

**CIGRE Study Committee B5**

**PROPOSAL FOR THE CREATION OF A NEW WORKING GROUP**

<b>WG N° B5.77</b>	<b>Name of Convenor:</b> Emiliano Casale (IT)	
<b>Strategic Directions #2:</b> 1, 2		<b>Sustainable Development Goal #3:</b> 9
<b>The WG applies to distribution networks:</b> <input checked="" type="checkbox"/> Yes / <input type="checkbox"/> No		
<b>Potential Benefit of WG work #4 :</b> 1, 2, 3		
<b>Title of the Group:</b> <b>Requirements for Information Technologies (IT) and Operational Technology (OT) managed of Protection, Automation and Control Systems (PACS)</b>		
<p><b>Scope, deliverables and proposed time schedule of the WG:</b></p> <p><b>Background:</b></p> <p>Digitalisation is widely recognised as a pillar for the modernisation of critical infrastructures, including the electric power systems. This implies that technologies and solutions that are considered useful and effective for operation and which are used in the general field of Information Technologies (IT), such as automatic patching, virtualisation, orchestration, are being proposed for the operation of Protection, Automation and Control Systems (PACS) based on digital Operational Technology (OT). This leads to a convergence of IT and OT.</p> <p>The effects of evolutions in IT on OT need to be considered, including or high level architecture, virtualisation of functions and use of (Software Defined Network) SDN. For critical functions of the PACS, namely protection functions, a high availability is required.</p> <p>Operations leading to simultaneous degraded operation or unavailability of functions providing mutual redundancy or backup must thus be avoided. This includes also degraded communication network conditions due to the additional traffic caused by the IT operations. If not well addressed, standard IT operations may induce unacceptable risks or degradation for the PACS operation.</p> <p><b>Scope:</b></p> <p>The Working Group will formulate functional requirements for IT operations in PACS taking into account constraints of PACS related to the operation of the electric power systems. A methodology to develop approaches for IT operations suitable for PACS and to apply them in a reliable way needs to be outlined and described.</p> <p>This implies a review of the state of the art of Operational Technology (OT) and Information Technology (IT) “worlds”, respectively. The Technical Brochure is expected to contribute to “bridge the gap” which still exists between protection and telecommunication worlds.</p> <p>In particular, the Technical Brochure elaborated by the working group is expected to cover the following items:</p> <ul style="list-style-type: none"> <li>• Clarification and Definition of the term "IT-OT convergence" for PACS</li> <li>• Evolution of PACS with emphasis of convergence of OT and IT technologies</li> <li>• Description of operational methods of OT</li> <li>• Description of operational methods of IT</li> <li>• Analysis of possibilities and constraints to apply routine IT operations to OT, including</li> </ul>		

- description of unacceptable or constraint situations for PACS functions
- long-term availability interfaces between PACS and maintenance PC
- firmware updates (including cyber-security related)
- Convergence of IT/OT
  - High level analysis
  - Probable evolutions
  - Advantages and drawbacks
  - impact on the architecture of PACS
  - impact on utility organisation and share of responsibilities
  - impact on contracting engineer and maintenance services
  - impact on training (university courses and in-job)
- Proposals and Requirements for IT-like OT management and processes
  - Specific tests in Factory Acceptance Test (FAT) and Site Acceptance Test (SAT)
  - IT / OT maintenance procedures
  - Supervision, logs and failure detection
  - guarantee for minimal availability and reliability of PACS functions
  - cybersecurity constraints
- Evaluation of the impact of virtualisation
  - Mapping of IT tools of virtualised infrastructure to PACS OT requirements
  - Specific constraints and opportunities
- Use cases for IT-like operations in PACS based on a matrix of
  - IT management and update methods
  - IT Functions and services implemented in PACS

A survey among utilities about the practice of IT / OT convergence and methods shall be conducted by the Working Group, giving the state of the art of the approaches implemented in the industry.

**Exclusions:**

- The virtualisation and functional integration is covered by B5.60. The WG is to reference the TB elaborated by WG B5.60. Only aspects related to IT / OT operation and maintenance of virtualised structures are to be covered by the new WG.
- Cyber Security in general has been covered by several previous WG. Only cyber security aspects related to IT/OT operation shall be discussed by the new WG, referring where possible to the existing Technical Brochures.

**Deliverables:**

- Technical Brochure and Executive Summary in Electra
- Electra Report
- Future Connections
- CSE
- Tutorial
- Webinar

**Time Schedule:** start: 03 2022

**Final Report:** 03 2025

**Approval by Technical Council Chairman:**

**Date:** February 16, 2022



Notes: <sup>1</sup> Working Group (WG) or Joint WG (JWG), <sup>2</sup> See attached Table 1, <sup>3</sup> See attached Table 2 and CIGRE reference Paper: Sustainability – at the heart of CIGRE's work. <sup>4</sup> See attached Table 3

**Table 1: Strategic directions of the Technical Council**

1	The electrical power system of the future reinforcing the End-to-End nature of CIGRE: respond to speed of changes in the industry by preparing and disseminating state-of-the-art technological advances
2	Making the best use of the existing systems
3	Focus on the environment and sustainability (in case the WG shows a direct contribution to at least one SDG)
4	Preparation of material readable for non-technical audience

**Table 2: Environmental requirements and sustainable development goals**

	CIGRE selected the 7 SDGs that are the most relevant to CIGRE. In case the WG work refers to other SDGs or do not address any specific SDG, it will be quoted 0.
0	Other SDGs or not applied
7	<b>SDG 7: Affordable and clean energy</b> Increase share of renewable energy; e.g. expand infrastructure for supplying sustainable energy services; ensure universal access to affordable, reliable, and modern energy services; energy efficiency; facilitate access to clean energy research and technology
9	<b>SDG 9: Industry, innovation and infrastructure</b> Facilitate sustainable infrastructure development; facilitate technological and technical support
11	<b>SDG 11: Sustainable cities and communities</b> Increase attention on sustainable and resilient buildings utilizing local (raw) materials, power for electric vehicles, strengthening long-line transmission and distribution systems to import necessary power to cities, developing micro-grids to reinforce the sustainable nature of cities; protect and safeguard the world's cultural and natural heritage; reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and waste management
12	<b>SDG 12: Responsible consumption and production</b> E.g. Promote public procurement practices that are sustainable; address reducing use of SF6 and promote alternatives, encourage companies to adopt sustainable practices and to integrate sustainability information into their reporting cycle, address inefficient fossil-fuel subsidies that encourage wasteful consumption
13	<b>SDG 13: Climate action</b> E.g. Increase share of renewable or other CO <sub>2</sub> -free energy; energy efficiency; expand infrastructure for supplying sustainable energy; strengthen resilience and adaptive capacity to climate-related hazards and natural disasters; integrate climate change measures into national policies, strategies and planning; improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning
14	<b>SDG 14: Life below water</b> E.g. Effects of offshore windfarms; effects of submarine cables on sea-life
15	<b>SDG 15: Life on land</b> E.g. Attention for vegetation management; bird collisions; integration of substations and lines into the landscape

**Table 3: Potential benefit of work**

<b>1</b>	Commercial, business, social and economic benefits for industry or the community can be identified as a direct result of this work
<b>2</b>	Existing or future high interest in the work from a wide range of stakeholders
<b>3</b>	Work is likely to contribute to new or revised industry standards or with other long term interest for the Electric Power Industry
<b>4</b>	State-of-the-art or innovative solutions or new technical directions
<b>5</b>	Guide or survey related to existing techniques; or an update on past work or previous Technical Brochures
<b>6</b>	Work likely to contribute to improved safety.