

ENTSO-E Common Grid Model Exchange Standard (CGMES) – information webinar

Webinar

13 January 2014

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Reliable Sustainable Connected

Information

- The webinar session is now recorded and will be available in the ENTSO-E web site together with these slides

Agenda

- **Introduction** – 20 min - Chavdar Ivanov (R&D Senior Advisor, ENTSO-E Secretariat)
- **Conformity Assessment Process** – 20 min – David Papier (Project Manager, ENTSO-E Secretariat)
- **Relevant tools in the process chain for exchanging models and scenarios** – 20 min – Miloš Bunda (Convener TF CGM, TenneT TSO B.V.)
- **Survey addressed to vendors** – 20 min – Wim Ivens (System Operation Advisor, ENTSO-E Secretariat)
- **Questions/Discussion** – 40 min



Introduction – 20 min

Chavdar Ivanov (R&D Senior Advisor, ENTSO-E Secretariat)

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Introduction

- On 18 Dec 2013 ENTSO-E Assembly approved the Common Grid Model Exchange Standard (CGMES) v.2.4.13.
- CGMES is approved as a baseline data exchange standard for the EU **operational** and market Network Codes
 - CACM : Capacity Allocation and Congestion Management
 - FCA : Forward Capacity Allocation
 - OS : Operational Security
 - OPS : Operational Planning & Scheduling
- CGMES will also be used for **system development** studies data exchanges including ENTSO-E Ten Year Network Development Plan related studies

Introduction

- CGMES was developed in the last 4 years and covers:
 - Bus-branch and node-breaker representation
 - Exchange of solved and unsolved load flow models (combinations of equipment, topology, steady state hypothesis and state variables profiles)
 - Exchange of diagram layout
 - Exchange of geographical location (GIS)
 - Exchange of dynamics models

Significant update of transformer modeling was done and HVDC representation was introduced

- ENTSO-E web site is the primary place to obtain the last information on the CGMES versions

Introduction

CGMES documentation

- Main page on CIM – [link](#)
- Version 2.3.13 is available [here](#)
- Information on CGMES conformity process will be available [here](#)

The documentation includes the following:

- Main document – standard, which defines the framework and sets rules
- HTML documents – exported for each profile belonging to the CGMES. Specific profile rules are defined in these documents
- HTML Enterprise Architect export – identical view of the UML model as in EA
- RDFS export – RDF schema for each profile belonging to the CGMES
- XMI export – directly exported from EA; contains all profiles
- CGMES issue list – this list should be used to report issues on the CGMES. Issues should be sent to cgmes@entsoe.eu

Introduction

Expected additional documentation related to CGMES:

- Export of all profiles in Microsoft Word (.doc) version
- Machine readable validation rules (scripts) which would cover rules defined in the main CGMES standard and also in the individual profiles. OCL syntax will be used. Publication is expected by the end of Jan 2014.

Introduction

Activities related to CGMES implementation:

CGMES Implementation Roadmap – internal document which defines a series of projects and tasks to implement CGMES and reach a stage when CGMES based exchanges are put in operation

CERTI-I – internal project:

- Phase I (2013)
 - List necessary use cases;
 - Develop requirements for test models to be used in conformity assessment program
 - Identify options for conformity assessment
- Phase II (Jan-May 2014)
 - Develop conformity assessment program for the selected option

CERTI-II – internal project with vendor participation:

- Duration: Jan-Jun 2014
- Deliverables:
 - Develop test models/data to be used in the conformity assessment program – vendors support is expected – Call for vendors announcement issued on 20 Dec 2013. See [here](#). Deadline **21 Jan 2014**.
 - Develop test procedures (test scripts) to be used in the conformity tests

PROFI – internal project

- Duration: Jan – July 2014
- Objective to further develop CGMES (issue new version) to address all (the most urgent) requirements defined in the CGMES (CGMES currently covers 73% of the requirements)
- IEC WG13 will be kept informed on the CIM extensions proposals coming from this projects. Discussions will be arranged in the frame of the liaison with IEC.
- ENTSO-E will CIM experts to support the work

