



1-5
June
2026

SIRGAS RT Group

Mónica Zabala Haro

David Cisneros

Gustavo Caubarrere

SIRGAS Regional Experimental Caster: Architecture, Operation and Perspectives for Real-Time GNSS Services

ORGANIZING INSTITUTIONS



SANTIAGO - CHILE

www.igs-workshop-2026.com



Background

- SIRGAS Real-Time Group
 - 2022-2026
- SIRGAS - IPGH webinar 2024, Experiencias servicios GNSS RT a nivel global
- SIRGAS School – Noviembre 2024 - Bogotá – Colombia
- SIRGAS Regional Experimental Caster



SIRGAS Real Time Workgroup

- David Cisneros, IGM Ecuador, Coordinador SIRGAS RT
- Mónica Zabala, ESPOCH Ecuador
- Sandra Bolaños, NRCAN Canadá
- Fernanda Camisay, UdelaR Uruguay
- Melvin Hoyer, Universidad Zulia Venezuela
- Gustavo Caubarrere, SIRGAS President

SIRGAS Real Time Workgroup

General Objective

To coordinate the technical and administrative activities required for the development and continuity of the SIRGAS Real Time project, aligned with the IGS-RT strategic framework.

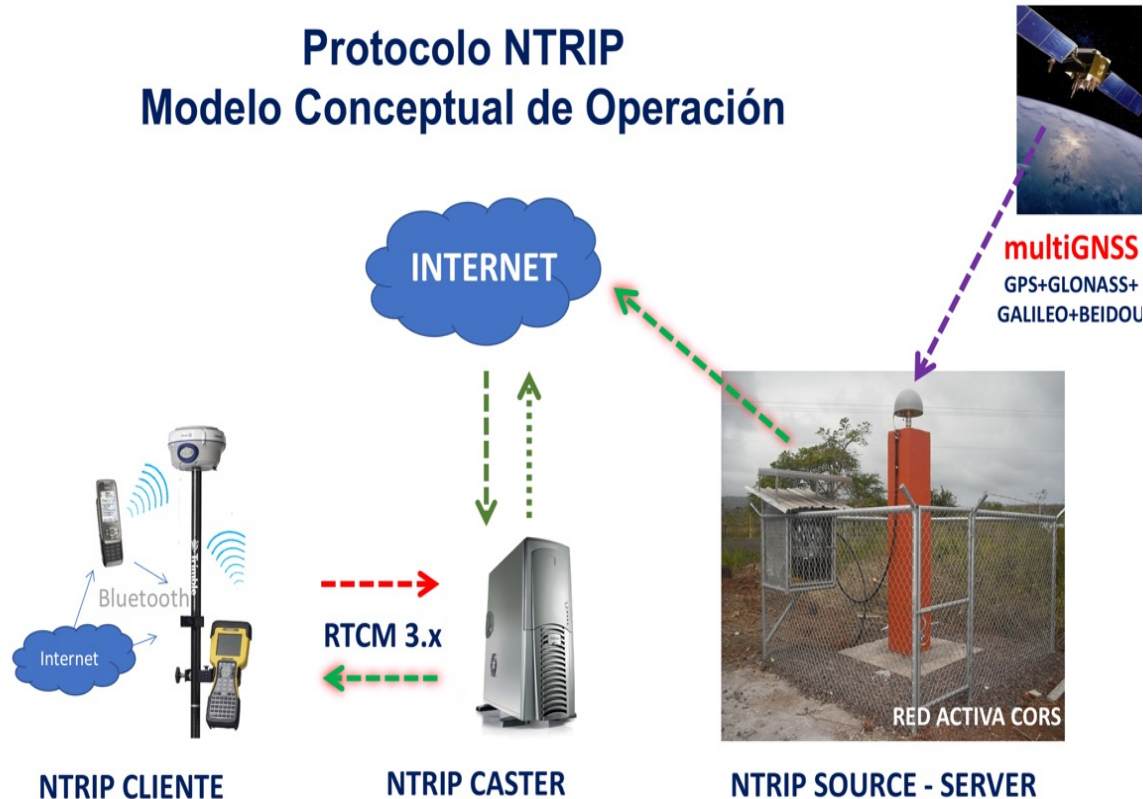
Specific Objectives

- Strengthen the regional GNSS real-time infrastructure through interoperability and collaboration.
- Promote technical cooperation and capacity building in real-time GNSS applications.
- Support open-access GNSS data and services for research, education, and scientific applications.
- Integrate regional GNSS stations into a common NTRIP caster infrastructure.

