

# Role of Metrology in the Global “Quality Infrastructure”

UNECE WP.6 “Back to Basics” QI training session

**B**ureau  
International des  
**P**oids et  
**M**esures

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# Today I briefly cover:

- What is Metrology?
- Why it is a part of national quality infrastructure?
- How it contributes to legitimate regulatory objectives?
- In which manner does regional/international harmonization in this area address TBT/trade?
- Top future challenge

# The objectives of Metrology

Metrology is the “science and practice of measurement”, its objectives are

## Measurements that are stable

- Long-term trends can be used for decision making

## Measurements that are comparable

- Results from different laboratories can be brought together

## Measurements that are coherent

- Results from different methods can be brought together

To meet the needs of the economy, society and citizens

# Metrology is essential for...

Metrology influences, drives and underpins much of what we do and experience in our everyday lives.

## SCIENCE & INNOVATION



## QUALITY of LIFE



## INDUSTRY & TRADE



...all rely on metrology

# “types” of metrology

No absolute definition, but often one sees the following terms:

- **Scientific metrology**, realization and dissemination of units (“metrological traceability”), and research to be able to measure ‘better’
- **Legal metrology**, legal or regulatory requirements
  - those affected have conflicting interests, or don't have the competence or the possibility to evaluate the reliability of the measurement results
  - legal evidence is needed of measurement reliability
  - health & safety require reliability of measurement
- **Industrial metrology**, measurements on the shop floor, or out in the field, instrumentation

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## The BIPM –

*the intergovernmental organization through which Member States act together on matters related to measurement science and measurement standards*

The BIPM's **mission** is to work with the NMIs of its Member States, the RMOs and strategic partners world-wide and to use its international and impartial status to promote and advance the global comparability of measurements for:

- Scientific discovery and innovation,
- Industrial manufacturing and international trade,
- Improving the quality of life and sustaining the global environment.



*Custodian of the International System of Units (SI)*

Established in **1875** –

64 Member States and 36 Associates

*108 of the 193 states listed by the UN now participate in the BIPM's activities, covering around 98 % of the world's GDP according to 2021 IMF data.*



## The OIML –

*the intergovernmental treaty organization which develops model regulations, standards and related documents for use by legal metrology authorities and industry*

The OIML's **mission** is to enable economies to put in place effective legal metrology infrastructures that are mutually compatible and internationally recognised, for all areas for which governments take responsibility, such as those which facilitate trade, establish mutual confidence and harmonize the level of consumer protection worldwide.

Established in **1955** –

63 Member States and 64 Corresponding Members

*The OIML issues International Recommendations, which are model regulations for a number of categories of measuring instruments, and which OIML Member States are morally obliged to implement as far as possible*

# Quality infrastructure

## *“The system ..*

comprising the organizations (public and private) together with the policies, relevant legal and regulatory framework, and practices

needed to support and enhance the quality, safety and environmental soundness of goods, services and processes.

*it relies on*

- *metrology*
- *standardization*
- *accreditation*
- *conformity assessment, and*
- *market surveillance” (in regulated areas)”*

“The quality infrastructure is required for the effective operation of domestic markets, and its international recognition is important to enable access to foreign markets.

It is a critical element in promoting and sustaining economic development, as well as environmental and social wellbeing.”

