Bureau of Indian Standards
Electronics and Information Technology Department

10th MEETING OF CLOUD COMPUTING, IT & DATA CENTRES, LITD 31

Venue:	Virtual Meeting (https://bismanak.webex.com/bismanak/j.php?MTID=m3d5dea00ac8bb7880b7f26bc9264f533)
Date:	04 July 2024
Time:	1100 hrs
Chairperson:	Prof G. Siva Kumar (IIT Bombay, Mumbai)
Member Secretary:	Mr Priyanshu Sharma (Scientist-C, LITD)

AGENDA

ITEM 0: WELCOME ADDRESS

0.1 Welcome by Member Secretary.
0.2 Opening Remarks by the Chairperson.

ITEM 1: FORMAL CONFIRMATION OF THE MINUTES OF LAST MEETING

1.1 The minutes of the last committee meeting held on 11.03.2024, were circulated on 02.04.2024. No comments have been received on the minutes. The committee may formally confirm the minutes.

The committee may finally confirm the minutes

ITEM 2: SCOPE AND COMPOSITION OF LITD 31

2.1 **Scope:** To establish Indian standards in the field of

a) Cloud Computing and Distributed Platforms including Foundational concepts and technologies, Operational issues, and Interactions among Cloud Computing systems and with other distributed systems

b) Assessment methods, design practices, operation and management aspects to support resource efficiency, resilience and environmental sustainability for and by information, data centres and other facilities and infrastructure necessary for service provisioning

The committee may please note.

2.2 LITD 31 is the national mirror committee for the following committees:

a) ISO/IEC/JTC1 / SC 38 - Cloud computing and distributed platforms - Principle (P)
b) ISO/IEC/JTC1 / SC 39 - Sustainability, IT and data centres - Principle (P)

The committee may please note.

2.3 The composition of "Cloud Computing, IT & Data Centres Sectional Committee LITD 31 and its panels" is given in **Annex -1**. Following co-option requests were received for membership in LITD 31, the CVs for the experts are given in **Annexure - 8**:

SI. No.	Name	Organization
1	Mr Manoj Kumar	Google India Private Limited, Bengaluru
2	Dr Prathviraj N	Individual Capacity
3	Mr Ganesh Parmar	Acumen Cognitive Engineering
4	Dr Smita Agrawal	Institute of Technology, Nirma University, Ahmedabad
5	Mr Rishabh Dangwal	KPMG
6	Mr Gaurav Meena	National Institute of Technology, Srinagar
7	Dr Sudhanshu Maurya	Symbiosis International University, Pune
8	Mr Arpan Kumar Das	ECPL
9	Mr R Muralidaran	HCL, Noida (2020)
10	Mr Ashish Kumar	Larsen and Toubro Limited, Chennai (2020)
11	Mr Abhishek Dhiman	Acumen Security(2020)

The committee may consider and decide.

2.4 LITD 31: Panel 2, Panel on Data Centres was constituted by the committee in the 8th meeting of LITD 31 held on 30.10.2023. Composition of the panel is placed in **Annexure-1.** Terms of Reference for the panel is placed at **Annexure-2.**

The committee may review and approve.

2.5 LITD 31: Panel 3, Panel on Multi-cloud management related work was constituted by the committee in the 9th meeting of LITD 31 held on 11.03.2024. Composition of the panel is placed in **Annexure-1.** Terms of Reference for the panel is placed at **Annexure-2.**

The committee may review.

ITEM 3: PROGRAM OF WORK OF LITD 31

3.1 The program of work of LITD 31 is given in **Annexure 3.**

The committee may note.