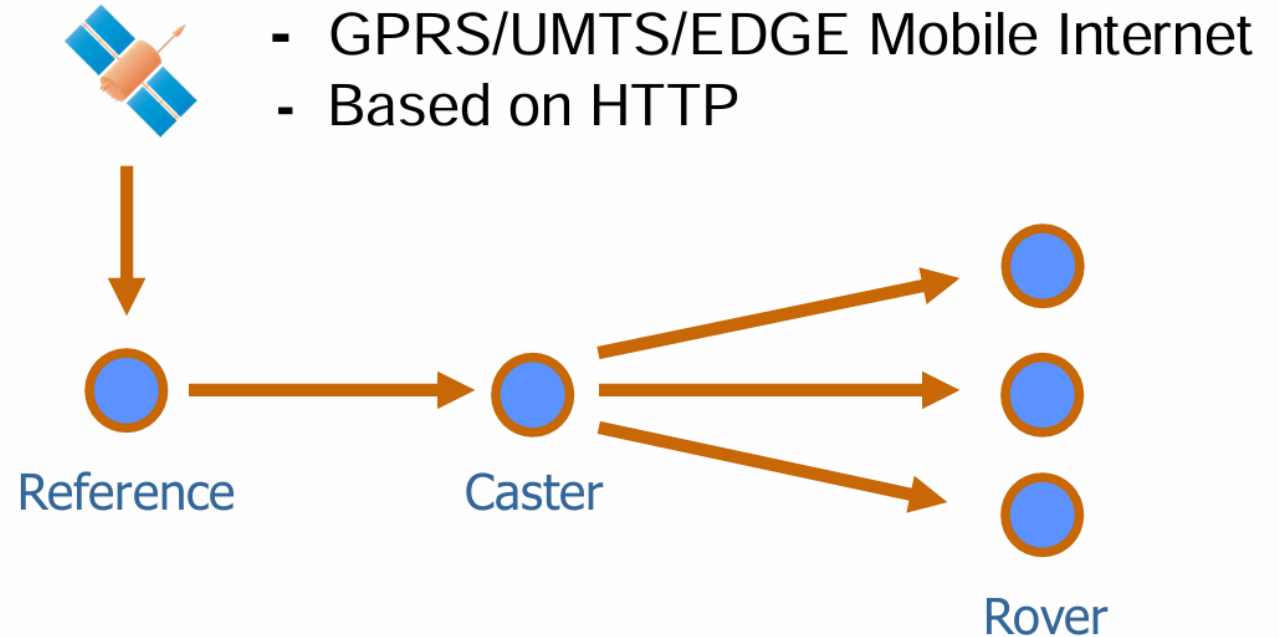


Architecture

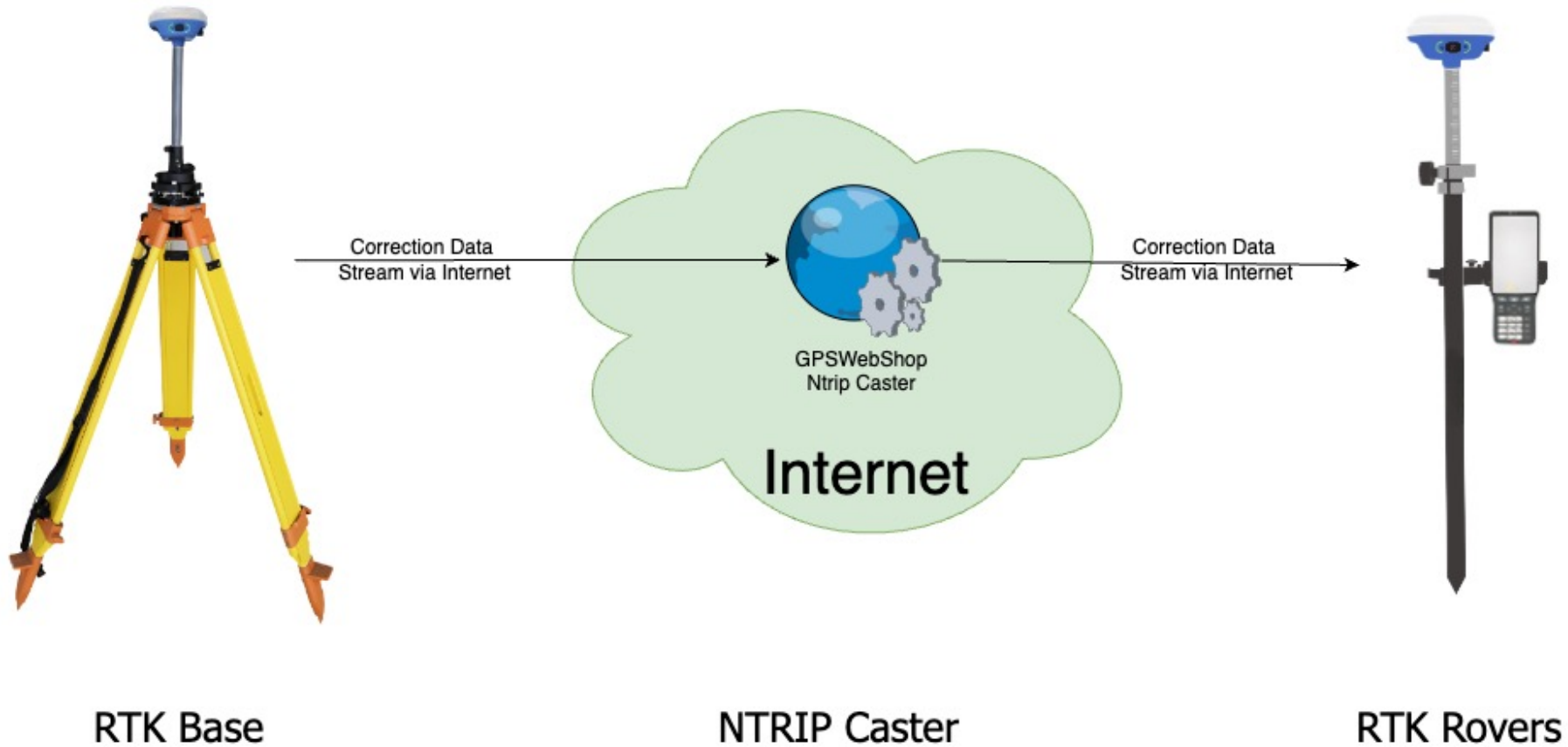
Protocolo NTRIP Modelo Conceptual de Operación



Networked Transport of RTCM via Internet Protocol (Ntrip)

