TIME DISSEMINATION SERVICES

The following tables are based on information received at the BIPM between February and March 2024.

AUTHORITIES RESPONSIBLE FOR TIME DISSEMINATION SERVICES

AGGO
Argentinean-German Geodetic Observatory (AGGO)
Camino Gral. Belgrano km 40
1884 Berazategui, Provincia de Buenos Aires
Argentina

AOS
Astrogeodynamical Observatory
Borowiec near Poznan
Space Research Centre P.A.S.
PL 62-035 Kórnik - Poland

AUS
Electricity Section
National Measurement Institute
36 Bradfield Rd
Lindfield NSW 2070 - Australia

BelGIM
Belarussian State Institute of Metrology
National Standard for Time, Frequency and
Time-scale of the Republic of Belarus
Minsk, Minsk Region – 220053 Belarus

BEV
Bundesamt für Eich- und Vermessungswesen
Arltgasse 35
A-1160 Wien, Vienna – Austria

BIM
Bulgarian Institute of Metrology
General Directorate National Center of Metrology
52-B, Dr. G. M. Dimitrov Blvd.
1797 Sofia, Bulgaria

BoM
Ministry of economy - Bureau of metrology
Jane Sandanski 109a
1000 Skopje, Macedonia

CENAM
Centro Nacional de Metrología
Dirección de Tiempo y Frecuencia
km. 4.5 carretera a Los Cués
El Marqués, Querétaro 76246, México.

CENAMEP
Centro Nacional de Metrología de Panamá AIP
CENAMEP AIP
Ciudad del Saber
Edif. 206 Panama

DFM
Dansk Fundamental Metrologi, DFM A/S
Danish National Metrology Institute
Kogle Allé 5
DK-2970 Hørsholm
Denmark

DMDM
Directorate of Measures and Precious Metals
Section for electrical quantities, time and frequency
Mike Alasa 14
11000 Belgrade
Serbia

EIM
Hellenic Institute of Metrology
Electrical Measurements Department
Block 45, Industrial Area of Thessaloniki

PO 57022, Sindos
Thessaloniki, Greece

GUM — Time and Frequency Laboratory
Główny Urząd Miar – Central Office of Measures
ul. Elektoralna 2
PL 00 – 139 Warszawa, Poland

HKO — Hong Kong Observatory
134A, Nathan Road
Kowloon, Hong Kong, China

ICE — Instituto Costarricense de Electricidad
ICE
San Jose
Costa Rica

IGNA — Instituto Geográfico Nacional
Servicio Internacional de la Hora
Cabildo 381
C1426AAD Ciudad de Buenos Aires
Argentina

ILNAS — Bureau Luxembourgeois de Métrologie
Laboratoire Temps Fréquence
22 avenue des Hauts Fourneaux
L-4362 Esch-sur-Alzette, Luxembourg

IMBH — Institute of Metrology of Bosnia and Herzegovina (IMBH)
Laboratory for time and frequency
Branilaca Sarajeva 25
71000 Sarajevo, Bosnia and Herzegovina

INACAL — Instituto Nacional de Calidad
Calle De La Prosa 150
Código postal 15034
San Borja, Lima 41, Peru

INM — Instituto Nacional de Metrología de Colombia
Avenida Carrera 50 No. 26 – 55 Interior 2
Bogotá D.C. – Colombia

INPL — National Physical Laboratory of Israel
Ministry of Economy and Industry
Bank of Israel Street, 5, Jerusalem 9103101
P.O.B. 3166; Tel.: +972-(0)74-7215923
Israel

INRIM — Istituto Nazionale di Ricerca Metrologica
Strada delle Cacce, 91
I – 10135 Turin, Italy

INTI — Instituto Nacional de Tecnología Industrial
Av. General Paz Nº 5445
B1650WAB San Martín
Buenos Aires, Argentina

JV	Justervesenet Norwegian Metrology Service PO Box 170 2027 Kjeller, Norway
KRISS	Center for Time and Frequency Division of Physical Metrology Korea Research Institute of Standards and Science 267 Gajeong-Ro, Yuseong Daejeon 34113 Republic of Korea
KZ	Time and Frequency Laboratory Kazakhstan Institute of Standardization and Metrology Mangilik El Ave., 11, building "Reference Center" Nur-Sultan, Republic of Kazakhstan
LNE-SYRTE	Laboratoire National de Métrologie et d'Essais Systèmes de Référence Temps-Espace Observatoire de Paris 61, avenue de l'Observatoire, 75014 Paris – France
LRTE	Laboratório de Referências de Tempo e Espaço Grupo de Óptica University of São Paulo Av. Trabalhador Saocarlense, 400 13566-590 São Carlos, Brazil
LT	Time and Frequency Standard Laboratory Center for Physical Sciences and Technology Saulėtekio av. 3, Vilnius LT-10257, Lithuania
MASM	Time and Frequency Standard Laboratory Mongolian Agency for Standardization and Metrology Peace avenue 46A, Bayanzurkh district, Ulaanbaatar 13343 Mongolia
METAS	Federal Institute of Metrology Sector Length, Optics and Time Lindenweg 50 CH-3003 Bern-Wabern Switzerland
MIKES	VTT Technical Research Centre of Finland Ltd Centre for Metrology MIKES P.O. Box 1000, FI-02044 VTT, Finland
MSL	Measurement Standards Laboratory Callaghan Innovation 69 Gracefield Road PO Box 31-310 Lower Hutt – New Zealand
NAO	Time Keeping Office Public Relations Center National Astronomical Observatory of Japan 2-21-1 Osawa, Mitaka, Tokyo 181-8588, Japan
NICT	Space-Time Standards Laboratory National Institute of Information and Communications Technology