ITEM 4: UPDATES FROM THE PANELS UNDER LITD 31

4.1 Panel 2

4.2 Panel 3

The panel Convenor may provide an update since the last meeting of the committee

ITEM 5: INTERNATIONAL STANDARDIZATION ACTIVITIES

5.1 ISO/IEC/JTC1 / SC 38 "Cloud computing and distributed platforms" and ISO/IEC/JTC1 / SC 39 "Sustainability, IT and data centres" deals with standardization in the field of Cloud Computing and data centres. India is a participating member (P Member) of JTC 1/SC 38 and SC 39 and has the obligation to vote and send response on all the documents emanating from this subcommittee. Details of the members nominated in the working groups of the committees is placed in **Annexure-4.**

The committee may please note

5.2 Debriefing from the 29th Plenary of SC 38 held during 18-22 March 2024

The 29th plenary meeting of ISO/IEC JTC 1/SC 38 was held in Sao Paulo, Brazil from 18-22nd March 2024. Indian Delegation comprising of the following members attended the meeting:

a) Shri. Srinivasan Ramakrishnan (In personal capacity) - SC 38 plenary and WG 3 meetings in person at Sao Paulo, Brazil.
b) Shri Bijoyendra Roychowdhuri (In personal capacity) - SC 38 plenary and WG 5 meetings in person at Sao Paulo, Brazil.
c) Shri. Ignesius Thambyraj (CCICI) - SC 38 plenary and WG 3 meetings *(Remote participation)*
d) Shri Kshitij Kushagra (Ministry of Electronics and Information Technology, New Delhi) - SC 38 WG 5 and AG 5 Meetings *(Remote participation).*
e) Shri. Dinkar Sitaram (CCICI)- SC 38 WG 5 Meeting *(Remote participation).*
f) Shri Madhav Chablani (Cloud Security Alliance)- SC 38 WG 5 Meeting *(Remote participation).*
g) Ms. Ankita Srivastava (BIS)- SC 38 WG 3, AG 5 and WG 5 meetings (*Remote Participation)*

Meeting report for the Plenary, advisory group, working group meetings is placed as **Annexure-6.**

The committee may kindly review and accept

5.3 30th meeting of ISO/IEC JTC 1/ SC 38 and its working groups:

30th meeting of ISO/IEC JTC 1/SC 38 is scheduled to be held from 09th -13th September 2024 in London, United Kingdom. An email regarding the same, seeking nominations from members to attend the meeting was sent on 12 June 2024 and the members were requested to send their interests by 25 June 2024 through email positively. The following groups are scheduled to meet during the week**:**

- 30th Opening SC 38 Plenary – 09th September 2024
- JTC 1/SC 38 WGs – 10th to 12th September 2024
- 30th Closing Plenary – 13th September 2024

Interests have been received from the following membes of LITD 31 & its Panels for attending the meetings:

1. Shri. Srinivasan Ramakrishnan (In personal capacity) - SC 38 plenary and WG 3 meetings in person
2. Shri Bijoyendra Roychowdhuri (In personal capacity) - SC 38 plenary and WG 5 meetings in person
3. Shri Kshitij Kushagra (Meity) - SC 38 plenary and WG 5 meetings in person
4. Shri Sanket Bhondve (Meity) - SC 38 plenary and WG 3 meetings in person
5. Shri. Ignesius Thambyraj (CCICI) - SC 38 plenary and WG 3 meetings in person

The committee may consider and finalize the Indian delegation for the meetings

5.4 Additionally, the committee is requested to review the experts nominated in SC 38 and SC 39 and its various sub-groups to update fresh nominations and remove the inactive members.

The committee may review and decide

5.5 STANDARDS OF ISO/IEC JTC 1/SC 38 AND ISO/IEC JTC 1/SC 39

5.5.1 A list of standards published by ISO/IEC JTC 1/SC 38 and ISO/IEC JTC 1/SC 39 along with harmonized status of standards published by LITD 31 are given in **Annexure-5.** **The business plan of JTC 1/SC 38 is given in Annexure-7.**

The committee may examine and identify the standards required to be adopted as national standards

ITEM 6: RESEARCH AND DEVELOPMENT PROJECTS FOR FORMULATION AND REVIEW OF INDIAN STANDARDS

6.1 As the committee is aware, BIS has launched the scheme of commissioning Research and Development projects for formulation and review of Indian Standards. Consequent to the Terms of Reference as finalized by the committee, the following two R&D projects, have been awarded by BIS:

- **Use-case testing for Cloud interoperability and portability** – Dr Mohit Kumar, NIT Jalandhar
- **Study of Data Centre infrastructure in India** - Dr Rangarajan Saravanan, Vel Tech Multi Tech Chennai

The committee may note

Other committee members are also encouraged to submit relevant potential R&D project proposals for the committee's consideration.

