European Commission

Smart-Grid Task Force
Expert Group 2

JRC-IPSC-Digital Citizen Security Unit

Joint Research Centre

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The Expert Group 2 (EG2) for Regulatory Recommendations for Privacy , Data Protection and Cyber-Security in the Smart Grid Environment

The EG2, chaired by JRC under the umbrella of the SGTF received a two years mandate on 1st February 2012 for the following tasks:

1. *To develop a proposal for Privacy and Data Protection Impact Assessment template for Smart Grids (DPIA template).*

2. *To evaluate available methodologies for a trustworthy network for sharing vulnerabilities and threats analysis of smart grid and smart metering systems among stakeholders*

3. *To report the Best Available Techniques (BAT) with regard to the 10 common minimum functional requirements related to smart metering systems (Recommendation 2012/148/EU) under a Cyber-Security and Privacy perspective.*

Sustainable process supported by EG2 tools

The EU Data protection toolbox and its implementing tools

The DPIA template

- Elements accomplished by EG2 and WP29:
  - *8 of January 2013 First version submitted to the WP29*
  - *22 of April 2013 WP29 first opinion*
  - *20 of August 2013 Second version submitted to the WP29*
  - *4 of December 2013 WP29 second opinion*
  - *31 Jan 17 Feb Template finalisation by editorial team*
  - *18 March final EG2 DPIA template version*
- Next (possible) steps:
  - *EC Recommendation*
  - *Promote and monitor the test phase*
  - *Produce a new version at the end of the test phase*

Techniques to enforce cyber-security and privacy related to the 10 minimum requirements (COM 2012/148/EU)

Consumer side

1. Provide readings directly to the customer and any third party designated by the consumer
2. Update the readings referred to in point frequently enough to allow the information to be used to achieve energy savings

Metering Operator

3. Allow remote reading of meters by the operator.
4. Provide two-way communication between the smart metering system and external networks for maintenance and control of the metering system
5. Allow readings to be taken frequently enough for the information to be used for network planning

For Commercial aspects of energy supply

6. Support advanced tariff systems.
7. Allow remote on/off control of the supply and/or flow or power limitation
8. Provide secure data communications

For Security and Data Protection

9. Fraud prevention and detection
10. Provide import/export and reactive metering

- **Heterogeneous set of techniques**
- **Different levels of requirements for security, reliability, privacy and availability**
- **Need for a common set of BEST techniques**

Best Available Techniques

The most effective and advanced stage in the development of activities and their methods of operation, which indicate the practical suitability of particular techniques for providing in principle the basis for complying with the EU data protection framework. They are designed to prevent or mitigate risks on privacy, personal data and security

Sevilla Process

A process adopted in other fields (e.g. Industrial Emissions Directive (IED), 2010/75/EU) which provides as output a Best Available techniques Reference document (BREF)

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Technical Contribution 2013

What:

To support the BAT process, JRC performed a Technical Survey on the "Smart-Meter available techniques, already implemented or in pilot phase, to comply with the minimum functional requirements", which is a complementary input to EG2's own on the listing of Available Techniques.

How:

- *Desktop Research*
- *Identification of a reference model and consequent map of the requirements on the model*
- *Survey on Available techniques accomplishing the 10 minimum requirements while guaranteeing the cyber-security of citizens and operators*

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Map of the 10 min. requirements on the reference model

Survey's Structure

1. EG2 Representatives provided a list of point of contact within the organisations represented to JRC
2. JRC prepared a detailed questionnaire
3. JRC interviewed the PoC
4. JRC analysed and structured the gathered results into a JRC-Technical Report
5. EG2 members analysed the data gathered and validated their completeness for what concerns the countries represented in the survey.