4 -2 -1, Nukui-kitamachi
Koganei, Tokyo 184-8795 - Japan

NIM	Time & Frequency Division National Institute of Metrology No. 18, Bei San Huan Dong Lu Beijing 100029 - People's Republic of China
NIMB	Time and Frequency Laboratory National Institute of Metrology Sos. Vitan - Barzesti, 11 042122 Bucharest, Romania
NIMT	Time and Frequency Laboratory National Institute of Metrology (Thailand) 3/5 Moo 3, Klong 5, Klong Luang, Pathumthani 12120, Thailand
NIST	National Institute of Standards and Technology Time and Frequency Division, 688.00 325 Broadway Boulder, Colorado 80305, USA
NMIJ	Time Standards Group National Metrology Institute of Japan (NMIJ), AIST Umezono 1-1-1, Tsukuba, Ibaraki 305-8563, Japan
NMISA	Time and Frequency Laboratory National Metrology Institute of South Africa Private Bag X34 Lynnwood Ridge 0040, Pretoria - South Africa
NMLS	Time and Frequency Laboratory National Metrology Institute of Malaysia Lot PT 4803, Bandar Baru Salak Tinggi, 43900 Sepang - Malaysia
NPL	National Physical Laboratory Time and Frequency Department Hampton Road Teddington, Middlesex TW11 0LW United Kingdom
NPLI	Time and Frequency Metrology Section CSIR-National Physical Laboratory Dr.K.S.Krishnan Road New Delhi 110012 - India
NRC	Frequency and Time, Metrology National Research Council of Canada M-36, 1200 Montreal Road Ottawa, Ontario, K1A 0R6, Canada
NSC IM	Time and Frequency Section National Scientific Center "Institute of Metrology" Kharkov - Ukraine Str. Mironositska 42 Region – 61002 Ukraine

NTSC	National Time Service Center Chinese Academy of Sciences 3 East Shuyuan Rd, Lintong District, Xi'an Shaanxi 710600, China
ONBA	Servicio de Hidrografía Naval Observatorio Naval Buenos Aires Servicio de Hora Av. España 2099 C1107AMA – Buenos Aires, Argentina
ONRJ	Observatorio Nacional (MCTIC) Divisão Serviço da Hora Rua General José Cristino, 77 São Cristovão 20921-400 Rio de Janeiro, Brazil
ORB	Royal Observatory of Belgium Avenue Circulaire, 3 B-1180 Brussels, Belgium
PTB	Physikalisch-Technische Bundesanstalt Time and Frequency Department, WG 4. 42 Bundesallee 100 D-38116 Braunschweig, Germany
RISE	RISE Research Institutes of Sweden Box 857 S-501 15 Borås Sweden
ROA	Real Instituto y Observatorio de la Armada Plaza de las Tres Marinas s/n 11100 San Fernando Cádiz, Spain
SG	National Metrology Centre Agency for Science, Technology and Research (A*STAR) 8 CleanTech Loop #01-20 Singapore 637145
SIQ	SIQ Ljubljana Metrology department Mašera-Spasićeva ulica 10 1000 Ljubljana Slovenia
SL	Measurement Units, Standards and Services Department (MUSSD), Mahenawatta, Pitipana, Homagama, - Sri Lanka
SMD	FPS Economy Directorate-General Quality and Safety Metrology North Gate Boulevard du Roi Albert II 16 1000 Brussels, Belgium

SNSU-BSN	Standar Nasional Satuan Ukuran -- Badan Standardisasi Nasional National Measurement Standards -- National Standardization Agency (SNSU-BSN) Kawasan PUSPIPTEK Gedung 420 Serpong Tangerang 15314 Banten - Indonesia
TL	National Standard Time and Frequency Laboratory Telecommunication Laboratories Chunghwa Telecom. Co., Ltd. No. 99, Dianyan Road Yang-Mei, Taoyuan, 32661 Taiwan Chinese Taipei
TP	Institute of Photonics and Electronics Czech Academy of Sciences Chaberská 1014/57, 182 00 Praha 8 Czech Republic
UME	Ulusal Metroloji Enstitüsü Baris Mah. Dr. Zeki Acar Cad. No: 1 41470 Gebze - Kocaeli Türkiye
USNO	U.S. Naval Observatory 3450 Massachusetts Ave., N.W. Washington, D.C. 20392-5420 USA
UZ	Uzbek National Institute of Metrology (UzNIM) Time and Frequency Laboratory Tashkent city, Farobiy street, 333 “A” 100049, Republic of Uzbekistan
VMI	Laboratory of Time and Frequency (TFL) Vietnam Metrology Institute (VMI) No 8, Hoang Quoc Viet Rd, Cau Giay Dist., Hanoi Vietnam.
VNIIFTRI	All-Russian Scientific Research Institute for Physical Technical and Radiotechnical Measurements, Moscow Region 141570 Russia
VSL	VSL National Metrology Institute Thijsseweg 11 2629 JA Delft Netherlands