Dynamics profile implementation

- Objective: harmonized implementation of the CGMES dynamics profile by vendors
- An effort launched in Dec 2013. Expected finalization in Sep-Oct 2014
- Vendors participating in the effort: DigSILENT (Power Factory), Tractebel/RTE (Eurostag), CESI (SICRE), BCP (Neplan), Siemens (PSS/ODMS, PSS/E, Netomac), CEPS (own tool)

Interoperability testing

- IOP 2014 – will be held in Brussels in the week of 14 July 2014

Other tasks

- TSOs activities to gather different data to satisfy requirements for the data exchanges (requirements in the Network codes, TYNDP and other needs).

IOP in 2014 – the two objectives:

Testing of the commercial releases of the tools

- Conformity testing for tools using **CGMES v2.4.13** – the process to be prepared in the frame of conformity assessment program

Testing of the CGMES extensions established in PROFIT

- Testing of the interoperability of the **updated CGMES version** – a standard vetting type of IOP tests to validate the new version of the CGMES; Vendors using prototype tools as usual
- Registration form will be send out after this web session
 - Deadline to reply is set at 31 January 2014



Conformity Assessment Process – 20 min

David Papier (Project Manager, ENTSO-E Secretariat)



WHAT

⇒ Increase overall **quality** of the exchanged data by

- **Adopting CGMES** as standards (TSO's)
- Having TSO's able to **rely** on applications/systems adopting **CGMES**.

OBJETCIVE



WHY

- Improved data collection handling - TSO's
- Improved data collection handling – ENTSO-E Secretariat
- Improved exchange of data between TSO's – Improve interoperability

BENEFITS

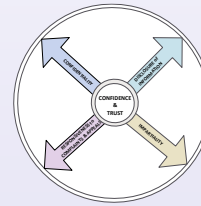




➔ Launch CERTI-I Project

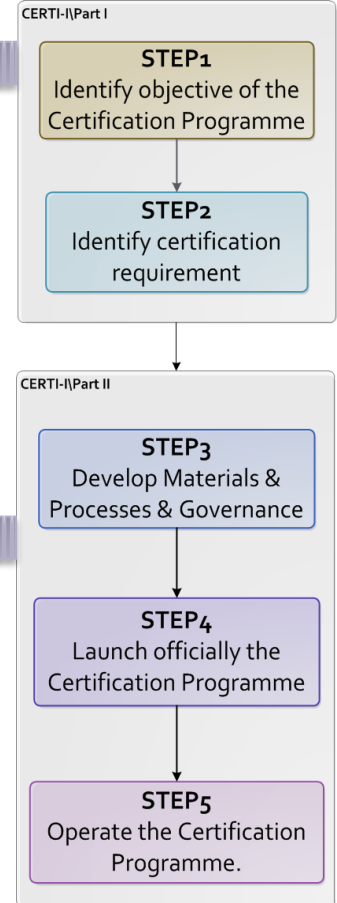
Phase 1: [Analysis] (*Finished*)

- Adopting CASCO Standards
- Identify Processes & Materials needed.

