

## **TIME DISSEMINATION SERVICES**

The following tables are based on information received at the BIPM between May and June 2022.

## 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
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 Argentino  
Servicio Internacional de la Hora  
General Manuel N. Savio 1898  
B1650KLP – Villa Maipú, Provincia 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  
Savanoriu av. 231  
Vilnius LT-02300, 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	National Research Council of Canada Metrology Frequency and Time Standards Bldg 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 11.100 San Fernando Cádiz, Spain
SG	National Metrology Centre Agency for Science, Technology and Research (A*STAR) 1 Science Park Drive 118221 Singapore
SIQ	SIQ Ljubljana Metrology department Mašera-Spasičeva 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 57, 182 51 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

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 Dutch Metrology Institute  
Postbus 654  
2600 AR Delft  
Netherlands

## TIME DISSEMINATION SERVICES

AGGO	<p>Network Time Service: AGGO operates a stratum-1 open access NTP server referenced to UTC(AGGO). Server Host Name: ntp.aggo-conicet.gob.ar</p>
AOS	<p>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 (<a href="mailto:nawrocki@cbk.poznan.pl">nawrocki@cbk.poznan.pl</a>) Robert Diak (<a href="mailto:kondor@cbk.poznan.pl">kondor@cbk.poznan.pl</a>)</p>
AUS	<p>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 <a href="http://www.measurement.gov.au/Services/Pages/TimeandFrequencyDisseminationService.aspx">http://www.measurement.gov.au/Services/Pages/TimeandFrequencyDisseminationService.aspx</a> for information on access or contact <a href="mailto:time@measurement.gov.au">time@measurement.gov.au</a></p>
BelGIM	<p>Internet Time Service: BelGIM operates one time server Stratum 1 using the "Network Time Protocol" (NTP). The server host name is: <a href="http://www.belgim.by">http://www.belgim.by</a> (Stratum 1)</p>
BEV	<p>Three NTP servers are available; addresses: bevtime1.metrologie.at bevtime2.metrologie.at time.metrologie.at more information on <a href="http://www.metrologie.at">http://www.metrologie.at</a></p> <p>Provides a time dissemination service via phone and modem to synchronize PC 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...).</p>
BIM	<p>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 controlled by BIM.</p>
BoM (1)	<p>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</p>

(1) Information based on the Annual Report 2020, not confirmed by the Laboratory.



CENAM	<p>CENAM operates a telephone voice system that provides the local time for time zones in Mexico. Phone numbers and zones:</p> <p>+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)</p> <p>Telephone Code CENAM provides a telephone code for setting time in computers. For more information about this service please contact <a href="mailto:tiempo@cenam.mx">tiempo@cenam.mx</a></p> <p>Network Time Protocol (NTP) Operates two time servers using NTP (located at CENAM). Further information at <a href="http://www.cenam.mx/hora_oficial/">http://www.cenam.mx/hora_oficial/</a></p> <p>Web-based time-of-day clock which displays local time for all Mexican time zones. Referenced to CENAM Internet Time Service. Available at <a href="http://www.cenam.mx/hora_oficial/">http://www.cenam.mx/hora_oficial/</a></p>
CENAMEP	<p>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 <a href="mailto:servicios@cenamep.org.pa">servicios@cenamep.org.pa</a></p> <p>Web Clock A web clock is used to display the time of day in real time. To access the Web Clock, enter the link <a href="http://horaexacta.cenamep.org.pa/">http://horaexacta.cenamep.org.pa/</a></p> <p>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</p>
DMDM	<p>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.</p> <p>Web-based time-of-day clock that displays local time for Serbia referenced to the DMDM ITS. Available at the web page: <a href="http://www.dmdm.rs/en/index.php">http://www.dmdm.rs/en/index.php</a></p>
EIM	<p>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).</p>
GUM	<p>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</p>

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](mailto: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](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  
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 [ofallasc@ice.go.cr](mailto: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/laboratorios/lametro>

IGNA (1)

GPS common-view data  
GPS common-view data using CGGTTS format referred to UTC(IGNA) is available through our website at  
<http://www.ign.gob.ar/NuestrasActividades/Geodesia/ServicioInternacionalHora/TrasferenciaDeTiempo>