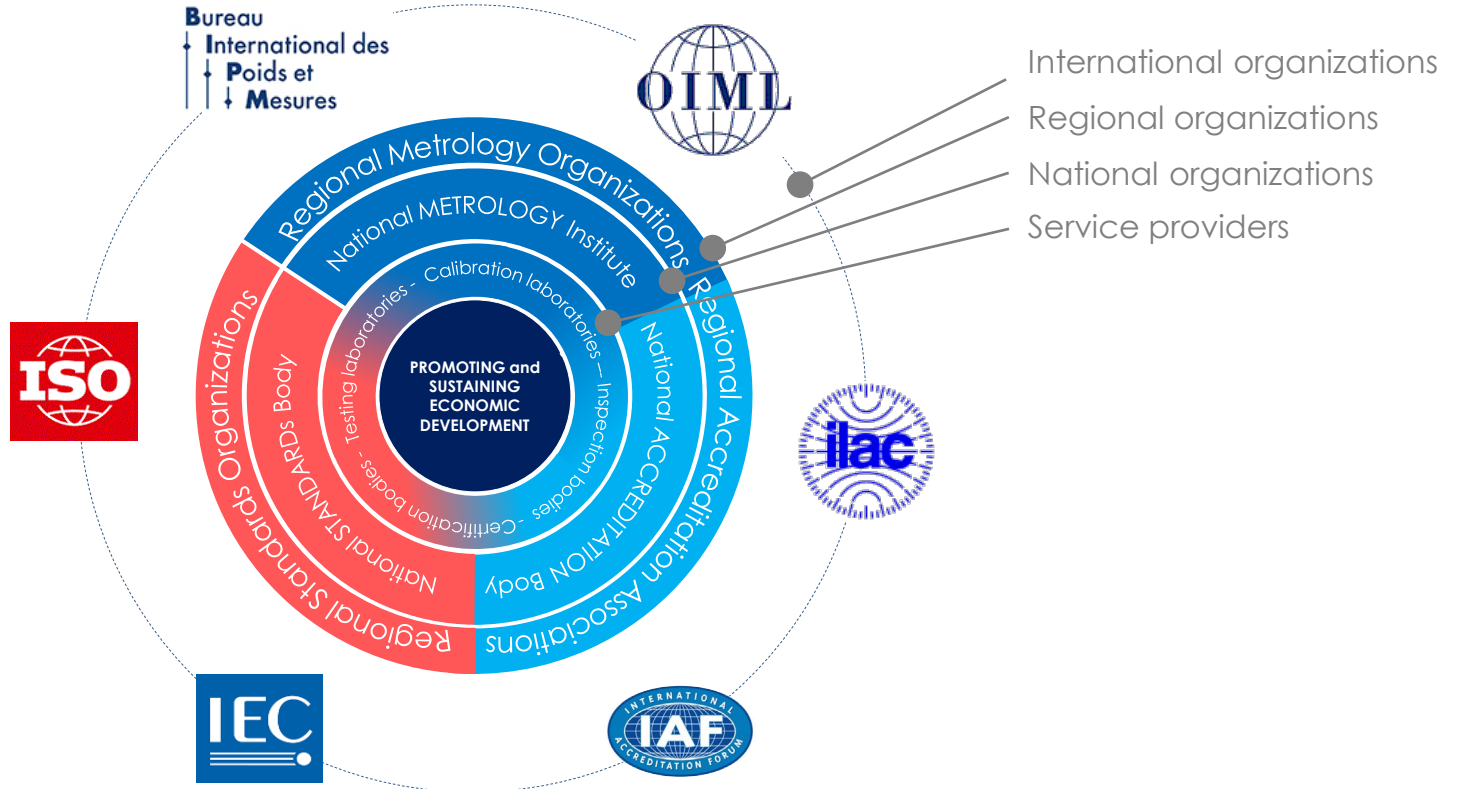
*adopted in June 2017 by the DCMAS Network.*

*Now INetQI.*

*Members: BIPM, IAF, IEC, IIOC, ILAC, IQNET Association, ISO, ITC, ITU, OIML, UNECE, UNIDO, WTO and World Bank.*



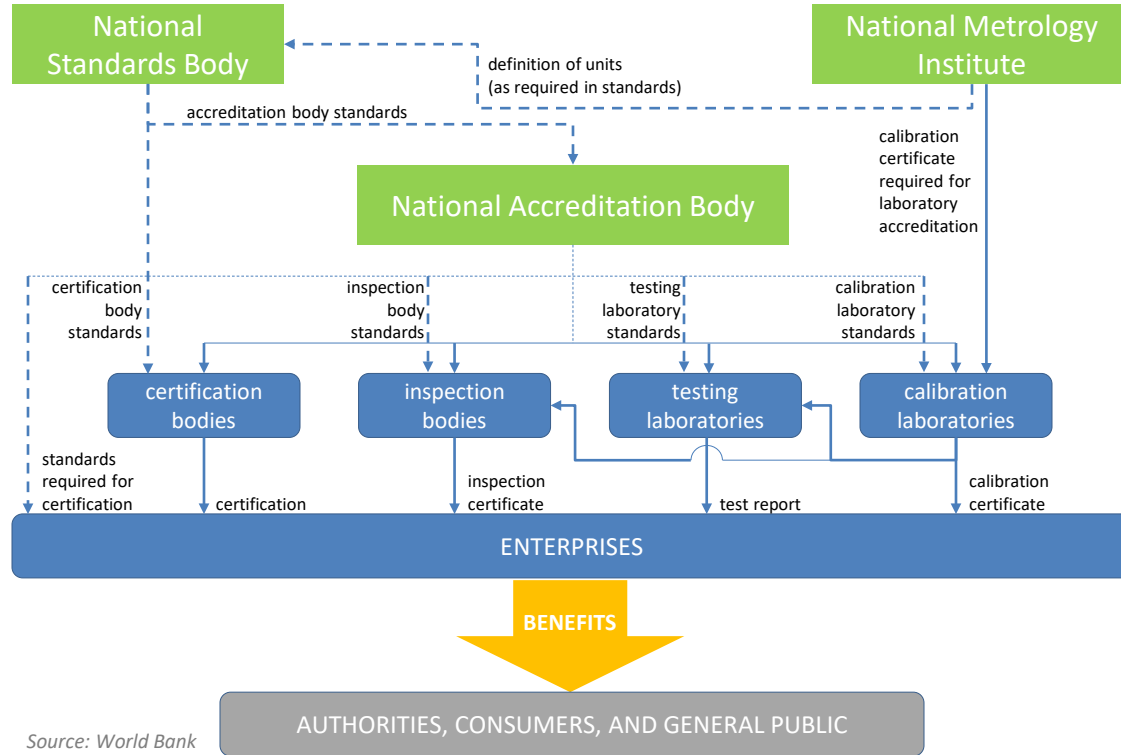
# Some Key QI players ...