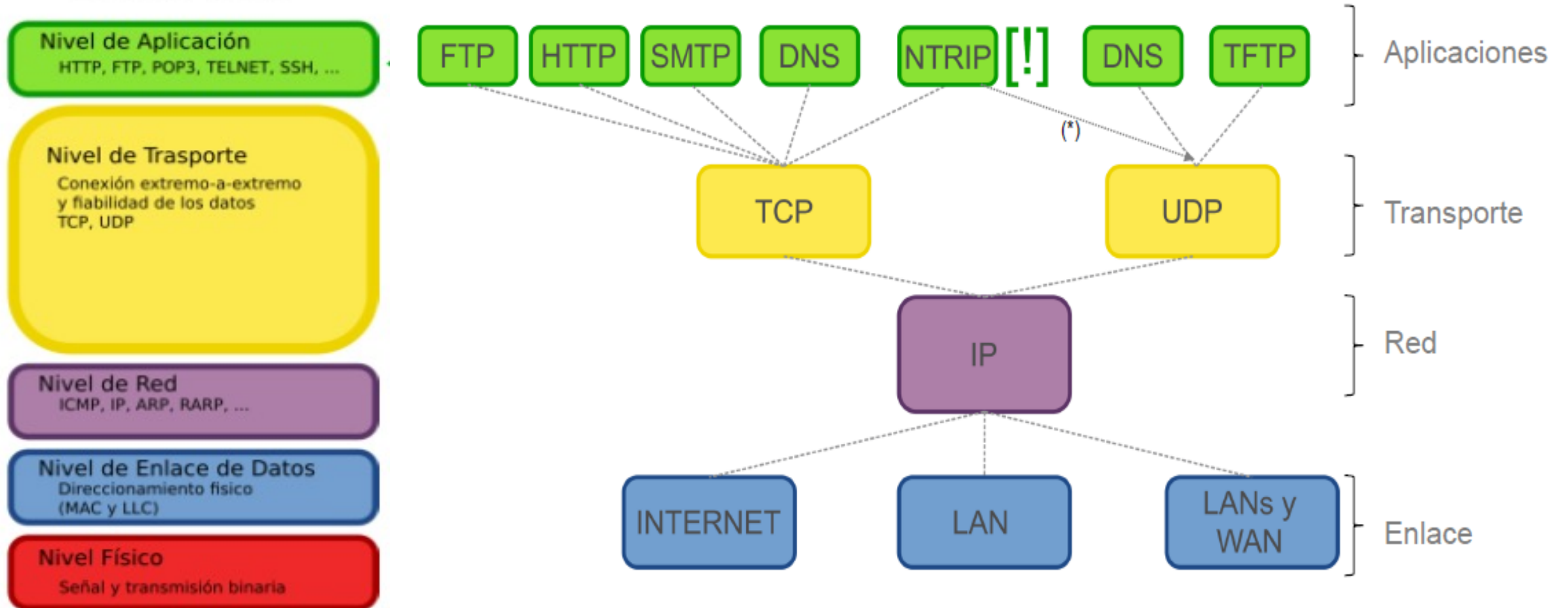


Architecture



Architecture

LA PILA TCP/IP



Architecture

• BKG software caster

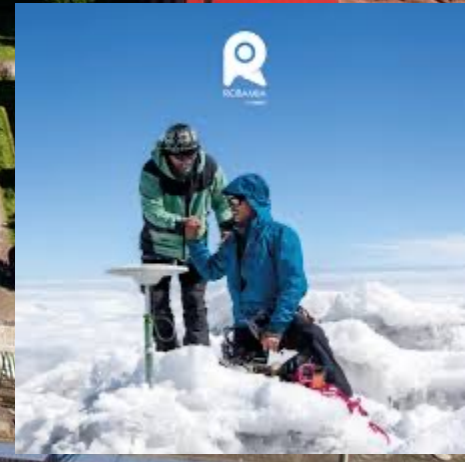
← → ↺ ↻ sirgas-rt.esPOCH.edu.ec2101

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#Sistema de Referencia Geodesico para las Americas
#CASTER SIRGAS EXPERIMENTAL
#Grupo de trabajo en tiempo real 2024 2026
#El caster SIRGAS experimental, es una iniciativa de las instituciones a nivel regional.
#Todas las estaciones CORS, son de libre acceso con fines de investigacion, capacitacion y contribucion a los usuarios de la comunidad GNSS global.
#Para agregar nuevas estaciones CORS, favor enviar su requerimiento via email:
#alincisneros@gmail.com
#m_zabala@esPOCH.edu.ec
#gustavo.caubarrere@igm.gub.uy
#ECUADOR
#STR; EREC3;RIOBAMBA;RTCM 3.0;1004(1),1006(60),1008(60),1012(1);2;GPS+GLO;REGME-IP;ECU;00.35;-78.12;0;0;Trimble NetR9;none;B;N;5700;REGME_Ecuador
STR;IBEC1;Ibarra;RTCM 3.0;1004(1),1006(60),1008(60),1012(1);2;GPS+GLO;REGME-IP;ECU;00.35;-78.12;0;0;Trimble NetR9;none;B;N;5700;RENGEO-IGEPN
#COLOMBIA
