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**Technical requirements for TAA to certify
UTC-traceability**

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Foreword

This Japanese Industrial Standard has been revised by the Minister of Economy, Trade and Industry through deliberations at the Japanese Industrial Standards Committee as the result of proposal for revision of Japanese Industrial Standard submitted by National Institute of Information and Communications Technology (NICT)/Japanese Standards Association (JSA) with the draft being attached, based on the provision of Article 12 Clause 1 of the Industrial Standardization Law applicable to the case of revision by the provision of Article 14.

Consequently **JIS X 5094:2011** is replaced with this Standard.

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Technical requirements for TAA to certify UTC-traceability

Introduction

This Japanese Industrial Standard was established in 2011, and has been revised this time with the aim of harmonizing its contents with **ISO/IEC 18014-4** : 2015, with some modifications of the technical contents to reflect the needs and conditions unique to Japan.

The dotted underlines indicate changes from the corresponding International Standard. A list of modifications with the explanations is given in Annex JA.

This Standard describes an overall architecture for providing trusted time to the time-stamping authority (TSA) and specifies technical guidelines to guarantee its correctness through the use of the time assessment authority (TAA).

1 Scope

This Standard

- defines the functionality of the time assessment authority (TAA),
- describes an overall architecture for providing the time to the time-stamping authority (TSA) and to guarantee the correctness of it through the use of the TAA, and
- gives technical guidelines for the TAA to provide, and to provide assurance in, a trusted time source to the TSA.

NOTE The International Standard corresponding to this Standard and the symbol of degree of correspondence are as follows.

ISO/IEC 18014-4 : 2015 *Information technology — Security techniques — Time-stamping services — Part 4 : Traceability of time sources* (MOD)

In addition, symbols which denote the degree of correspondence in the contents between the relevant International Standards and **JIS** are IDT (identical), MOD (modified), and NEQ (not equivalent) according to **ISO/IEC Guide 21-1**.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this Standard. The most recent editions of the standards (including amendments) indicated below shall be applied.

ISO/IEC 18014-1 *Information technology — Security techniques — Time-stamping services — Part 1 : Framework*

ITU-R TF.1876 *Trusted time source for Time Stamp Authority*

3 Terms and definitions

For the purpose of this Standard, the following terms and definitions apply.

3.1

accuracy

closeness of the agreement between the result of a measurement and the true value of the measurand (ITU-R TF.686-3 : 2013, ANNEX 1)

NOTE Accuracy is generally characterized by the overall uncertainty of a measured value.

3.2

leap second

intentional time step of one second used to adjust UTC to ensure approximate agreement with UT1 (ISO 8601 : 2004, 2.2.2)

3.3

measurement

process of experimentally obtaining one or more quantity values that can be reasonably attributed to a quantity (TS Z 0032 : 2012, 2.1)

3.4

second

basic unit of time or time interval that is equal to the duration of 9 192 631 770 periods of the radiation corresponding to the transition between the two hyperfine levels of the ground state of caesium-133 (JIS Z 8000-3 : 2014, 3-7.a)

3.5

time assessment authority, TAA

entity which audits the time of the TSA clock and may also disseminate time to TSA

3.6

TAA clock

clock system of the TAA, used for time audit and time dissemination

3.7

time audit

audit of the time of downstream clocks in time traceability chains in order to check that it is consistent within the required accuracies

3.8

time dissemination

distribution of a time signal from one location to another

3.9

time offset certificate

certificate issued by a TAA to certify the measured time offset of a TSA clock with respect to the TAA clock

3.10

time-stamping service

service that provides proof for existence of a data item before a particular point in time (JIS X 5063-1 : 2005, 3.3)

3.11

time-stamping authority, TSA

trusted third party trusted to provide a time-stamping service (ISO/IEC 18014-1 : 2008, 3.17)

3.12

time-stamp token, TST

data structure containing a verifiable cryptographic binding between a data item's representation and a time-value (ISO/IEC 18014-1 : 2008, 3.15)

NOTE A time-stamp token can also include additional data items in the binding.

3.13

time traceability chain

chain consisting of a sequence of reference clocks starting with UTC(*k*), used to relate the time from an end user to a timing centre

3.14

timing centre

organization with the means to disseminate the UTC(*k*) time to a TSA with the required accuracy

NOTE The UTC(*k*) generated by the timing centre can be used in real time and its time difference from UTC is regularly published by the BIPM (the Bureau International des Poids et Mesures).

3.15

traceability

property of the result of a measurement or the value of a standard whereby it can be related to stated references, usually national or international standards, through an unbroken chain of comparisons all having stated uncertainties (ITU-R TF.686-3 : 2013, ANNEX 1)

3.16

TSA clock

clock of the TSA, which generates the time information included in the TST

3.17

UTC

time scale maintained by the Bureau International des Poids et Mesures (BIPM) and the International Earth Rotation and Reference Systems Service (IERS) that forms the basis of a coordinated dissemination of standard frequencies and time signals

NOTE UTC is Coordinated Universal Time defined by ITU-R (ISO 19108 : 2002, 4.1.3).

3.18

UTC(*k*) [UTC(*k*)]

time scale realized by institute “*k*” and kept in close agreement with UTC, with the goal to be within ± 100 ns, according to Recommendation S5 (1993) of the Consultative Committee for the Definition of the Second (ITU-R TF.536-2 : 2003, 2)

4 Symbols and abbreviated terms

For the purpose of this Standard, the following abbreviations apply :

GNSS Global Navigation Satellite System

GPS Global Positioning System

NMI National Measurement Institute

NTP Network Time Protocol

OID Object Identifier

TTP Trusted Third Party

URL Uniform Resource Locator

5 General

In time-stamping services, the TSA clock used to create TST is required to be synchronized with UTC within the declared accuracy, and shall be managed so as to guarantee the correctness of the time parameter included in the TST. The TAA certifies the traceability of the time reference of the TSA to the time scale of UTC(*k*) provided by a timing centre and may, optionally, distribute time information to the TSA. The function of the TAA may be performed by a timing centre or by a TTP.

As for time-stamping services, those specified in ISO/IEC 18014-1 shall be referred to. As for functionalities of the TAA, those defined in ITU-R TF.1876 shall be referred to.

This Standard describes an overall architecture for providing accurate and traceable time to the TSA and for certifying the traceability of the time of the TSA to UTC(*k*). It also addresses technical requirements for the TAA :