IGS Data Center Working Group 2014

C. Noll

NASA Goddard Space Flight Center, Code 690.1
Greenbelt, MD 20771 USA
Carey.Noll@nasa.gov

1   Introduction

The IGS Data Center Working Group (DCWG) was established in 2002. The DCWG tackles many of the problems facing the IGS data centers as well as develops new ideas to aid users both internal and external to the IGS. The direction of the IGS has changed since its start in 1992 and many new working groups, projects, data sets, and products have been created and incorporated into the service since that time. The DCWG was formed to revisit the requirements of data centers within the IGS and to address issues relevant to effective operation of all IGS data centers, operational, regional, and global.

2   Recent Activities

The DCWG met in conjunction with the Multi-GNSS Experiment (MGEX) Working Group during the 2014 IGS Workshop in Pasadena, CA in June 2014. The main issues discussed at this DCWG splinter meeting revolved around supporting RINEX V3 and integrating the MGEX archive of data in RINEX V3 format into the operational IGS archives at the DCs. Two main topics were addressed: merging RINEX V3 data into the archives and accepting data using the new RINEX V3 filename format.

The current parallel structure found at the DCs supporting MGEX limits the motivation of the ACs to switch to the RINEX V3 format. Integration of the two data archives will promote use of multi-GNSS data and the new format. The MGEX Working Group has suggested development of a transition plan for adding the MGEX data, and hence RINEX V3 data, to the operational archives. Participants agreed that members of the IGS infrastructure (DCs, the IC, ACs, etc.) should develop this transition plan. It was proposed to include three six-month phases: a preparation phase, followed by an implementation phase and a finalization phase, with full integration of RINEX V3 into the archives by the end of 2015. RINEX V2 for MGEX stations and stations capable of generating RINEX V3 would end at this time.

Those ACs attending the DCWG meeting agreed to utilize the filename convention specified in the RINEX V3 documentation. The DCs, however, will need software tools to create these new filenames from RINEX V2 filenames until stations and receiver manufacturers can create the new filenames directly. Tools also need to be made available to the DCs for data QC and metadata extraction as well as tools for the ACs and users to convert RINEX V3 to RINEX V2.

The RINEX V3 format should also address navigation files. The current format documentation specifies one file per station for observation data; therefore, the format should specify one file per station that includes navigation messages from all GNSS constellations. A tool may need to be developed for this capability rather than depend upon generation in the receiver.

The following recommendations were generated from the June 2014 DCWG meeting:

1. Develop a transition plan that will integrate RINEX V3, including the V3 filename convention, into the operational IGS archives by the end of 2015. (IC, DCs, ACs, MGEX WG)
    Progress: The IGS Infrastructure Committee has drafted this transition plan for comment. The plan works toward the "one network one archive" concept, merging the RINEX V2 and V3 files currently maintained in separate structures at the data centers, into one archive structure. The IC has recommended the IGS Governing Board provide guidance on next steps.

2. Provide software tools that DCs can use to continue to provide needed QC and metadata extraction enabling creation of data status information.
   Progress: Possible tools have been discussed but not identified for general use through the IGS infrastructure.
3. Provide software tools to support data conversion (e.g., RINEX V3 to RINEX V2. RINEX V3 filename creation) that both DCs and ACs can use.
   Progress: The transition plan has identified the need for these tools.

The above recommendations reiterate those from the 2012 IGS Analysis Workshop:

1. The DCs recommend continuing the efforts by the Infrastructure Committee and the RINEX WG to agree on new file names.
   Progress: The new filename convention is included in the RINEX V3 transition plan. To date, RINEX V3 data utilized in support of MGEX are archived at data centers (CDDIS and IGN) in separate directory structures. To improve/encourage data access and usage, the RINEX V3 transition plan states the DCs will use the new filenames and incorporate RINEX V3 data within the operational directory structure.
2. Until the RINEX V3 filename convention is finalized, separate directories for distinguishing between files created from streams and by receivers will be established by all DCs.
   Progress: The DCWG has not addressed this recommendation to archive of high-rate files from real-time streams vs. receivers. However, the RINEX V3 filename convention has been finalized and is included in the latest RINEX V3 documentation. With the adoption of the proposals outlined in the RINEX V3 transition plan, stream-created data will be clearly identified by filename.
3. All DCs explore transition options for a follow on compression scheme to replace UNIX "compress" as early as possible.
   Progress: IGS users reported to DCs that the decompression tools for UNIX compress (".Z") is an outdated method for data compression. It is recommended that the IGS infrastructure change to a standard compression format as early as possible. Plans for transition from UNIX compress to another compression scheme, e.g., gzip, will be coordinated with testing of RINEX V3 data flow.

3   Future Plans

One topic discussed at the IGS Infrastructure Committee meeting at the 2014 IGS Workshop involved metadata, particularly in the area of site logs. The IGS CB has introduced the Site Log Manager System, which is utilized at the IGS Central Bureau for handling IGS site logs and provides a basis for promoting the transmission of these logs in XML format. An XML/database management approach to site logs provides several advantages, such as rapid update of site log contents, utilization of consistent information across data centers, and availability of more accurate station metadata. The IGS CB and UNAVCO, in conjunction with the DCWG, are proposing email discussions and/or telecons to allow participants in this effort to collaborate and plan for a way forward in design, development, and implementation of a shared geodesy XML schema, possibly utilizing the site log schema developed at SOPAC, for site information. If feasible the group would like to plan for future meetings on this collaboration, perhaps in conjunction with community-held meetings (e.g., EGU, AGU, IGS workshops, etc.).

The DCWG will also work with the IGS DCs to implement the recommendations developed during the 2012 and 2014 workshops. In particular, the DCWG will work with the MGEX Working Group and the Infrastructure Committee to finalize the RINEX V3 Transition Plan and work toward implementing the plan itself. Additional topics the WG hopes to address follow.

- Support of the IGS Infrastructure Committee: A major focus of the DCWG will be to support the IC in its various activities to coordinate the resolution of issues related to the IGS components.

These activities will address recommendations from recent IGS Workshops including assessment and monitoring of station performance and data quality, generating metrics on these data.

- RINEX file naming convention: The DCWG will work with the IC and the RINEX WG on implementation of the new IGS RINEX file naming convention.
- Data center harmonization: The working group will consider methodologies for ensuring key data sets are available at all GDCs.
- Compression: As per a recommendation from past IGS workshops, the DCWG will develop a plan for the introduction of a new compression scheme into the IGS infrastructure by evaluating tests of available tools, surveying the IGS infrastructure, making a recommendation on a new IGS compression scheme, and coordinating recommendations with the IC to develop implementation schedule. Ideally, the new compression scheme will be made part of the RINEX V3 file naming implementation.
- Next meeting: A meeting of the DCWG is planned for the next IGS workshop in 2016.

4   Membership

- Carey Noll (NASA GSFC/USA), Chair
- Yehuda Bock (SIO/USA)
- Fran Boler (UNAVCO)
- Ludwig Combrinck (HRAO/South Africa)
- Bruno Garayt (IGN/France)
- Kevin Choi (NOAA/USA), ex-officio
- Heinz Habrich (BKG/Germany)
- Michael Moore (GA/Australia) (tbc)
- Ruth Neilan (JPL/USA), ex-officio
- Markus Ramatschi (GFZ/Germany)
- Nacho.Romero (ESA/Germany)
- Mike Schmidt (NRCan/Canada)
- Giovanni Sella (NOAA/USA)
- Grigory Steblov (RDAAC/Russia)
- Dave Stowers (JPL/USA)