ITEM 7: DATE AND PLACE FOR THE NEXT MEETING

ITEM 8: ANY OTHER BUSINESS

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ANNEXURE 1

Composition and Attendance

S.No.	Organization	Member Name	Role	7th Meeting	8th Meeting	9th Meeting	Total
1	Indian Institute of Technology Bombay, Mumbai	Prof G. Siva Kumar	C	Y	Y	Y	3/3
2	Amazon India, Bengaluru	Shri Narayana Birakayala	P	Y	Y	Y	3/3
3	Centre for Development of Advanced Computing, Pune	Shri Kailash	P	Y	Y	Y	3/3
		Shri Chandrakant Dhutadmal	A				
4	Clearing Corporation of India Ltd, Mumbai	Shri Santosh Bhalerao	P	N	Y	N	1/3
5	Cloud Computing Innovation Council of India, Bengaluru	Shri IGNESIUS ERNEST THAMBYRAJ	P	Y	Y	Y	3/3
		Dr Dinkar Sitaram	A				
6	ESDS Software Solution Limited, Bengaluru	Shri Rishi Jadhav	P	N	Y	Y	2/3
		Shri Kalpesh Parikh	P				
7	International Institute of Information Technology, Bangalore	Prof ShrishaRao	P	Y	Y	Y	3/3
		Shri Vinu Venugopal	A				
8	Microsoft Corporation (India) Private Limited, Gurgaon	Shri Ashutosh Chadha	P	Y	Y	Y	3/3
		Shri Rajesh Ranjan	A				
9	Ministry of Electronics and Information Technology, New Delhi	Shri Kshitij Kushagra	P	Y	Y	Y	3/3
		Shri Sanjay Koul	A				
10	National Informatics Centre, New Delhi	Shri Ashok Kaul	P	N	Y	N	1/3
		Shri Mohd Sibli Sirajee	A				
11	National Institute of Technology, Tiruchirapalli	Dr. G.R. Gangadharan	P	Y	Y	Y	3/3
12	Oracle India Private Limited, New Delhi	Shri Bharat Sondhi	A	Y	Y	Y	3/3
		Shri Angiah Santhanaswamy	P				

13	Standardization Testing and Quality Certification (STQC)	Shri NakulAgarwal	P	Y	Y	N	2/3
		Shri Sunil Kumar Yadav	A				
		Praveen Kumar Singh	A				
14	Telecommunications Standards Development Society India, New Delhi	Shri Vijay Madan	P	Y	Y	N	2/3
		Shri Satish Jamadagni	A				
		Shri Vishnu	A				
		Shri Pritam Bishnoi	A				
15	United Nations Children's Fund, New Delhi	Shri Manish Wasuja	P	N	Y	N	1/3
16	In Personal Capacity	Dr Gargi Keeni		Y	Y	N	2/3
17	In Personal Capacity	Shri Bijoyendra Roy chowdhuri		Y	Y	Y	3/3
18	In Personal Capacity	Shri Srinivasan Ramakrishnan		Y	Y	Y	3/3
19	In Personal Capacity	Shri Madhav Chablani		-	-	Y	1/1

COMPOSITION OF LITD 31: PANEL 2

S.No.	Organization	Member Name
1.	Centre for Development of Advanced Computing, Pune	Shri Kailash
2.	Centre for Development of Advanced Computing, Pune	Mr. Vinodh Kumar M
3.	Clearing Corporation of India Ltd, Mumbai	Shri Santosh Bhalerao
4.	Cloud Computing Innovation Council of India, Bengaluru	Shri IGNESIUS ERNEST THAMBYRAJ
5.	ESDS Software Solution Limited, Bengaluru	Shri Kalpesh Parikh
6.	Ministry of Information and Technology, New Delhi	Mr. Sanjay Koul
7.	National Institute of Technology, Tiruchirapalli	Mr. Dr. G.R. Gangadharan
8.	In Personal Capactiy	Mr. Shri Srinivasan Ramakrishnan
9.	In Personal Capactiy	Mr. Madhav Chablani