TIME DISSEMINATION SERVICES

AGGO (1)	Network Time Service: AGGO operates a stratum-1 open access NTP server referenced to UTC(AGGO). Server Host Name: ntp.aggo-conicet.gob.ar
AOS	AOS Computer Time Service: vega.cbk.poznan.pl (150.254.183.15) Synchronization: NTP V3 primary (Caesium clock), PC Pentium, RedHat Linux Service Area: Poland/Europe Access Policy: open access Contact: Jerzy Nawrocki (nawrocki@cbk.poznan.pl) Robert Diak (kondor@cbk.poznan.pl)
AUS	Network Time Service Computers connected to the Internet can be synchronized to UTC(AUS) using the NTP protocol. The NTP servers are referenced to UTC(AUS) either directly or via a GPS common view link. Please see http://www.measurement.gov.au/Services/Pages/TimeandFrequencyDisseminationService.aspx for information on access or contact time@measurement.gov.au
BelGIM	Internet Time Service: BelGIM operates one time server Stratum 1 using the "Network Time Protocol" (NTP). The server host name is: http://www.belgim.by (Stratum 1)
BEV	Internet Time Service: BEV operates three time servers using NTP and NTS (Network Time Security) protocol. The hostnames of the servers are: bevtime1.metrologie.at bevtime2.metrologie.at time.metrologie.at More information at https://www.bev.gv.at/en/Topics/Metrology-Service/Metrological-Subject-Fields/Time-Services/Internet-Time-Synchronization.html Telephone Time Service: BEV provides a time dissemination service via phone and modem to synchronize clocks. Uses the Time Distribution System from TUG. It has a baud rate of 1200 and everyone can use it with no cost. Access phone number is +43 1 21110 826381 The system will be updated periodically (DUT1, Leap Second…).
BIM (1)	BIM operates a time server using the "Network Time Protocol" (NTP). The server is available at IP addresses: 172.20.10.199; Access policy: restricted. The server is directly synchronized to UTC(BIM). "Six-pip time signals" are broadcast by Bulgarian National Radio at 3 pm every day and controled by BIM.
BoM (1)	Internet Time Service BoM operates two Stratum 1 NTP servers referenced to UTC(BoM). BoM also operates one time server Stratum 2 using the "Network Time Protocol" (NTP). Server Host Name: time.bom.gov.mk

(1) Information based on the Annual Report 2022, not confirmed by the Laboratory.

CENAM

CENAM operates a telephone voice system that provides the local time for time zones in Mexico.
Phone numbers and zones:

+52 (442) 211 0505 → Southeast Time
+52 (442) 211 0506 → Central Time
+52 (442) 211 0507 → Pacific Time
+52 (442) 211 0508 → Northwest Time
+52 (442) 211 0509 → UTC(CNM)

Telephone Code
CENAM provides a telephone code for setting time in computers. For more information about this service please contact tiempo@cenam.mx

Network Time Protocol (NTP)
Operates two time servers using NTP (located at CENAM).
Further information at http://www.cenam.mx/hora_oficial/

Web-based time-of-day clock which displays local time for all Mexican time zones. Referenced to CENAM Internet Time Service.
Available at http://www.cenam.mx/hora_oficial/

CENAMEP (1)

Network Time Server
A Stratum 1 time server is used to synchronize computer networks of the government institutions and companies in the private sector using the NTP protocol. To access the Network time service, send an email to servicios@cenamep.org.pa

Web Clock
A web clock is used to display the time of day in real time. To access the Web Clock, enter the link http://horaexacta.cenamep.org.pa/

Voice Time Server
An assembly of computers provides the local time. To access the service, call the telephone numbers (507) 5173201, (507) 5173202 and (507) 5173203

DFM

DFM operates a network time service using the standard Network Time Protocol (NTP) and its authenticated version NTS available
from time.dfm.dk. The server is directly synchronized with UTC(DFM).
Further information at https://dfm.dk/ntp/
A web-based clock is available at https://dfm.dk/ur/
Access policy: free.

DMDM

Internet Time Service (ITS)
DMDM operates two Stratum 1 time servers using the “Network Time Protocol” (NTP), synchronized to UTC(DMDM).
Access policy: restricted.
DMDM also operates two Stratum 2 NTP servers:
vreme1.dmdm.rs or vreme1.dmdm.gov.rs
vreme2.dmdm.rs or vreme2.dmdm.gov.rs
Access policy: free.