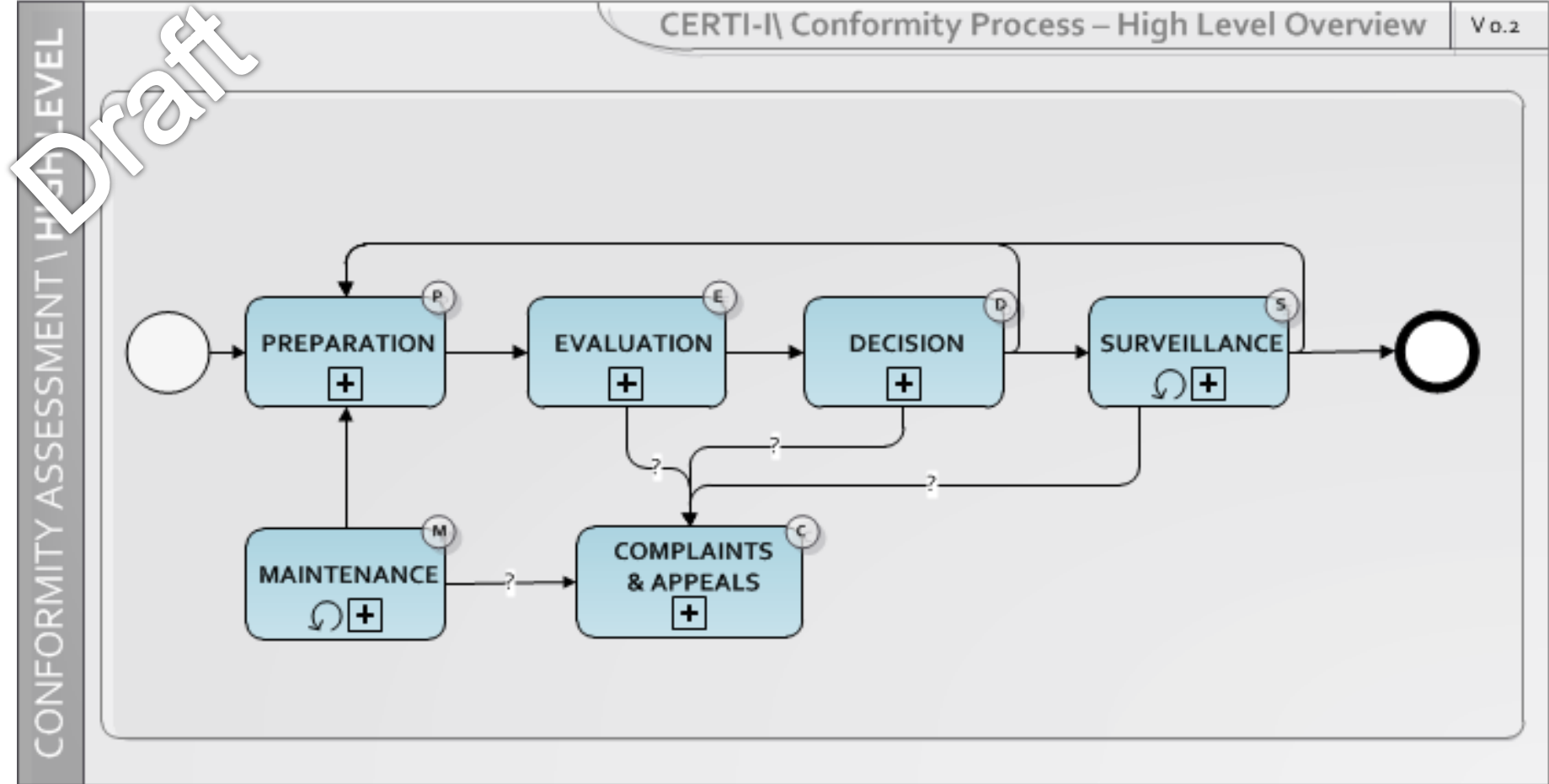


Phase 2: [Development & Launch] (*Starting*)

- Develop Processes & Materials
- Establishing Governance
- Operating as Service (Initiating)