COMPOSITION OF PANEL-3 OF LITD 31

S.No.	Organization	Member Name
1.	Cloud Computing Innovation Council of India, Bengaluru	Dr. Dinkar Sitaram
2.	Ministry of Electronics and Information Technology, New Delhi	Shri Kshitij Kushagra
3.	Ministry of Electronics and Information Technology, New Delhi	Shri Sanket Bhondve
4.	In Personal Capacity	Shri Bijoyendra Roy Chowdhuri
5.	In Personal Capacity	Shri Srinivasan Ramakrishnan

ANNEXURE 2

LITD 31: Panel 2 – Data Centres Panel

The Data Centre Panel is established to comprehensively assess, enhance, and develop standards pertaining to data centers in India. The Panel will actively monitor and align its work with the developments and standards set by the ISO/IEC JTC 1/SC 39 committee.
The primary objectives of the Panel are as follows:

a) Review and Evaluate Existing Standards: Conduct a thorough examination of current Data center standards. Identify gaps, redundancies, and areas for improvement in the existing standards.

b) Develop and Enhance Standards: Propose updates, amendments, and new standards to address identified gaps. Collaborate with stakeholders to ensure relevance, practicality, and effectiveness.

c) Alignment with ISO/IEC JTC 1/SC 39: Regularly monitor the work undertaken by the ISO/IEC JTC 1/SC 39 committee. Align Indian data center standards with international best practices and advancements and vice-versa.

d) Assess Ongoing Requirements: Stay abreast of technological advancements and evolving needs in the field of data centers. Periodically assess the ongoing requirements of Indian data centers.

The Data Centre Panel will play a pivotal role in ensuring the adequacy, effectiveness, and international alignment of standards governing data centers in India. This initiative aims to promote innovation, sustainability, and resilience in the rapidly evolving field of data management and storage.

LITD 31: Panel 3 – Cloud Computing Panel

This panel is constituted to cater to the requirements in the domain of cloud computing aspects of the committee. The primary objectives of the Panel are as follows:

Review of Standards Published by ISO/IEC JTC 1/SC 38:

a. Conduct an in-depth review of the standards published by ISO/IEC Joint Technical Committee 1/Subcommittee 38 (JTC 1/SC 38) on Cloud Computing and Distributed Platforms – from time to time, on a regular basis.
b. Assess the suitability of these international standards for adoption as Indian Standards, taking into account the specific needs and conditions prevalent in India.
c. Identify any gaps in the current standards and propose modifications or enhancements to better align with Indian requirements.

2. **Updation of catalogue of Cloud computing related Indian standards:**
    a. Identify the key stakeholders, ongoing initiatives, and existing standards being used within the country.
    b. Develop India specific standards for cloud computing and related services in consultation with industry and MeitY.
    c. Propose a roadmap for the development and adoption of cloud standards that can enhance the operational efficiency, security, and scalability of cloud services in India.
    d. Evaluate the gaps and opportunities in the Indian context, focusing on areas such as data sovereignty, security, privacy, and infrastructure readiness.

3. **Active Participation in ISO Standards Development:**
    a. Engage actively in the development of a series of standards on Multi-cloud Interoperability at the ISO level.
    b. Contribute to the writing, editing, and shaping of documents, ensuring that the interests and perspectives of India are well represented.
    c. Foster collaborations with international experts and working groups to stay updated on global trends and advancements in multi-cloud technologies.
    d. Foster collaboration with Indian experts at appropriate times of the ISO standard project development to enable valuable inputs and approaches.
    e. Ensure that the emerging standards on multi-cloud interoperability address key challenges such as data portability, seamless integration, security, and compliance.

