of the European Data Protection Directive with a view to addressing the data collected and transmitted by the IoT. A general principle should be adopted whereby IoT technologies should be designed to collect and use only the absolute minimum amount of data needed to perform their function.

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A potential for economic development: Parliament believes that the IoT has significant potential in terms of economic and productive development, better-quality services, the optimisation of corporate logistics and distribution chains, inventory management and the creation of new employment and business opportunities. It calls on the Commission to make an assessment of any impact that its proposed strategy might have on the productivity and competitiveness of European enterprises in the international market. It also believes that the IoT can contribute to the facilitation of trade flows between the EU and third countries through the expansion of markets and the securing of quality guarantees for the products traded. Furthermore, it stresses that RFID technologies will, on the one hand, enable European industries to control the volume of goods in circulation (i.e. by producing only when necessary, thereby protecting the environment) and, on the other hand, offer an effective means of combating piracy and counterfeiting, as it will be possible to trace the goods concerned. Applying new technologies to production processes will increase the resource efficiency and market competitiveness of consumer goods.

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