# QI links at regional level

Europe	Americas	Asia Pacific	Euro-Asia	Africa	Gulf
Metrology					
EURAMET	SIM	APMP	COOMET	AFRIMETS	GULFMET
Accreditation					
EA	IAAC	APLAC	-	AFRAC	GAC
Standards					
CEN/CENELEC/ ETSI	COPANT	PASC	EASC	ARSO	GCC-GSO

# National QI



- Enhanced product quality and compatibility
- Enhanced safety and health
- Decreased environmental impact
- Increased trade opportunities
- Facilitating innovations to the market place

Source: World Bank

# QI target group



# Importance of QI (example)

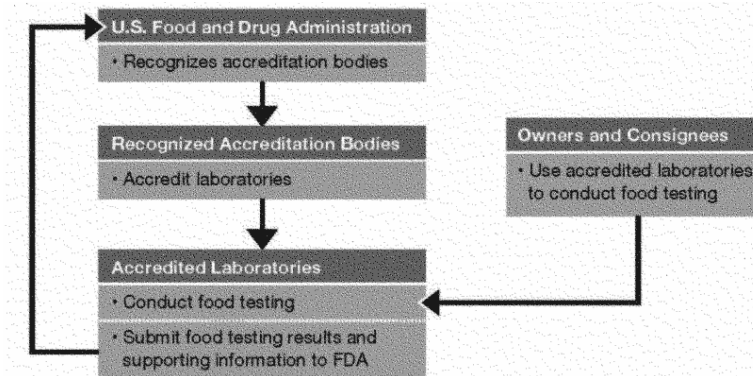
## Guyana's Top 10 Exports

The following export product groups represent the highest dollar value in Guyanese global shipments during 2021. Also shown is the percentage share each export category represents in terms of overall exports from Guyana.

1. Mineral fuels including oil: US\$2.9 billion (69.1% of total exports)
2. Gems, precious metals: \$559.1 million (13.2%)
3. Cereals: \$207.8 million (4.9%)
4. Railways, streetcars: \$176.5 million (4.2%)
5. Ores, slag, ash: \$79.3 million (1.9%)
6. Beverages, spirits, vinegar: \$60.1 million (1.4%)
7. Wood: \$44.3 million (1%)
8. Fish: \$41.1 million (1%)
9. Pharmaceuticals: \$37.1 million (0.9%)
10. Sugar, sugar confectionery: \$19.6 million (0.5%)

## Guyana's Major Trading Partners

The latest available country-specific data for 2021 shows that 95.7% of products exported from Guyana were bought by importers in: the United States of America (42% of the global total), Singapore (16.5%), United Arab Emirates (6.9%), United Kingdom (also 6.9%), Canada (6.6%), Barbados (also 6.6%), India (3.5%), Trinidad and Tobago (2.4%), Venezuela (1.5%), Jamaica (1.1%), Colombia (1%) and Portugal (0.8%).