4. **Utilizing Available Resources to Position India as a Leader in Cloud Domain:**
    a. Leverage existing research, knowledge, and technological advancements to position India as a global leader in the cloud computing domain.
    b. Promote the adoption and implementation of cloud standards aligned with global best practices, ensuring they cater to the needs of Indian businesses and government.
    c. Foster innovation and collaboration between industry, academia, and research institutions to drive forward-looking initiatives in cloud computing.
    d. Advocate for policy frameworks and incentives that encourage the development and deployment of cloud technologies in India, aiming to create a robust ecosystem that supports startups and established enterprises alike.

5. **Identification of experts in the domain:**
    a. The panel is also tasked with identification of experts from time to time in cloud computing, who would be willing to contribute to the standardization in the domain to ensure continuity of efforts and active persuasion of Indian interests.

ANNEXURE 3

PROGRAM OF WORK

SI. No.	IS No.	TITLE	Reaffirm M-Y	No. of Amds	Eqv.
1	IS/ISO/IEC 17788 : 2014 ISO/IEC 17788 : 2014	Information technology Cloud computing Overview and vocabulary	- (Published in July 2022)	-	Identical under single numbering
2	IS/ISO/IEC 19944-1 : 2020 ISO/IEC 19944 Part 1:2020	Cloud computing and distributed platforms Data flow data categories and data use Part 1: Fundamentals	- (Published in Aug 2022)	-	Identical under single numbering
3	IS/ISO/IEC 22123-1 : 2021 ISO/IEC 22123 Part 1:2021	Information technology Cloud computing Part 1: Vocabulary	- (Published in Aug 2022)	-	Identical under single numbering
4	IS/ISO/IEC 22237-1 : 2021 ISO/IEC 22237-1:2021	Information Technology Data Centre Facilities and Infrastructures Part 1: General Concepts	- (Published in Dec 2023)		Identical under single numbering
5	IS/ISO/IEC 22237-3 : 2021 ISO/IEC 22237-3:2021	Information Technology Data Centre Facilities and Infrastructures Part 3: Power Distribution	- (Published in Dec 2023)		Identical under single numbering
6	IS/ISO/IEC 22237-4 : 2021 ISO/IEC 22237-4: 2021	Information Technology Data Centre Facilities and Infrastructures Part 4: Environmental Control	- (Published in Dec 2023)		Identical under single numbering
7	IS/ISO/IEC 30134-1 : 2016 ISO/IEC 30134-1:2016	Information Technology Data Centers Key Performance Indicators Part 1 Overview and General Requirements	March, 2023	-	Identical under single numbering
8	IS/ISO/IEC 30134-2 : 2016 ISO/IEC 30134-2 : 2016	Information Technology Data Centres Key Performance Indicators Part 2 Power Usage Effectiveness (PUE)	March, 2023	-	Identical under single numbering
9	IS/ISO/IEC 30134-3 : 2016 ISO/IEC 30134-3 : 2016	Information Technology Data Centres Key Performance Indicators Part 3 Renewable Energy Factor (REF)	March, 2023	-	Identical under single numbering
10	IS/ISO/IEC 30134-4 : 2017 ISO/IEC 30134-4 : 2017	Information Technology Data Centres Key Performance Indicators Part 4 IT Equipment Energy Efficiency for Servers (ITEEsv)	March, 2023	-	Identical under single numbering
11	IS/ISO/IEC 30134-5 : 2017 ISO/IEC 30134-5 : 2017	Information Technology Data Centres Key Performance Indicators Part 5 IT Equipment Utilization for Servers (ITEUsv)	March, 2023	-	Identical under single numbering
12	IS/ISO/IEC 30134-6 : 2021 ISO/IEC 30134-6:2021	Information Technology Data Centres Key Performance	-		Identical under

		Indicators Part 6: Energy Reuse Factor ERF	(Published in Dec 2023)		single numbering
13	IS/ISO/IEC 30134-8 : 2022 ISO/IEC 30134-8:2022	Information Technology Data Centres Key Performance Indicators Part 8: Carbon Usage Effectiveness CUE	- (Published in Dec 2023)		Identical under single numbering
14	IS/ISO/IEC 30134-9 : 2022 ISO/IEC 30134-9:2022	Information Technology Data Centres Key Performance Indicators Part 9: Water Usage Effectiveness WUE	- (Published in Dec 2023)		Identical under single numbering