Web-based time-of-day clock that displays local time for Serbia referenced to the DMDM ITS. Available at the web page:
http://www.dmdm.rs/en/index.php

EIM (1)

Internet Time Service
EIM operates a time server using the “Network Time
Protocol” (NTP). The address hercules.eim.gr is also accessible through

	IP address 83.212.233.6. This route is offered under a restricted access policy. The server uses the 10 MHz signal from our primary standard as reference and is synchronized to UTC(EIM).
GUM (1)	Telephone Time Service providing the European time code by telephone modem for setting time in computers. Includes provision for compensation of propagation time delay. Access phone number : +48 22 654 88 72

	Network Time Service Two NTP servers are available: tempus1.gum.gov.pl tempus2.gum.gov.pl with an open access policy. It provides synchronization to UTC(PL). Contact: time@gum.gov.pl Web Clock A web clock is used to display the local time in Poland referred to the GUM NTP servers. Available at the web page: http://czas.gum.gov.pl
HKO	Internet Clock Services HKO operates time-of-day clocks that display Hong Kong Standard Time (=UTC(HKO) + 8 h) Available as web clock at https://www.hko.gov.hk/en/gts/time/clock_e.html Speaking Clock Service HKO operates an automatic “Dial-a-weather System” that provides a voice announcement of Hong Kong Standard Time. Access phone number: +852 1878200 (when connected, press “3”, “6”, “1” in sequence) Network Time Service HKO operates network time service using Network Time Protocol (NTP). Host names of the NTP servers: stdtime.gov.hk; time.hko.hk (for IPv6 users) Further information at https://www.hko.gov.hk/en/nts/ntime.htm
ICE	Network Time Server Two Stratum 1 time servers are used to synchronize computer networks of the government institutions and companies in the private sector using the NTP protocol. To access the Network time service, send an email to ofallasc@ice.go.cr Web Clock A web clock is used to display the time of day in real time. To access the Web Clock, enter the link: https://www.grupoice.com/wps/portal/ICE/quienessomos/laboratorioss/lametro
IGNA	Network Time Protocol IGN operates an open access NTP server referenced to UTC(IGNA). Server Host Name: ntp.ign.gob.ar (stratum 2, open access) Setup instructions (spanish): https://www.ign.gob.ar/NuestrasActividades/Geodesia/ServicioInternacionalHora/NTP GPS common-view data CGGTS and RINEX files for UTC(IGNA) are freely available through https://www.ign.gob.ar/NuestrasActividades/Geodesia/ServicioInternacionalHora/TransferenciaDeTiempo
ILNAS	Network Time Service via NTP Protocol Stratum-1 time server with monitoring (restricted access) Host names: ntp1.ilnas.blm.lu ntp2.ilnas.blm.lu ntp3.ilnas.blm.lu Further information at: https://portail-qualite.public.lu/fr/metrologie/etalonnages.html PTP services are provided to individual customers over dedicated links.

(1) Information based on the Annual Report 2022, not confirmed by the Laboratory.

IMBH (1)	Network Time Service over Internet IMBH operates several Stratum 1 time servers using the NTP protocol. These servers are directly synchronized to UTC(IMBH). The servers are available at public IP addresses: ntp1.imbih.gov.ba ntp2.imbih.gov.ba Common-view dataGPS and GLONASS common-view data using CGGTTS format referred to UTC(IMBH) are available at request. Direct fiber-optical links using PTP/WR protocol. Further information can be found at: http://met.gov.ba
INACAL	Network Time Server A time server is used to synchronize computer networks of the government institutions and companies in the private sector using the NTP protocol. To access the Network time enter the link https://www.inacal.gob.pe/metrologia/categoria/sincronizacion-de-sistemas-de-computo Web Clock A web clock is used to display the time of day in real time. To access the Web Clock, enter the link https://www.inacal.gob.pe/
INM	Network Time Service INM operates an open access time servers referenced to UTC(INM) using the "Network Time Protocol"; host names of the servers are: ntp1.inm.gov.co ntp2.inm.gov.co Further information on the web page: http://www.inm.gov.co/index.php/servicios-inm/hora-legal Web Clock Service A web clock is used to display the local time of day in real time. The web clock is available at: http://horalegal.inm.gov.co/ Voice Time Service Telephone voice announcements are followed by a tone to indicate the local time. The service is available to the public in Spanish by calling the telephone number (+57 601) 2542222 option 1.
INPL	Time dissemination service is performed in Israel by telecommunication companies, whose time and frequency standards are traceable to local UTC(INPL) time and are calibrated regularly once a year against the Israeli Time and Frequency National Standard kept by INPL.
INRIM (1)	CTD Telephone Time Code Time signals dissemination, according to the European Time code format, available via modem on regular dial-up connection. Access phone numbers : 0039 011 3919 263 and 0039 011 3919 264. Provides a synchronization to UTC(IT) for computer clocks without compensation for the propagation time. Internet Time Service INRIM operates two time servers using the "Network Time Protocol" (NTP); host names of the servers are ntp1.inrim.it and ntp2.inrim.it. More information on this service can be found on the web pages:

	http://rime.inrim.it/labtf/ntp/. Web-based time-of-day clock that displays UTC or local time for Italy (Central Europe Time), referenced to INRIM Internet Time Service. Provides a snapshot of time with any web browser. A continuous time display requires a web browser with Java plug-in installed: http://rime.inrim.it/labtf/tempo-legale-italiano/. Fiber based PTP time signal distribution to linked users.
INTI	Network Time Service: INTI operates an open access NTP server referenced to UTC(INTI). Server Host Name: ntp.inti.gob.ar
JV	Network Time Protocol JV operates an open access stratum 1 server referenced to UTC(JV) ntp.justervesenet.no By special arrangement customers may get direct access to PPS and/or 10 MHz from UTC(JV) as a reference for customer's own timing devices hosted at JV. PTP White Rabbit services are currently running on an experimental basis over dedicated link(s). The link is operated using a the customer's own reference clock as input to a Grandmaster at customer premises and a White Rabbit switch at JV as a slave clock, which output is monitored against UTC(JV).
KRISS (1)	Telephone Time Service Provides digital time code to synchronize computer clocks to Korea Standard Time (=UTC(KRIS) + 9 h) via modem. Access phone number: + 82 42 868 5116 Network Time Service KRISS operates three time servers using the NTP to synchronize computer clocks to Korea Standard Time via the Internet. Host name of the server: time.kriss.re.kr (210.98.16.100). Software for the synchronization of computer clocks is available at http://www.kriss.re.kr
KZ (1)	Network Time Service KZ (KazStandart) operates three Stratum 1 time servers using the "Network Time Protocol" (NTP). The hostnames of the servers are: ntp1.ksm.kz (Stratum 1) ntp2.ksm.kz (Stratum 1) ntp3.ksm.kz (Stratum 1)
LNE-SYRTE	LNE-SYRTE operates several time servers using the "Network Time Protocol" (NTP) : Stratum-1 time server: ntp-p1.obspm.fr (restricted access) Stratum-2 time server: ntp.obspm.fr (free access) Futher information at: http://syrte.obspm.fr/informatique/ntp_infos.php A web application analyzing the desynchronisation of computers clock is available at the following website: https://heurelegalefrancaise.fr/
LRTE (1)	Internet Time Service LRTE operates Stratum 1 and Stratum 2 time servers using the NTP protocol. The servers are directly synchronized to UTC(LRTE). The servers are available on free access at hostnames/ip : lrtest1.ntp.ifsc.usp.br/ 143.107.229.211 -> stratum 1 lrtest2.ntp.ifsc.usp.br/ 143.107.229.210 -> stratum 2 Further information available at https://www.ntppool.org/scores/143.107.229.211

https://www.ntppool.org/scores/143.107.229.210
https://thingspeak.com/channels/691405

LT	Network Time Service via NTP protocol Host name: laikas2.pfi.lt Directly referenced to UTC(LT) System: ELPROMA NTS5000 LITE 2RD Access policy: free
MASM	Computers connected to the Internet can be synchonized to UTC(MASM) using the NTP protocol. Access is available for users free of charge Address: ntp.mn for the users within Mongolia Host: master.ntp.mn System: LANTIME M1000 Access policy: free
METAS	Internet Time Service METAS operates three public stratum 1 NTP servers in open access policy, namely: ntp11.metas.ch ntp12.metas.ch ntp13.metas.ch The alias ntp.metas.ch dynamically points to one of the above-mentioned servers. More information available at http://www.metas.ch/metas/en/home/fabe/zeit-und-frequenz/time-dissemination.html
MIKES	VTT MIKES provides an official stratum-1 level NTP service to paying organizations and institutions. Stratum-2 level NTP service is freely available to everyone. Both NTP services are provided over public internet. PTP and PTP White Rabbit services are provided to individual customers over dedicated links. Further information can be found at http://www.mikes.fi/ntp-palvelu/
MSL	Network Time Service Computers connected to the Internet can be synchonized to UTC(MSL) using the NTP protocol. Access is available for users within New Zealand. Servers are available at pool.msltime.measurement.govt.nz and msltime1.measurement.govt.nz Speaking Clock A speaking clock gives New Zealand time. Because it is a pay service, access is restricted to callers within New Zealand. Further information about these services can be found at http://measurement.govt.nz/about-us/official-new-zealand-time
NAO	Network Time Service Three stratum 2 NTP servers are available. The NTP servers internally refer stratum 1 NTP server that is linked to UTC(NAO). One of the three stratum 2 NTP servers are selected automatically by a round-robin DNS server to reply for an NTP access. The server host name is s2csntp.miz.nao.ac.jp.
NICT	Optical IP Telephone Time Service (OTTS) NICT provides digital time code accessible by computer using Network Time Protocol, on Specific Optical IP Telephone lines and available only to agreement users. Network Time Service (NTS) NICT operates three Stratum 1 NTP time servers linked to UTC(NICT) through a leased line. Internet Time Service (ITS)

NICT operates five Stratum 1 NTP time servers linked to UTC(NICT) through the Internet, where servers are located in the headquarters and Kobe branch.
Host name of the servers: ntp.nict.jp (Round robin).

NIM

Network Time Service
Provides digital time code across the Internet using NTP server via free IP access:
ntp1.nim.ac.cn
ntp2.nim.ac.cn

BDS/GPS common view data
NIM provides the BDS/GPS common view data based on UTC(NIM) to the time service in China.

