One of the improvements we have in mind is to add an access control to avoid interactions of one user’s dashboards with other. The time the developers spent identifying bugs under the RADE framework has been reduced. The bug diagnostics has been improved a lot thanks to the ELK stack; all the data logs are centralised in a single application.

In our current system, there is a large variety of sources; LabVIEW applications running on CompactRIO and PXI targets, Apache Tomcat servers, Java services, C++ applications and extensions running on the most popular operating systems (Linux, Windows and OS X). In such systems, most of the logs have a different or weak structure. The main requirements for the desired system are:

- Support multiple log formats.
- Support different communication and network protocols.
- Centralized data messages.
- Have a web-viewer to analyse the logs.
- Be able to get statistics of the stored data.

Elasticsearch, Logstash and Kibana are three open source projects which combined are known as the ELK stack.

Logstsh is aimed to unify and normalise data from different sources in real time. It contains a rich collection of input and output plugins, for example:
- Logs: log4j for Java, syslog.
- Databases: Redis, SQLite, MongoDB.
- Network: UPD, TCP, WebSocket.
- Data streams: RabbitMQ, ZeroMQ.

Elasticsearch, as data store, is meant for handling real time data that needs to be processed and analysed in a rapid manner.

Kibana is the web interface to visualise and interact with the data through powerful graphics. Helps to understand large volumes of data and rapidly detect patterns or irregularities in them.

The Kibana interface is simple and intuitive. There is no need to have a web development background to use it. Since the data and the purposes are different per user, each of them can customize a dashboard according to his needs. Log messages are indexed and tagged by Logstash, then filtered with Kibana to gather metrics and statistics.

Tests and integration:
- Installation of the system was really straightforward; less than a day with the basic configuration.
- Throughput is 5000 messages per second.
- Developed a Logger tool in LabVIEW where messages are sent by UDP and the implementation took less than a day. It is included in the RADE framework where all LabVIEW users can benefit from it.

Conclusion:
Thanks to the introduction of the ELK stack, all the log messages have been unified into a common format and the data storage is centralised. The management and analysis of all these data has greatly improved, users have created their own dashboard according to their needs.

The bug diagnostics has been improved a lot thanks to the ELK stack; all the data logs are centralised in a single application and errors can be identified easily. The time the developers spent identifying bugs under the RADE framework has been reduced.

We are also planning to add new graphical components in Kibana and to extend it to be used in other websites outside the ELK stack.