ANNEXURE 4

EXPERTS FROM INDIA REGISTERED IN WGs

ISO/IEC JTC 1/SC 38 Cloud computing and distributed platforms

S.No.	Member Name	Member Organization
1.	Mr Madhav Chablani	In Personal Capacity
2.	Dr Gargi Keeni	In Personal Capacity
3.	Mr Kshitij Kushagra	Ministry of Electronics and Information Technology
4.	Dr Srinivasan Ramakrishnan	In Personal Capacity
5.	Mr Bijoyendra Roychowdhury	Capgemini
6.	Mr Dinkar Sitaram	Cloud Computing Innovation Council of India
7.	Mr Ignesius Ernest Thambyraj	Cloud Computing Innovation Council of India, Bengaluru
8.	Ms Nisha Bura	BIS
9.	Mr Rajneesh Khosla	BIS
10.	Ms. Ankita Srivastava	BIS
11.	Mr Ashish Tiwari	BIS
12.	Mr Abhishek S. Naidu	BIS

ISO/IEC JTC 1/SC 38/AG 5 Long-term strategy

S.No.	Member Name	Member Organization
1.	Mr Bijoyendra Roychowdhury	Capgemini
2.	Ms. Ankita Srivastava	BIS
3.	Mr Kshitij Kushagra	Ministry of Electronics and Information Technology

ISO/IEC JTC 1/SC 38/WG 3 Cloud Computing Fundamentals (CCF)

S.No.	Member Name	Member Organization
1.	Mr Srinivasan Ramakrishnan	In Personal Capacity
2.	Mr Bijoyendra Roychowdhury	Capgemini
3.	Mr Ignesius Ernest Thambyraj	Cloud Computing Innovation Council of India, Bengaluru
4.	Ms. Ankita Srivastava	BIS

ISO/IEC JTC 1/SC 38/WG 5 Data in cloud computing and related technologies

S.No.	Member Name	Member Organization
1.	Mr Madhav Chablani	In Personal Capacity
2.	Mr Rajeev Papneja	ESDS Software Solution Limited
3.	Mrs Uma Chauhan	Ministry of Electronics and Information Technology
4.	Mr Bijoyendra Roychowdhury	Capgemini
5.	Mr Kshitij Kushagara	Ministry of Electronics and Information Technology

6.	Mr Ashok Kaul	National Informatics Centre
7.	Mr Dinkar Sitaram	Cloud Computing Innovation Council of India
8.	Ms. Ankita Srivastava	BIS

ISO/IEC JTC 1/SC 39 Sustainability, IT and data centres

S.No.	Member Name	Member Organization
1.	Dr Shrisha Rao	International Institute of Information Technology
2.	Mr Vinodh Kumar Markapuram	CDAC
3.	Mr Kailash S	CDAC
4.	Mr Ignesius Ernest Thambyraj	Cloud Computing Innovation Council of India, Bengaluru
5.	Ms Nisha Bura	BIS
6.	Mr Rajneesh Khosla	BIS
7.	Mr Abhishek S. Naidu	BIS
8.	Ms. Ankita Srivastava	BIS

ISO/IEC JTC 1/SC 39/WG 3 Sustainable facilities and infrastructures

S.No.	Member Name	Member Organization
1.	Dr G.R. Gangadharan	National Institute of Technology, Tiruchirapalli
2.	Mr Rishi Jadhav	ESDS Software Solution Limited
3.	Mr Vinodh Kumar Markapuram	CDAC
4.	Mr Kailash S	CDAC
5.	Mr Ignesius Ernest Thambyraj	Cloud Computing Innovation Council of India, Bengaluru
6.	Ms. Ankita Srivastava	BIS