STR;BP01_RTCM3;Bogota;RTCM 3.0;1004(30),1012(30),1019(30),1020(30);2;GPS+GLO+GAL;GeoRED;COL;4.64;-74.08;0;0;Trimble NetR9;None;N;N;0;;
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#BOLIVIA
#ARGENTINA
#PANAMA
#REPUBLICA DOMINICANA
STR;IGMO;MOCA;RTCM 3.3;1004(1),1006(60),1008(60),1012(1);2;GPS+GLO;REGNA-RD;DOM;19.3919;-70.5212;0;0;TrimbleR9S;none;B;N;5700;REGNA-RD
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#
ENDSOURCETABLE
```



Caster Server Location

- Escuela Superior Politécnica de Chimborazo - University
- City: Riobamba
- Country: Ecuador
- The nearest point to the sun – 3th Geodesic Mission



Architecture – SIRGAS-CON CORS STATION



Figura3. Estaciones CORS: IGN1 Panamá (izq.), MARA Venezuela (cent.), RDSD República Dominicana (der.)
Fuente: Cortesía de Javier Cornejo, Ileanis Arenas, Saulimar Rodríguez

Participating Countries

7

Active STR Stations

16

GNSS Networks

7

Receiver Types

8

- Colombia
- Ecuador
- República Dominicana
- Panamá
- Venezuela
- Argentina
- Bolivia



Operations and Statistics

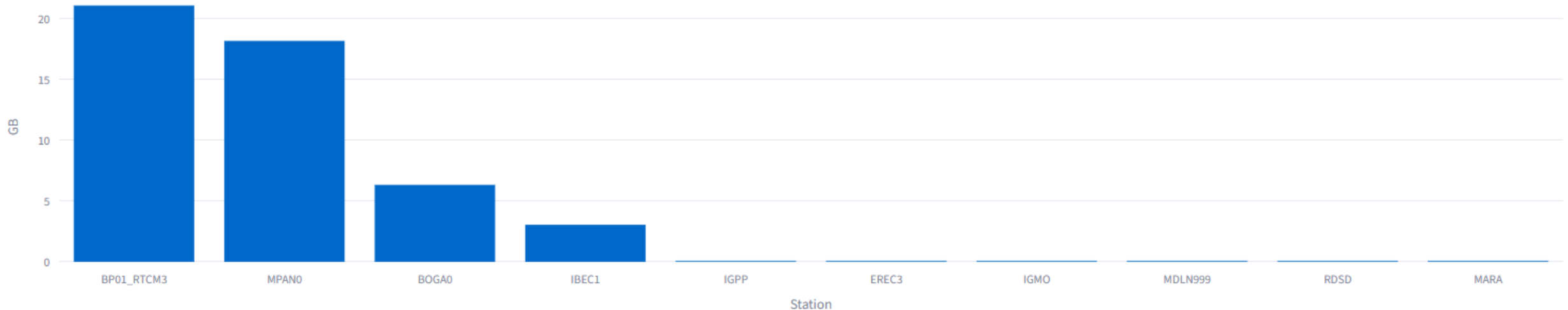
- November, 2025 to December 2025