The Questionnaire

a) **Provide readings directly to the consumer and any third party designated by the consumer**

This functionality is essential in a smart metering system, as direct consumer feedback is essential to ensure energy savings on the demand side. There is a significant consensus on provision of standardised interfaces which would enable energy management solutions in 'real time', such as home automation, and different demand response schemes and facilitate secure delivery of data directly to the consumer. Accurate, user-friendly and timely readings provided directly from the interface of consumer 's choice to the consumer and any third party designated by the consumer are strongly recommended since they are the key to running demand response services, taking 'on-line' energy-saving decisions and effective integration of distributed energy resources. In order to stimulate energy saving, Member States are strongly recommended to ensure that final consumer s using smart metering systems are equipped with a standardised interface which provides visualised individual consumption data to the consumer.

Requirement's description

Example of Technologies: Display, web portal, accessible at consumer premise, mobile application etc.

Examples

Q1: Is this feature implemented?

Explanation: We are interested in understanding if the metering system in place already adopts technologies allowing a consumer to access data related to its actual energy consumption.

Question and explanation

Answer:

Answer

Q2: If a proper technology is in place, please provide briefly a description of the interface adopted.

Explanation: Information of interest is related to the design approach:

- *Is the service based on web-access, or relies on some other communication technique?*
- *Is the service provided locally by the meter or the consumer needs to access a remote server where the data are collected and aggregated?*

Answer:

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Survey Coverage

Some surprising facts (1):

Smart meter data storage

Protection mechanisms

- Authentication mechanisms
- VPN network
- User-name passwords
- Confidentiality protection is secured through access control and PKI.
- SFTP
- Security services provided by GSM/GPRS

Use of Access Control Mechanisms

Protection of the Communication Channel

Some surprising facts (2):

Communication Protocols

- Satellite
- GSM/GPRS/ CDMA
- PLC
- DSL
- DLMS Cosem over PLC
- RF-Mesh
- IDIS
- PRIME
- G3
- EN 61334-4-32 /33

Huge Heterogeneity

General Considerations

- Huge variety in the solutions adopted at European level to accomplish with the 10 min. requirements
- Security and Privacy issues well understood with regard to the data storage at operator premises
- Security and Privacy seriously jeopardised at **end-user and smart-meter premises -> threats to the end-user privacy and security**
- Strong need for a standardisation action at european level to harmonise the techniques adopted and the level of privacy and security guaranteed to the citizen
- Need for research activities on threats and vulnerabilities of the coming architectures (e.g. mobile access and control enabled)

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The way Forward… A proposal for the BAT

A successful BAT process strongly relies on the ability of reaching a wide consensus among the stakeholders involved in the process. To reach such objective we propose to adopt a lighter version of the Sevilla process.

Selection Process Actors

- **The Stakeholder Forum (SF)** will be composed by the actual EG2 WG (its composition will be revised and eventually enriched to ensure the representativeness of all the stakeholders). The SF will be in charge of the validation and approval of the selected techniques and will act as facilitators in the activities related to the collection of the needed technical information.
- **The Technical Editorial Group (TEG)** will be composed by 5 experts. These experts will be nominated among the representatives of the **SF** and will be in charge of elaborating the BAT draft to be presented for approval to the SF.
- **The JRC Smart-meter team (JRC-SMT)** will be in charge of supervising the whole project, providing at the same time technical and scientific support to the **TEG** in the identification of suitable metrics and in the selection of the techniques.
- **DG-ENER** will act as facilitator during the creation of the Stakeholders forum.

Work Packages

WP1 – Metrics and Selection Criteria: JRC-Team and TEG will work together to identify a suitable set of criteria evaluate and compare the different techniques under analysis. The SF will validate the criteria during ad-hoc organised meetings

WP2 – Techniques' Inventory and Mapping: This work-package aims at gathering as much information as possible about the techniques adopted to accomplish with the 10 common minimum functional requirements (2012/148/EU) under a cyber-security and privacy perspective

WP3 – Analysis of the techniques: JRC-Team and TEG will work together to analyse the techniques identified according to the criteria identified in WP1

WP4 – Selection and Validation: a draft proposal for the a BAT will be prepared by JRC-Team and TEG and submitted for validation to the SF

WP5 – Coordination

Selection Process

…Comments?