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>

IMBH	<p>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</p> <p>Common-view dataGPS and GLONASS common-view data using CGGTTS format referred to UTC(IMBH) are available at request.</p> <p>Direct fiber-optical links using PTP/WR protocol.  Further information can be found at: <a href="http://met.gov.ba">http://met.gov.ba</a></p>
INACAL	<p>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  <a href="https://www.inacal.gob.pe/metrologia/categoria/sincronizacion-de-sistemas-de-computo">https://www.inacal.gob.pe/metrologia/categoria/sincronizacion-de-sistemas-de-computo</a></p> <p>Web Clock  A web clock is used to display the time of day in real time. To access the Web Clock, enter the link <a href="https://www.inacal.gob.pe/">https://www.inacal.gob.pe/</a></p>
INM	<p>Network Time Protocol  Operates a time server using the "Network Time Protocol", it is located at the Instituto Nacional de Metrología de Colombia, Bogotá D.C., Colombia. Further information at:  <a href="http://www.inm.gov.co/index.php/servicios-inm/hora-legal">http://www.inm.gov.co/index.php/servicios-inm/hora-legal</a></p> <p>Web Clock Service  A web clock is used to display the time of day in real time. The web clock is available at:  <a href="http://horalegal.inm.gov.co/186.155.28.147">http://horalegal.inm.gov.co/186.155.28.147</a></p> <p>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.</p>
INPL	<p>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.</p>
INRIM	<p>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.</p> <p>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:  <a href="http://rime.inrim.it/labtf/ntp/">http://rime.inrim.it/labtf/ntp/</a>.</p>

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	<p>Network Time Service: INTI operates an open access NTP server referenced to UTC(INTI). Server Host Name: ntp.inti.gob.ar</p>
JV	<p>Network Time Protocol JV operates an open access stratum 1 server referenced to UTC(JV) ntp.justervesenet.no</p> <p>By special arrangement customers may get direct access to PPS from UTC(JV) as a reference for customer's own NTP-server(s) hosted at JV.</p> <p>PTP White Rabbit services are currently running on an experimental basis over dedicated link(s).</p>
KRISS	<p>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</p> <p>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 <a href="http://www.kriss.re.kr">http://www.kriss.re.kr</a></p>
KZ	<p>Network Time Service KZ (KazStandart) operates three Stratum 1 time servers using the "Network Time Protocol" (NTP).</p> <p>The hostnames of the servers are: ntp1.ksm.kz (Stratum 1) ntp2.ksm.kz (Stratum 1) ntp3.ksm.kz (Stratum 1)</p>
LNE-SYRTE	<p>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: <a href="http://syрте.obspm.fr/informatique/ntp_infos.php">http://syрте.obspm.fr/informatique/ntp_infos.php</a></p>
LRTE	<p>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 -&gt; stratum 1 lrtest2.ntp.ifsc.usp.br/ 143.107.229.210 -&gt; stratum 2</p> <p>Further information available at <a href="https://www.ntppool.org/scores/143.107.229.211">https://www.ntppool.org/scores/143.107.229.211</a> <a href="https://www.ntppool.org/scores/143.107.229.210">https://www.ntppool.org/scores/143.107.229.210</a> <a href="https://thingspeak.com/channels/691405">https://thingspeak.com/channels/691405</a></p>

LT	<p>Network Time Service via NTP protocol  NTP v3  Host name: laikas.pfi.lt  Directly referenced to UTC(LT)  System: Datum TymeServe 2100 NTP server  Access policy: free  Further information available at <a href="https://www.ftmc.lt/time-and-frequency-standard-laboratory">https://www.ftmc.lt/time-and-frequency-standard-laboratory</a></p>
MASM	<p>Network Time Service via NTP  It provides synchronization to UTC(MASM)  Address: ntp.mn  System: LANTIME M600  Access policy: free</p>
METAS	<p>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 points to one of the above servers.  More information available at <a href="http://www.metas.ch/metas/en/home/fabe/zeit-und-frequenz/time-dissemination.html">http://www.metas.ch/metas/en/home/fabe/zeit-und-frequenz/time-dissemination.html</a></p>
MIKES	<p>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 <a href="http://www.mikes.fi/ntp-palvelu/">http://www.mikes.fi/ntp-palvelu/</a></p>
MSL	<p>Network Time Service  Computers connected to the Internet can be synchronized to UTC(MSL) using the NTP protocol. Access is available for users within New Zealand. Servers are available at pool.msitime.measurement.govt.nz and msitime1.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 <a href="http://measurement.govt.nz/about-us/official-new-zealand-time">http://measurement.govt.nz/about-us/official-new-zealand-time</a></p>
NAO	<p>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.</p>
NICT	<p>Telephone Time Service (TTS)  NICT provides digital time code accessible by computer at 300/1200/2400 bps, 8 bits, no parity.  Access number to the lines: + 81 42 327 7592.    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.</p>

#### 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 one server is located in Kobe branch.

Host name of the servers: ntp.nict.jp (Round robin).

#### GPS common view data

NICT provides the GPS common view data based on UTC(NICT) to the time business service in Japan.

#### NIM

##### Telephone Time Service

The coded time information generated by NIM time code generator, referenced to UTC(NIM). Telephone Code provides digital time code at 1200 to 9600 bauds, 8 bits, no parity, 1 stop bit.

Access phone number: 8610 6422 9086.