*Imported food products are subject to FDA (U.S. Food And Drug Administration) inspection when offered for import at U.S. ports of entry. Both imported and domestically-produced foods must meet the same legal requirements in the United States.*

<https://www.fda.gov/food/food-imports-exports/importing-food-products-united-states>

Source:

<https://www.worldstopexports.com/guyana-s-top-10-exports/>

# National QI in practice

## Government

Technical regulation

WTO (TBT, SPS)  
Trade agreements  
CODEX  
OIML  
etc...



Safety,  
Environment,  
Health and  
consumer  
protection  
requirements

Product and  
service  
Quality  
requirements



Confirmation of  
regulatory  
compliance

Customer  
satisfaction



## Market

Competition

ISO  
IEC  
DIN  
ASTM  
Contract  
etc...

  
**Standardization**  
Provides standards

  
**Metrology**  
Calibration,  
verification &  
measurement services

  
**Accreditation**  
Certification & testing  
services

  
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# Role of the government

The government (ideally) promotes and supports:

- Implementation of the relevant international and regional agreements (WTO TBT & SPS Agreement etc.)
- Participation of national QI organisations in international and regional elements of QI
- The development of capacities of QI organisations
- Education and skills
- Networking of public and private institutions in relevant QI forums

The government (should):

- Set the framework conditions through legislation for the QI organisations,
- Set balanced technical regulation regime and implementation
- Create transparency by facilitating the provision of information (e.g. standards information and the WTO TBT & SPS National Enquiry Point), and by involving industry and consumer associations in QI deliberation and implementation activities

*Source: The World bank*

# Digital Transformation

## Digital Transformation

Joint Statement of Intent *On the digital transformation in the international scientific and quality infrastructure*

### Joint Statement of Intent

#### "On the digital transformation in the international scientific and quality infrastructure"

The joint statement provides a platform for the signatory organizations to come together to indicate their support, in a way appropriate to their particular organization, to the development, implementation, and promotion of the SI Digital Framework as part of a wider digital transformation of the international scientific and quality infrastructure.

The joint statement is part of an ongoing initiative by the CIPM and its Task Group on the Digital SI (CIPM-TG-DSI) to develop and establish a world-wide uniform and secure data exchange format based on the International System of Units (SI).

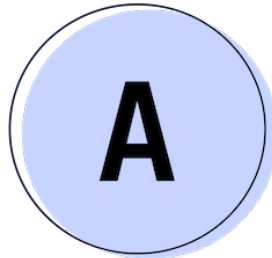
Signed by: CIE, CODATA, IEC, ILAC, IMEKO, ISC, ISO, OIML, NCSLI



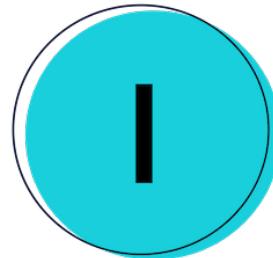
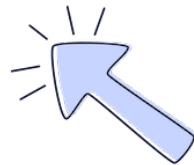
# The FAIR principles



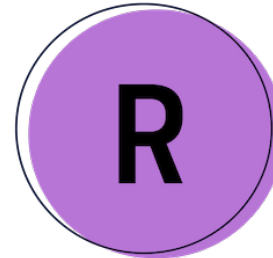
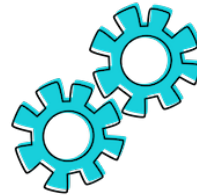
Findable