ACCESS Operational Analytics



Top Stations by Traffic



RT Sessions

1,667

Unique Users

31

Active Stations

13

Traffic GB

48.72



Daily Traffic Evolution

Daily Traffic Evolution



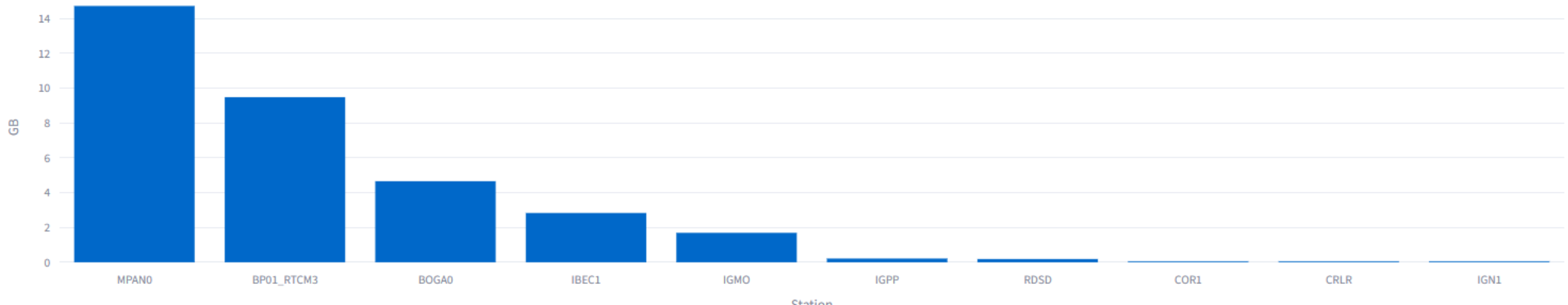
Operations and Statistics

- January, 2026 to May 2026

ACCESS Operational Analytics



Top Stations by Traffic





RT Sessions

2,254

Unique Users

96

Active Stations

16

Traffic GB

33.85



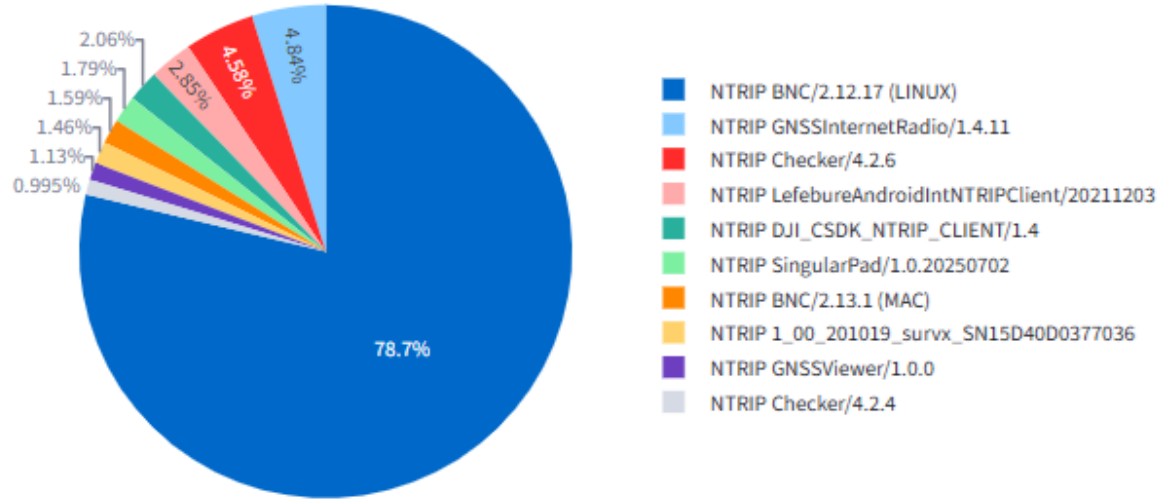
Daily Traffic Evolution

Daily Traffic Evolution

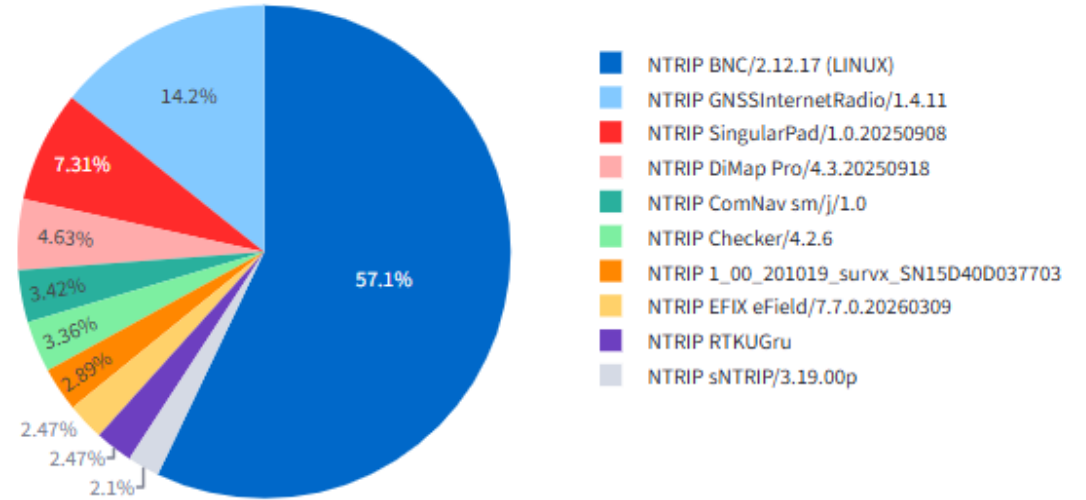


GNSS clients

2025



2026



GNSS clients

NTRIP connection

SIRGAS CASTER
sirgas-rt.esPOCH.edu.ec:2101

User name
regnard999

Mountpoint
RDSD



Latitude
-0.214867

Longitude

Edit

Duplicate

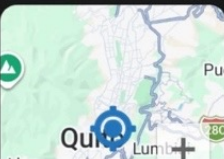
Connect

NTRIP connection

SIRGAS CASTER
sirgas-rt.esPOCH.edu.ec:2101

User name
Panama

Mountpoint
ign1



Latitude
-0.214867

Longitude

Edit

Duplicate

Connect

ign1
Panamá

Disconnect

Status
Connected

Data received
1 MB

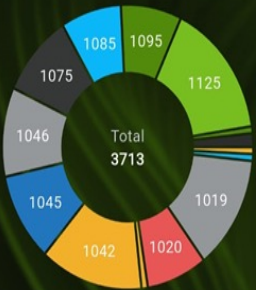
Protocol
RTCM 3 (MSM5)

Messages

Satellites

Base station

Messages



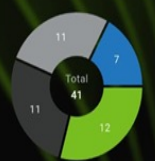
Message ID	Count
1085	1
1095	1
1125	1
1075	1
1046	1
1045	1
1042	1
1020	1
1019	1
Total	3713

Reset

Search

Message ID	Last time received	Count
1006	14:26:18.32	29
1013	14:26:20.34	29
1019	14:26:21.54	484
1020		

Satellites



System	Satellites	Frequencies
GPS	12	L1, L2, L5
BeiDou	11	B1, B2, B3
Galileo	11	E1, E5a, E5b, E5(a+b), E6
GLONASS	7	G1, G2
QZSS		
SBAS		

Perspectives

- Continue integrating new GNSS stations to strengthen regional coverage and interoperability across Latin America.
- Support countries and institutions that still do not have their own local caster infrastructure by providing an experimental regional GNSS RT platform.
- Incorporate new real-time stream transmission formats and emerging GNSS standards.
- Expand toward advanced real-time correction services, including orbit and clock corrections for future PPP-RTK applications.
- Increase interoperability through connections with other regional and international GNSS casters aligned to IGS RT guidelines.



- sirgas-rt.esPOCH.edu.ec:2101
- Contact:
- m_zabala@esPOCH.edu.ec