##### 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

#### NIMB

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  $\sim 10$  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](http://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](http://ntp1.sirim.my) and [ntp2.sirim.my](http://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](http://www.npl.co.uk/time). The server host names are:  
[ntp1.npl.co.uk](http://ntp1.npl.co.uk)  
[ntp2.npl.co.uk](http://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:  
[time1.nplindia.org](http://time1.nplindia.org)  
[time2.nplindia.org](http://time2.nplindia.org)  
[time.nplindia.org](http://time.nplindia.org) (Round Robbin)  
[time.nplindia.in](http://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.

For more information see:

<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. The web page is at:

<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. Further information at:

<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. Further information at:

<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.

For more information see: <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.

For more information see: <https://nrc.canada.ca/en/certifications-evaluations-standards/instrument-calibration-services/frequency-time-calibration-services>.

The official website for the Frequency and Time group is:

<https://nrc.canada.ca/en/certifications-evaluations-standards/canadas-official-time>

The contact email is: [MSS-SMETime@nrc-cnrc.gc.ca](mailto: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](mailto: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 Network Time Service via NTP protocol  
Hostname : ntp1.oma.be and ntp2.oma.be  
Access policy : free  
Synchronization to UTC(ORB)  
Contact : [ntp-as@oma.be](mailto:ntp-as@oma.be)

ORB provides a time dissemination via phone and modem to synchronize PC clocks on UTC(ORB). The system used is the Time Distribution System from TUG, which produces the telephone time code mostly used in Europe.  
The baud rate used is 1200. The access phone number is 32 (0) 2 373 03 20. The system is updated periodically with DUT1 and leap seconds

PTB Contact : [time@ptb.de](mailto: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

The PTB operates three 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

Since 2020 PTB enhanced these time servers by Network Time Security (NTS). NTS is a security protocol specified in RFC 8915, which provides a scalable approach to protect NTP packets. PTB's time servers provide NTS secured NTP service to NTS-enabled clients who request it.

PTB also provides a fee-based authenticated NTP service based on the NTP's pre-shared key approach specified in RFC 5905. In 2018, the IETF published RFC 8673, which deprecates the usage of MD5 for the pre-shared key approach and replaces it with a message authentication code based on AES-CMAC as specified in RFC 4493. PTB's authenticated time service has been enhanced in order to comply to RFC 8673.

The hostnames of the servers are:

ntpsmgw1.ptb.de  
ntpsmgw2.ptb.de

PTB created a new service to distribute legal time via the WWW. The PTB clock is completely programmed in pure Hypertext Markup Language (HTML). The time queries at the PTB server are performed via WebSocket (WS), a supplement to the established Hypertext Transfer Protocol (HTTP) specified by the Internet Engineering Taskforce (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](http://www.ri.se)

ROA

Telephone Code

The coded time information is referenced to UTC(ROA) 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 : +34 956 599 429

Network Time Protocol

More information is available from the ROA web site at [www.roa.es](http://www.roa.es)

Host names of the servers:

hora.roa.es  
minuto.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	<p>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</p>
SL (1)	<p>Network Time Service  Computers connected to the Internet can be synchronized to UTC(SL)  Using the NTP protocol using NTP Time Server at <a href="http://www.sltime.org">http://www.sltime.org</a>.  For more information please visit <a href="http://www.sltime.org">http://www.sltime.org</a> and  <a href="http://www.measurementsdept.gov.lk">http://www.measurementsdept.gov.lk</a> or contact through email;  <a href="mailto:adelec@measurementsdept.gov.lk">adelec@measurementsdept.gov.lk</a>.</p>
SMD	<p>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.</p> <p>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: <a href="https://clock.economie.fgov.be">https://clock.economie.fgov.be</a></p>
SNSU-BSN (1)	<p>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</p>
TL	<p>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.</p> <p>The Computer Time Service  Provides ASCII time code by telephone modem for setting time in computers.  Access phone number: +886 3 4245117.  NTP Service  TL operates the network time service using the "Network Time Protocol" (NTP).  Host name of the server: time.stdtime.gov.tw, further information in  <a href="http://www.stdtime.gov.tw/english/e-home.aspx">http://www.stdtime.gov.tw/english/e-home.aspx</a></p>
TP	<p>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 <a href="http://www.ufe.cz/">http://www.ufe.cz/</a></p>
UME	<p>Network Time Service  UME operates an NTP server referenced to UTC(UME).  Server Host Name: time.ume.tubitak.gov.tr</p>

(1) Information based on the Annual Report 2020, not confirmed by the Laboratory.

USNO  
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.

VMI  
Network Time Service  
VMI operates one time server Stratum 1 using the Network Time Protocol (NTP). For information on access to the website, please contact [phuongtv@vmi.gov.vn](mailto:phuongtv@vmi.gov.vn). The server host name is:  
<http://standardtime.vmi.gov.vn/> or IP: 113.160.59.166 port 123

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  
ntp1.vsl.nl  
ntp2.vsl.nl