

**From:** Anne Gwynne-Robson <[angwy@microsoft.com](mailto:angwy@microsoft.com)>

**Sent:** Monday, June 5, 2017 8:34 AM

**To:** Johan Sundstrom <[johansu@microsoft.com](mailto:johansu@microsoft.com)>; Chris Rininger <[chrisrin@microsoft.com](mailto:chrisrin@microsoft.com)>

**Subject:** RE: Scouting 2018

I did the bulk of the work on the app, Nathaniel – another of our mentors – worked on the Bluetooth connection (both client and server side), and Johan wrote the server code.

The android tablets in question are Kindle Fires, the server can be any computer that runs Windows. Johan's got excellent, detailed instructions on how to set it up.

The key technologies that students would need to be familiar with for the three areas are:

1. Android programming (Java) for the app and Bluetooth client
2. C# .NET programming for the server
3. Tableau for the analytics

I worked on the app and can tell you that Android programming is hard to get your head into. Key concepts you need to be comfortable with include inheritance, interfaces, threads, and event-driven programming. I highly recommend that students who are interested in this aspect of the scouting system start learning how to code for Android sooner rather than later. We could also benefit enormously on the app side from students who are interested in graphic design, but any designers will also need to be comfortable with doing a little coding – at the very least they need to implement stub event handlers for UI elements.

I spent a lot less time on the server, but it seemed to be straightforward C#. That said, any student working on it will need to also be comfortable working with SQL server.

Can't comment on Tableau, alas.

**From:** Johan Sundstrom

**Sent:** Friday, June 2, 2017 9:30 PM

**To:** Chris Rininger <[chrisrin@microsoft.com](mailto:chrisrin@microsoft.com)>; Anne Gwynne-Robson <[angwy@microsoft.com](mailto:angwy@microsoft.com)>

**Subject:** RE: Scouting 2018

Hi Chris,

There are three distinct areas of student contribution:

1. Android App – design and UI programming for web/mobile development inclined students
2. Data movement - pushing data from app to server for students who are inclined for "systems" work
3. Tableau / Data Analysis - for statistics / machine learning inclined students

We ended up with a very functional system by Cheney / Houston and have a solid code base to build from. Tweaking the data collected and pushing it to laptop is minor work for 2018 which means more time can be spent on Android App and Data Analysis next year. Potentially even uploading to the Cloud so parents can see the data too on their phones using Tableau client- a request we got was to see the tableau charts.

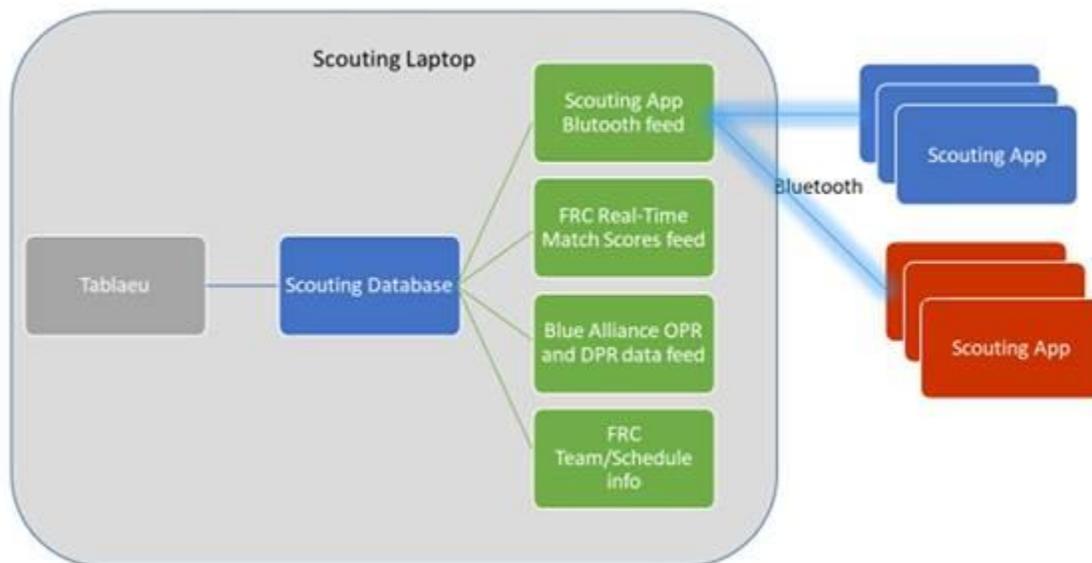
Obviously a mentor who understands the end-to-end and can help with deployments and troubleshooting.

## Architecture

Here's the high-level architecture for the Scouting system:

- Scouting Apps (Android) collect data and push data to Scouting Laptop over Bluetooth in JSON
- Scouting laptop (Windows) receives data and updates the local (SQL Express) database (Android/Java -> network send protocol -> network receive protocol -> upload to SQL)
- Tableau connects to local database for updates and slices and dices the data (understanding what answers team wants from data to best compete)

In addition, we're looking to preload the data base with Team/Schedule (potentially the android apps as well) and other info form FRC as well as in real-time collect the FRC Match Scores and Blue Alliance OPR/DPR data. This may require tethering to a phone if WiFi internet isn't accessible or walking out to an area where it is.



**From:** Chris Rininger

**Sent:** Friday, June 2, 2017 8:28 PM

**To:** Anne Gwynne-Robson <[angwy@microsoft.com](mailto:angwy@microsoft.com)>; Johan Sundstrom <[johansu@microsoft.com](mailto:johansu@microsoft.com)>

**Subject:** Re: Scouting 2018

Hi!

I confirmed with one of our captains there is interest, but there is also a question: what kind of skills would someone need to collaborate and set the solution up? I remember the solution is android tablets + Window OS machine with server connection via Bluetooth, but that's about it.

Thanks for reminding me about this!

--Chris

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**From:** Anne Gwynne-Robson  
**Sent:** Friday, June 2, 2017 4:10:37 PM  
**To:** Chris Rininger; Johan Sundstrom  
**Subject:** Scouting 2018

Hey Chris!

Are you guys still interested in a collaborating on a scouting app?

Cheers,  
Anne Gwynne-Robson