ANNEXURE 5

ISO/IEC JTC 1/SC 38 Cloud computing and distributed platforms

S.No.	Published Standards	Adoption Status
1.	ISO/IEC TR 3445:2022 Information technology — Cloud computing — Audit of cloud services	N
2.	ISO/IEC 5140:2024 Information technology — Cloud computing — Concepts for multi-cloud and the use of multiple cloud services	N
3.	ISO/IEC TS 5928:2023 Information technology — Cloud computing and distributed platforms — Taxonomy for digital platforms	N
4.	ISO/IEC 17203:2017 Information technology — Open Virtualization Format (OVF) specification	N
5.	ISO/IEC 17963:2013 Web Services for Management (WS-Management) Specification	N
6.	ISO/IEC 18384-1:2016 Information technology — Reference Architecture for Service Oriented Architecture (SOA RA) — Part 1: Terminology and concepts for SOA	N
7.	ISO/IEC 18384-2:2016 Information technology — Reference Architecture for Service Oriented Architecture (SOA RA) — Part 2: Reference Architecture for SOA Solutions	N
8.	ISO/IEC 18384-3:2016 Information technology — Reference Architecture for Service Oriented Architecture (SOA RA) — Part 3: Service Oriented Architecture ontology	N
9.	ISO/IEC 19086-1:2016 Information technology — Cloud computing — Service level agreement (SLA) framework — Part 1: Overview and concepts	Y
10.	ISO/IEC 19086-2:2018 Cloud computing — Service level agreement (SLA) framework — Part 2: Metric model	Y
11.	ISO/IEC 19086-2:2018/Amd 1:2023 Cloud computing — Service level agreement (SLA) framework — Part 2: Metric model — Amendment 1	N
12.	ISO/IEC 19086-3:2017 Information technology — Cloud computing — Service level agreement (SLA) framework — Part 3: Core conformance requirements	Y
13.	ISO/IEC 19941:2017 Information technology — Cloud computing — Interoperability and portability	N

14.	ISO/IEC 19944-1:2020 Cloud computing and distributed platforms ─ Data flow, data categories and data use — Part 1: Fundamentals	Y
15.	ISO/IEC 19944-2:2022 Cloud computing and distributed platforms — Data flow, data categories and data use — Part 2: Guidance on application and extensibility	N
16.	ISO/IEC 22123-1:2023 Information technology — Cloud computing — Part 1: Vocabulary	Y
17.	ISO/IEC 22123-2:2023 Information technology — Cloud computing — Part 2: Concepts	N
18.	ISO/IEC 22123-3:2023 Information technology — Cloud computing — Part 3: Reference architecture	N
19.	ISO/IEC 22624:2020 Information technology — Cloud computing — Taxonomy based data handling for cloud services	Y
20.	ISO/IEC TR 22678:2019 Information technology — Cloud computing — Guidance for policy development	Y
21.	ISO/IEC TS 23167:2020 Information technology — Cloud computing — Common technologies and techniques	Y
22.	ISO/IEC TR 23186:2018 Information technology — Cloud computing — Framework of trust for processing of multi-sourced data	N
23.	ISO/IEC TR 23187:2020 Information technology — Cloud computing — Interacting with cloud service partners (CSNs)	Y
24.	ISO/IEC TR 23188:2020 Information technology — Cloud computing — Edge computing landscape	Y
25.	ISO/IEC TR 23613:2020 Information technology — Cloud computing — Cloud service metering elements and billing modes	Y
26.	ISO/IEC 23751:2022 Information technology — Cloud computing and distributed platforms — Data sharing agreement (DSA) framework	N
27.	ISO/IEC TR 23951:2020 Information technology — Cloud computing — Guidance for using the cloud SLA metric model	Y
28.	ISO/IEC TR 30102:2012 Information technology — Distributed Application Platforms and Services (DAPS) — General technical principles of Service Oriented Architecture	N