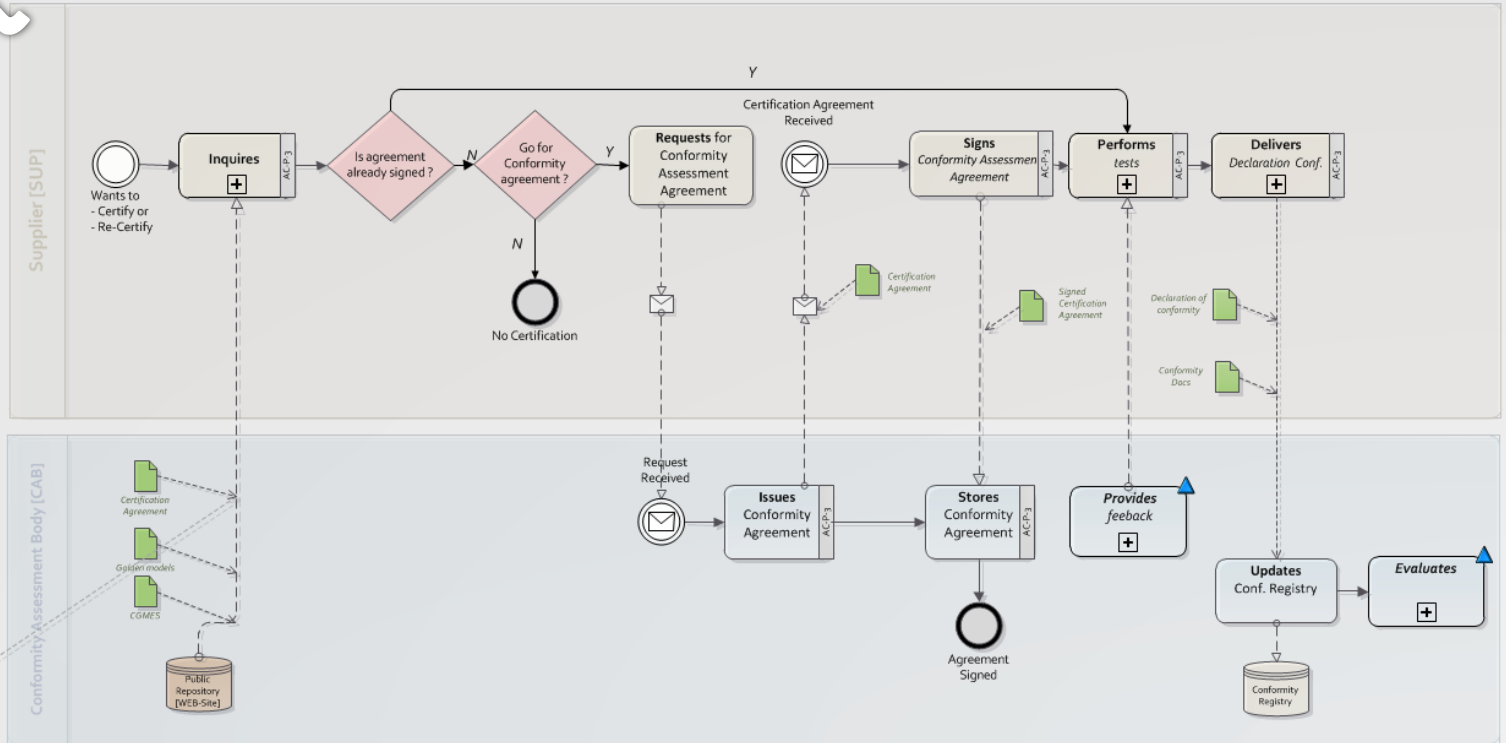


Conformity assessment\ High Level Overview



Conformity assessment\ Preparation Process

Draft



We want to allow Supplier have the possibility to download materials before submitting its application

➤ Deadline

- Target is for the IOP in July.

➤ More information will be provided in **February** through the following channels:

- **TSO CGMES SPOC**

- **ENTSO-E Website: Dedicated Page: CGMES Conformity**

<https://www.entsoe.eu/major-projects/common-information-model-cim/cim-for-grid-models-exchange/cgmes-conformity/>



Relevant tools in the process chain for exchanging models and scenarios – 20 min

Miloš Bunda (Convener TF CGM, TenneT TSO B.V.)

Relevant tools in the process chain



Time horizons addressed in the Network Codes:

- Year ahead: outage coordination (NC OPS), Forward Capacity Calculation (NC FCA)
- Month ahead: Forward Capacity Calculation (NC FCA), Regional Operational Security Assessment (current business needs)
- Week ahead: Regional Operational Security Assessment (NC OPS)
- Two days ahead: Capacity Calculation for D-1 market (NC CACM)
- Day ahead: Operational Security assessment, model corrections and assessment of remedial actions (NC OPS), Capacity Calculation for Intraday market (NC CACM)
- Intraday: Regional Operational Security Assessment (NC OPS)
- Updates for outage plans upon request by Outage planning agents
- Regional security assessment requires at least Common Grid Models for the whole synchronous area

