



PTB project “Metrology for Digital Transformation – International Cooperation” CABUREK Global Program

Working Group: 2

National project title: DCC Brasil Framework

National Metrology Institute: Inmetro Brazil

Coach: Physikalisch-Technische Bundesanstalt (PTB)

An Integrated Architecture for Digital Calibration Certificates

Structure ↓



Digital Calibration Certificates

DCC (Digital Calibration Certificate) is a digitally structured and machine readable and interpretable version of a traditional calibration certificate

- From AI-powered PDF conversion of Calibration Certificates – Anatel Project
- Developed in Inmetro for 3 services, will be expanded soon for other. The software run online on the Intranet
- Embedded in PDF files for signature and conformance with Quality System. Will be pure XML in future
- Following PTB DCC Schema



Semantics



Ontology for Metrology

Semantic structures that organize knowledge into relationship graphs, enabling complex queries and logical inferences.

- Many different digital vocabularies for Metrology (BIPM, PTB, NCLSI)
- Work with SIM, PTB, BIPM to have an Inmetro Ontology to be used to provide context for Inmetro DCC (Portuguese)
- Will be provided to all Brazilian DCC (NMI and Secondary laboratories) in Inmetro web page
- Will be expanded to other metrology contexts beyond DCC



Inference



LLM Agents

Autonomous agents based on language models that utilize structured knowledge to execute complex tasks and make intelligent decisions.

- The current software model (imperative) is hard to develop smart applications for DCC
- New software paradigm – LLM AI Agents
- Complex task execution. The LLM control the logic of the Agent
- Ontology integration for advanced functionalities



Integrated Workflow for Smart Documents - Machine Readable and Interpretable

LLM agents to enable intelligent actions and decision making