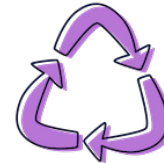
Accessible



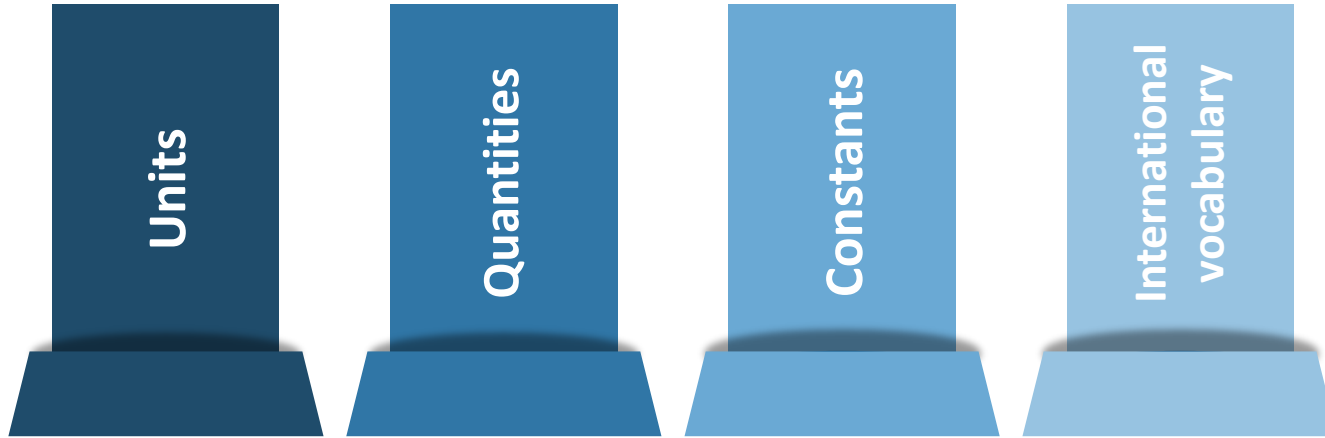
Interoperable



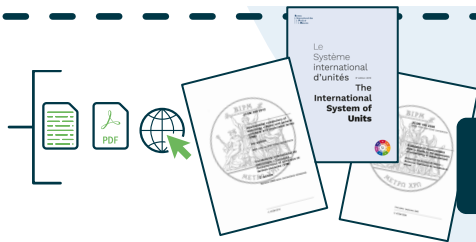
Reusable



# The Interoperability Plane: Interoperability and Reusability



BIPM core references



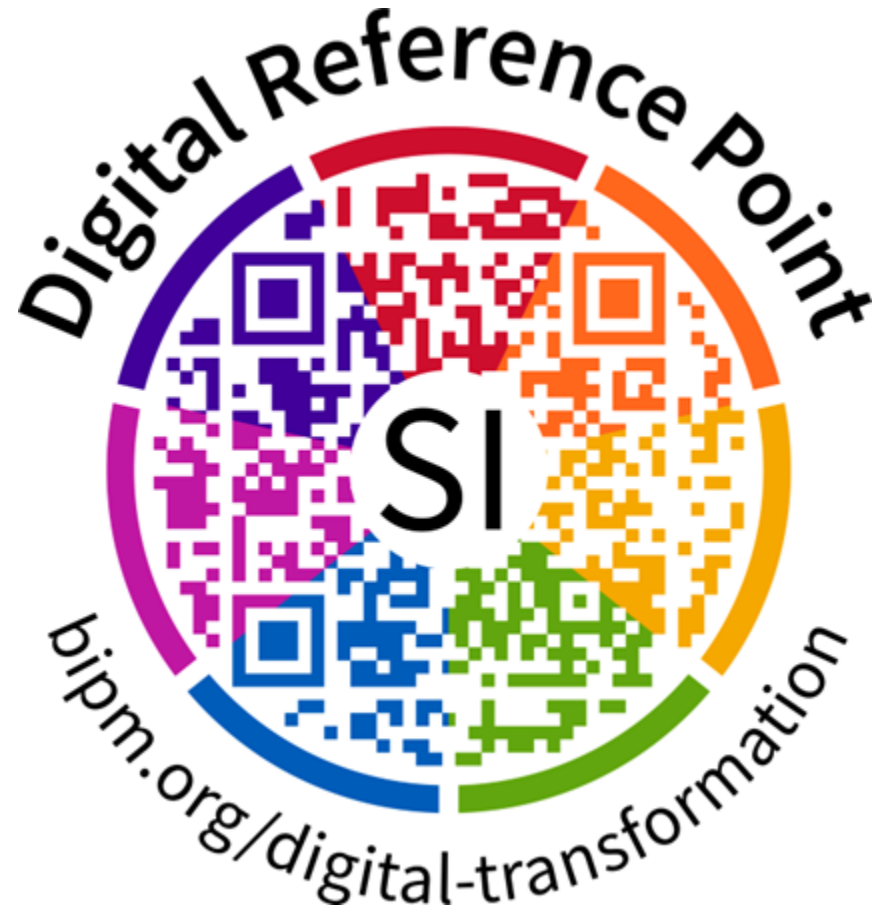
VIM

SI brochure

GUM



Soon to come...



# Conclusions

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- The world economy, society and citizens depend on the international “quality infrastructure” – metrology, standards and accreditation
- The international and national quality infrastructure plays a major role in ensuring good metrological practice is carried from the laboratory to the application
- At national, regional and international level the elements have to link up effectively
- Regulators need to make best use of this infrastructure