Relevant tools in the process chain



Increase of data exchange:

- ❑ 8 Common Grid Models for year ahead, this implies $8 \times 34 = 272$ Individual Grid Models, instead of 6 Common Grid Models for RG CE, corresponding to $6 \times 26 = 156$ Individual Grid Models (which is exchanged by email now)
- ❑ 34 TSOs will provide hourly Individual Grid Models for D-2, instead of 17 TSOs for some regions only (CWE, CEE, CSE)
- ❑ 34 TSOs will provide hourly Individual Grid Models for D-1, instead of 26 TSOs for RG CE only
- ❑ Increase of models exchanges for Intraday modelling (rolling forecast) will depend on the new TSOs that will implement this process (already implemented by 12 TSOs of RG CE)

Relevant tools in the process chain



Impact on tools and processes within TSOs:

- ❑ In order to prepare for data exchange in the CGMES a multitude of grid situations is to be calculated
- ❑ For this purpose schedules are used at an hourly resolution:
 - Schedules for “vertical” load (at the exchange points between TSOs and DSOs)
 - Schedules for the in-feed of conventional generation (retrieved from market participants)
 - Schedules for the in-feed of renewable energy sources
 - Schedules for switch positions/planned outages
 - Schedules for voltages and reactive power
- ❑ Consistency of data is very important!

Relevant tools in the process chain



Relevant tools and functions in the creation and assessment of grid situations:

- The ability to model different grid configurations (year ahead -> intraday)
- Outage scheduling
- Load scheduling
- Generation scheduling
- Voltage scheduling
- Load flow
- (n-1) security assessment
- The ability to assess redispatch scenarios



Survey addressed to vendors – 20 min

Wim Ivens (System Operation Advisor, ENTSO-E Secretariat)

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Communication set up: put ENTSO-E secretariat in the loop

- Each TSO has to indicate a SOC SPOC for the follow up and implementation of CGMES
 - SPOC means: 1 Person per TSO for the operational exchanges!
- CGMES SOC SPOC contacts relevant vendors
 - Vendor identification: Which software is used by which TSO?
 - ENTSO-E wants to openly communicate with all of them
 - Communication with vendors and CGMES SPOCS is essential to establish progress regarding the implementation of CGMES
 - Global goal is to prepare the IOP of July 2014 in the best possible way: no surprises for nobody!
 - Survey: 16 easy question to get familiar with the tools/vendor companies

Questions type 1: tool/vendor company identification

- For which tool are you completing the survey
- Do you have already a commercial release that supports CGMES v2.4.13
 - If yes: ...
 - If no: ...
- Please provide us with your contact details

Questions type 2: supported applications



- Does the tool support symmetrical short – circuit calculations according to IEC 60909
- Does the tool support asymmetrical short – circuit calculations, according to IEC 60909
- Does the tool support dynamic time – domain simulations? Does it model electromechanical behaviors?
- Does the tool have limitations in terms of size of the model (number of nodes, or particular elements)? If yes, is this limitation linked with licensing options or is it a technical constraint?

Questions type 3: global element modeling questions

- Does the tool support node-breaker modelling?
- Does the tool support detailed modelling of DC devices, lines and grids?
- Which generator models (fuel types) does the tool support?
- Does the tool support the modelling of three winding transformers?
- Does the tool support modelling of tables that reflect the phase angle difference and impedance with the tap step of transformers?
- Does your tool support modelling of transformers with both angle and phase regulation?
 - Remark about voltage regulation
- Does the tool support modeling of both symmetrical and asymmetrical phase shifting transformers?

Current Status & Timing aspect



- Current status 12 January 2014
 - X1 TSOs: have delivered a filled out survey to the ENTSO-E secretariat
 - X2 TSOs: have contacted their vendor(s) but a filled out survey has not been received by the ENSTO-E secretariat
 - X3 TSOs: no update at all
- **FINAL deadline: 20 January 2014!**



Questions/Discussion – 40 min