NIMB (1)

1 NTP server is available:
Address: ntp.inm.ro (STRATUM 1) with an open access policy
Server is referenced to UTC(NIMB).

NIMT

Internet Time Services
NIMT operates 5 NTP servers with around 30 back up services at:

time1.nimt.or.th
time2.nimt.or.th
time3.nimt.or.th
time4.nimt.or.th
time5.nimt.or.th

The NTP servers are referenced to UTC(NIMT).

Timing information with FM/RDS broadcasted by national radio stations have to be synchronised to UTC(NIMT) through NTP under frequency allocation act.

NIST

Automated Computer Time Service (ACTS)
Provides digital time code by telephone modem for setting time in computers.
Free software and source code available for download from NIST.
Includes provision for calibration of telephone time delay.
Access phone numbers : +1 303 494 4774 (4 phone lines) and
+1 808 335 4721 (2 phone lines).
Further information at
https://www.nist.gov/pml/time-and-frequency-division/services/automated-computer-time-service-acts

Web-based time-of-day clock: https://time.gov

Internet Time Service (ITS)
Provides digital time code across the Internet using three different protocols: Network Time Protocol (NTP), Daytime Protocol, and Time Protocol. (Time Protocol is not supported by all servers)

Geographically distributed set of multiple time servers at multiple locations within the United States of America. For most current listing of time servers and locations, see: http://tf.nist.gov/tf-cgi/servers.cgi
Free software and source code available for download from NIST. Further information at
https://www.nist.gov/pml/time-and-frequency-division/services/internet-time-service-its

Telephone voice announcement: Audio portions of radio broadcasts from time and frequency stations WWV and WWVH can be heard by telephone: +1 303 499 7111 for WWV and +1 808 335 4363 for WWVH. For more information see:
https://www.nist.gov/pml/time-and-frequency-division/radio-stations/wwv/telephone-time-day-service

Time Measurement and Analysis Service (TMAS) and NIST Disciplined Clock (NISTDC)

	Subscription-based calibration services that utilize GPS common-view measurements and can either measure a clock with respect to UTC(NIST), or discipline an atomic clock to agree with UTC(NIST) with an uncertainty of ~10 ns (k = 2). The NISTDC can be either a rubidium clock supplied by NIST or a cesium clock supplied by the customer. For more information see: https://www.nist.gov/programs-projects/time-measurement-and-analysis-service-tmas
NMIJ	GPS common-view data GPS common-view data using CGGTTS format referred to UTC(NMIJ) are available through the NMIJ's web site for the remote frequency calibration service.
NMISA	Network Time Service One open access NTP server is available at address time.nmisa.org. More information is available at http://time.nmisa.org/
NMLS	Web-based time-of-day clock A web clock is used to display the local time for Malaysia. The service is available at http://mst.sirim.my. Network Time Service The NTP time information is referenced to UTC(NMLS) and is currently generated by Stratum-1 NTP servers, made available to the public freely. The NTP server host names are ntp1.sirim.my and ntp2.sirim.my.
NPL	Internet Time Service Two servers referenced to UTC(NPL) provide Network Time Protocol (NTP) time code across the internet. More information is available from the NPL web site at www.npl.co.uk/time. The server host names are: ntp1.npl.co.uk ntp2.npl.co.uk
NPLI	Web clock Web-based time-of-day clock that displays Indian Standard Time (IST) and UTC(NPLI). It also displays local time in user's time zone, time-of-day of the user's device clock and its difference. Available at the web page: http://www.nplindia.in/clockcode/html/index.php Internet Time Service Multiple Stratum 1 NTP servers referenced to UTC(NPLI) provide time service. The server host names are: time.nplindia.org (Round Robbin) time.nplindia.in (Round Robbin)

NRC

Telephone Code
Provides digital time code by telephone modem for setting time in computers.
Access phone number: +1 613 745 3900.
https://nrc.canada.ca/en/certifications-evaluations-standards/canadas-official-time/computer-time-date

Talking Clock Service
Voice announcements of Eastern Time are at ten-second intervals followed by a tone to indicate the exact time.
The service is available to the public in English at +1 613 745 1576 and in French at +1 613 745 9426.
https://nrc.canada.ca/en/certifications-evaluations-standards/canadas-official-time/telephone-talking-clock

Web Clock Service
The Web Clock shows dynamic clocks in each Canadian Time zone, for both Standard time and daylight saving time.
https://nrc.canada.ca/en/web-clock/

Short Wave Radio
CHU radio station broadcasts the time of day with voice announcements in English and French and time code at three different frequencies: 3.330 MHz, 7.850 MHz and 14.670 MHz.
https://nrc.canada.ca/en/certifications-evaluations-standards/canadas-official-time/nrc-shortwave-station-broadcasts-chu

Network Time Protocol
Operates multiple time servers using the " Network Time Protocol " at different locations and on two networks. Host names:
time.nrc.ca and time.chu.nrc.ca.
https://nrc.canada.ca/en/certifications-evaluations-standards/canadas-official-time/network-time-protocol-ntp

NRC TimeLinkTM – Monitored NTP Service
Subscription based service that provides a secure(authenticated) source of time directly traceable to UTC(NRC). Time synchronization is provided by a connection with the NRC stratum-1 servers. Monthly reports on the server's performance are provided to the client.
https://nrc.canada.ca/en/certifications-evaluations-standards/instrument-calibration-services/frequency-time-calibration-services.