Standards by ISO/IEC JTC 1/SC 39 Sustainability, IT and data centres

S.no.	Published Standards	Adoption Status
1.	ISO/IEC 19395:2015 Information technology — Sustainability for and by information technology — Smart data centre resource monitoring and control	N
2.	ISO/IEC TR 20913:2016 Information technology — Data centres — Guidelines on holistic investigation methodology for data centre key performance indicators	N
3.	ISO/IEC 21836:2020 Information technology — Data centres — Server energy effectiveness metric	N
4.	ISO/IEC TR 21897:2022 Information technology — Data centres — Impact of the ISO 52000 series on energy performance of buildings	N
5.	ISO/IEC 22237-1:2021 Information technology — Data centre facilities and infrastructures — Part 1: General concepts	Y
6.	ISO/IEC TS 22237-2:2018 Information technology — Data centre facilities and infrastructures — Part 2: Building construction	N
7.	ISO/IEC 22237-3:2021 Information technology — Data centre facilities and infrastructures — Part 3: Power distribution	Y
8.	ISO/IEC 22237-4:2021 Information technology — Data centre facilities and infrastructures — Part 4: Environmental control	Y
9.	ISO/IEC TS 22237-5:2018 Information technology — Data centre facilities and infrastructures — Part 5: Telecommunications cabling infrastructure	N
10.	ISO/IEC TS 22237-6:2018 Information technology — Data centre facilities and infrastructures — Part 6: Security systems	N
11.	ISO/IEC TS 22237-7:2018 Information technology — Data centre facilities and infrastructures — Part 7: Management and operational information	N
12.	ISO/IEC TS 22237-30:2022 Information technology — Data centre facilities and infrastructures — Part 30: Earthquake risk and impact analysis	N
13.	ISO/IEC TS 22237-31:2023 Information technology — Data centre facilities and infrastructures — Part 31: Key performance indicators for resilience	N
14.	ISO/IEC TR 23050:2019 Information technology — Data centres — Impact on data centre resource metrics of electrical energy storage and export	N
15.	ISO/IEC 23544:2021 Information Technology — Data centres — Application Platform Energy Effectiveness (APEE)	N
16.	ISO/IEC TR 30132-1:2016 Information technology — Information technology sustainability — Energy efficient computing models — Part 1: Guidelines for energy effectiveness evaluation	N

17.	ISO/IEC TR 30133:2023 Information technology — Data centres — Practices for resource-efficient data centres	N
18.	ISO/IEC 30134-6:2021 Information technology — Data centres key performance indicators — Part 6: Energy Reuse Factor (ERF)	Y
19.	ISO/IEC 30134-1:2016 Information technology — Data centres — Key performance indicators — Part 1: Overview and general requirements	Y
20.	ISO/IEC 30134-1:2016/Amd 1:2018 Information technology — Data centres — Key performance indicators — Part 1: Overview and general requirements — Amendment 1	Y
21.	ISO/IEC 30134-2:2016 Information technology — Data centres — Key performance indicators — Part 2: Power usage effectiveness (PUE)	Y
22.	ISO/IEC 30134-2:2016/Amd 1:2018 Information technology — Data centres — Key performance indicators — Part 2: Power usage effectiveness (PUE) — Amendment 1	Y
23.	ISO/IEC 30134-3:2016 Information technology — Data centres — Key performance indicators — Part 3: Renewable energy factor (REF)	Y
24.	ISO/IEC 30134-3:2016/Amd 1:2018 Information technology — Data centres — Key performance indicators — Part 3: Renewable energy factor (REF) — Amendment 1	Y
25.	ISO/IEC 30134-4:2017 Information technology — Data centres — Key performance indicators — Part 4: IT Equipment Energy Efficiency for servers (ITEEsv)	Y
26.	ISO/IEC 30134-5:2017 Information technology — Data centres — Key performance indicators — Part 5: IT Equipment Utilization for servers (ITEUsv)	Y
27.	ISO/IEC 30134-6:2021 Information technology — Data centres key performance indicators — Part 6: Energy Reuse Factor (ERF)	Y
28.	ISO/IEC 30134-7:2023 Information technology — Data centres key performance indicators — Part 7: Cooling efficiency ratio (CER)	N
29.	ISO/IEC 30134-8:2022 Information technology — Data centres key performance indicators — Part 8: Carbon usage effectiveness (CUE)	Y
30.	ISO/IEC 30134-9:2022	Y

	Information technology — Data centres key performance indicators — Part 9: Water usage effectiveness (WUE)	