NRC TimeLinkTM – Remote Clock Service
Subscription based GPS common-view service that provides a physical clock at the client's location which provides a time-of-day signal and a 1 pulse per second (1PPS) signal traceable to UTC(NRC) with uncertainty better than 1 us.
https://nrc.canada.ca/en/certifications-evaluations-standards/instrument-calibration-services/frequency-time-calibration-services.

Frequency and Time group official website:
https://nrc.canada.ca/en/certifications-evaluations-standards/canadas-official-time
Contact: MSS-SMETime@nrc-cnrc.gc.ca

NSC IM

Network Time Service.
National Science Center Institute of Metrology (Kharkiv, Ukraine) operates time server Stratum 1 using the "Network Time Protocol" (NTP).
Stratum-1 time server using the "Network Time Protocol" (NTP).
Free access.
ip 81.17.128.133
ip 31.202.14.125
ip 31.202.14.124

PTP services are provided to individual customers over dedicated links.

The server host name is: http://www.metrology.kharkov.ua/

NTSC

Network Time Service (NTS)

NTSC operates a time server directly referenced to UTC(NTSC). Software for the synchronization of computer clocks is available on the NTSC Time and Frequency web page: http://www.ntsc.ac.cn/
Access Policy: free
Contact: Shaowu DONG (sdong@ntsc.ac.cn).

ONBA

Speaking clock access phone number 113 (only accessible in Argentina).
Hourly and half hourly radio-broadcast time signal.
Internet time service at web site http://www.hidro.gov.ar/observatorio/lahora.asp

ONRJ

Telephone Voice Announcer (55) 21 25806037.
Telephone Code (55) 21 25800677 provides digital time code at 300 bauds, 8 bits, no parity, 1 stop bit (Leitch CSD5300)

Internet Time Service at the address : 200.20.186.75 and 200.20.186.94
SNTP at port 123
Time/UDP at port 37
Time/TCP at port 37
Daytime/TCP at port 13

WEB-based Time Services:
1) A real-time clock aligned to UTC(ONRJ) and corrected for internet transmission delay.
Further information at: http://200.20.186.71/asp/relogio/horainicial.asp
2) Voice Announcer, in Portuguese, each ten seconds, after download of the Web page at: http://200.20.186.71.

Broadcast Brazilian legal time (UTC – 3 hours) announced by a voice starting with “Observatório Nacional” followed by the current time (hh:mm:ss) each ten seconds with a beep for each second with a 1KHz modulation during 5ms and a long beep with 1KHz modulation during 200ms at the 58 , 59 and 00 seconds. The signal is transmitted every day of the year by the radio station PPE, whose signal is at 10 MHz with kind of modulation A3H and HF transmission power of 1 kW.

ORB

ORB operates several time servers using the “Network Time Protocol” (NTP) :
Hostname : ntp1.oma.be and ntp2.oma.be
Access policy : free
Synchronization to UTC(ORB)
Contact : ntp-as@oma.be
Further information on https://betime.be

Web Clock Service
The Web Clock displays UTC(ORB), basis for the Belgian legal Time
URL: https://betime.be

PTB

Contact : time@ptb.de
Information on the web pages
https://www.ptb.de/time

Telephone Time Service
The coded time information is referenced to UTC(PTB) and generated by a TUG type time code generator using an ASCII-character code.
The time protocols are sent in a common format, the “European Telephone Time Code”. Access phone number: +49 531 51 20 38.

Internet time service
PTB operates four time servers using the "Network Time Protocol" (NTP), see https://www.ptb.de/cms/en/ptb/fachabteilungen/abtq/gruppe-q4/ref-q42/time-synchronization-of-computers-using-the-network-time-protocol-ntp.html for details and explanations.

The hostnames of the servers are
ptbtime1.ptb.de
ptbtime2.ptb.de
ptbtime3.ptb.de
ptbtime4.ptb.de

Since 2020, PTB has enhanced these time servers with Network Time Security (NTS). NTS is a security protocol specified in RFC 8915 that provides a scalable approach for protecting NTP packets. PTB's time servers offer NTS-secured NTP services to NTS capable customers who request them.
In addition, PTB offers a fee-based authenticated NTP service that relies on NTP's pre-shared key approach specified in RFC 5905. In 2018, the Internet Engineering Taskforce (IETF) published RFC 8573, which deprecates the use of MD5 for the pre-shared key approach and replaces it with a message authentication code based on AES-CMAC according to RFC 4493. The authenticated time service of PTB has therefore been extended to comply with RFC 8573.
The hostnames of the servers are
ntpsmgw1.ptb.de
ntpsmgw2.ptb.de

As NTS replaces the old pre-shared key approach with automatic key distribution and stronger cryptography, the discontinued fee-based connections will be migrated to the free NTS-secured time service in the coming years.

PTB has also created a service for the dissemination of legal time via the WWW. The PTB clock is completely programmed in pure Hypertext Markup Language (HTML). Time requests to the PTB server are made via WebSocket (WS), a supplement to the established Hypertext Transfer Protocol (HTTP) specified by the IETF.
URL: https://uhr.ptb.de

RISE

The coded time information is referenced to UTC(SP) and generated by several NTP servers using the Network Time Protocol (NTP) for both IPv4 and IPv6.
Access host names: ntp1.sptime.se, ntp2.sptime.se, ntp3.sptime.se and ntp4.sptime.se

Speaking Clock
The speaking clock service is operated by Telia AB in Sweden.
The time announcement is referenced to UTC(SP) and disseminated from a computer-based system operated and maintained at RISE.
Access phone number : 90510 (only accessible in Sweden).
Access phone number : +4633 90510 (from outside Sweden).

More information about these services are found on the web site www.ri.se

ROA

Network Time Protocol
More information is available from the ROA web site at www.roa.es
Host names of the servers:
hora.roa.es
minuto.roa.es

Network Time Security (NTS)
Host name of the server:
nts1.roa.es

SG

Network Time Service (NeTS)
Transmit digital time code via the Internet using three protocols - Time Protocol, Daytime Protocol and Network Time Protocol.
Operate one time server at domain name: nets.org.sg

SIQ	Internet Time Service (Network Time Protocol) One server referenced to UTC(SIQ) provides Network Time Protocol (NTP) time code across the internet. There is free access to the server for all users. The server host names are: ntp.siq.si or time.siq.si (two URL's for the same server; IP: 153.5.147.30) New IP for NTP server on new location
SL	Network Time Service Computers connected to the Internet can be synchronized to UTC(SL) Using the NTP protocol using NTP Time Server at http://www.sltime.org. For more information please visit http://www.sltime.org and http://www.measurementsdept.gov.lk or contact through email; adelec@measurementsdept.gov.lk.
SMD	Network Time Service Disseminate time, UTC(SMD), through NTP protocol. URL's: ntp1.economie.fgov.be ntp2.economie.fgov.be ntp3.economie.fgov.be All users have free access. Web Clock Service. The Web Clock displays the local time in Belgium, adjusted for time zone and daylight saving time, and is based on UTC(SMD). URL: https://clock.economie.fgov.be
SNSU-BSN	Network Time Service The NTP time information referenced to UTC(IDN) is generated by Stratum-1 NTP server at URL: ntp.bsn.go.id Access Policy : free
TL	Speaking Clock Service Traceable to UTC(TL). Broadcast through PSTN (Public Switching Telephone Network) automatically and provides an accurate voice time signal to public users. Local access phone number: 117. NTP Service TL operates the network time service using the "Network Time Protocol" (NTP). Host name of the server: time.stdtime.gov.tw clock.stdtime.gov.tw tick.stdtime.gov.tw tock.stdtime.gov.tw watch.stdtime.gov.tw further information in https://www.stdtime.gov.tw/chrono/index_e_2_2.html
TP	Internet Time Service UFE operates time servers directly referenced to UTC(TP). Time information is accessible through Network Time Protocol (NTP). Server host name: ntp2.ufe.cz More information at http://www.ufe.cz/
UME	Network Time Service UME operates an NTP server referenced to UTC(UME). Server Host Name: time.ume.tubitak.gov.tr

(1) Information based on the Annual Report 2022, not confirmed by the Laboratory.

USNO (1)	Telephone Voice Announcer +1 202 762-1401 Backup voice announcer: +1 719 567-6742 Backup voice announcer: +1 202-762-1069 GPS via subframe 4 page 18 of the GPS broadcast navigation message Web-based time-of-day clock: https://time.gov Web site for information regarding the USNO Precise Time Department services: https://www.cnmoc.usff.navy.mil/Organization/United-States-Naval-Observatory/Precise-Time-Department/ Network Time Protocol (NTP): https://www.cnmoc.usff.navy.mil/Organization/United-States-Naval-Observatory/Precise-Time-Department/Network-Time-Protocol-NTP/ for software and site closest to you.
UZ	Network Time Service over Internet UZ operates Stratum 1 time server using the NTP protocol. This server is directly referenced to UTC(UZ). The URL for the NTP server: time.nim.uz
VMI	Network Time Service VMI operates one time server Stratum 1 using the Network Time Protocol (NTP) The NTP servers are referenced to UTC(VMI) IP: 222.252.20.174
VNIIFTRI	Internet Time Service VNIIFTRI operates eight time servers Stratum 1 and one time server Stratum 2 using the “Network Time Protocol” (NTP). The server host names are: ntp1.vniiftri.ru (Stratum 1) ntp2.vniiftri.ru (Stratum 1) ntp3.vniiftri.ru (Stratum 1) ntp4.vniiftri.ru (Stratum 1) ntp1. niiftri.irkutsk.ru (Stratum 1) ntp2. niiftri.irkutsk.ru (Stratum 1) vniiftri.khv.ru (Stratum 1) vniiftri2.khv.ru (Stratum 1) ntp21.vniiftri.ru (Stratum 2).
VSL	Internet Time Service VSL operates a time server directly referenced to UTC(VSL). Time information is accessible through Network Time Protocol (NTP). The URLs for the NTP server are: ntp.vsl.nl (open access) ntp1.vsl.nl (open access) ntp2.vsl.nl (access by registration only)