

Top 10 tips for data monitoring

The My Electric Avenue team have gathered practical experience with monitoring of several data sets from a multitude of distributed sites. We are keen to share our knowledge with you – and so we have collated a ‘Top 10 tips for data monitoring management’.

1. Plan how you’ll store your data

First off, to ensure that none of your hard work is lost, good data monitoring should be supported by reliable data storage. As you map out your requirements, review to what extent you are relying on storage provided by a third party with access for a limited time only; if so, consider taking early steps to transfer the data to a secure and backed up location under your own control.

2. Can you test your monitoring before launch?

Whatever the purpose of your monitoring, if you have the opportunity it is a good idea to set up and test your monitoring system ahead of time, for example as part of initial trial runs at the start of your project. Is it fit for purpose, or do you need to make adjustments? This will help to drive home the aims of your monitoring and resolve technical difficulties before actual data loss occurs.

3. Find anomalies early

If there are problems with your monitored data, you’ll want to find out quickly – and then decide whether action is required. As part of setting up your monitoring system, design an automated process that highlights for example whether data is missing, and whether it is outside the expected value range.

4. Know your units

Assumptions about the meaning of data can easily lead to unnecessary misinterpretations – nip this one in the bud immediately by stating clearly what units apply to each data field. This applies particularly to time standards (is it UTC or BST?) and quantities such as distance (is it kilometres or miles?), and if you are receiving data from a third party provider make sure you confirm all units with them.

5. Set up strong third party relationships

Data monitoring by a third party removes part of the burden from you, but creates risk in terms of data access and reliability. You might find that it takes longer to complete the data access cycle, and that errors occur in the third party system that you cannot rectify, both of which can lead to loss of data. Make sure you have a detailed knowledge up-front of the restrictions on the process by which you will access the data set, and that there is a dedicated person within the external company who will assist you to resolve problems as and when they arise.

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6. Tag data with 'identifiers'

Data monitoring can result in vast data sets, and it is crucial to be able to associate each and every data sample with the correct source. This is particularly true at the end of large projects that may have seen a gradual evolution of approaches to data collection. To tackle this, ensure that every data sample is clearly tagged (i.e. logged) with a unique identifier at the point of monitoring. An identifier could be for example a device serial number or participant ID, but stick to a single type if possible.

7. Go into detail with data aggregator providers

You may use a data aggregator service to sample and log data for you in the field and upload it to an online database, where you can access it. Do not make assumptions about the nature of that online data; the aggregator functionality is likely to manipulate and occasionally add to your data set, and it is valuable to understand that difference up-front. Make sure you sit down with the service provider to discuss it in depth.

8. Document each data processing stage

User-friendly but thorough documentation of your data monitoring setup is essential, to facilitate a rapid and accurate understanding by all relevant Partners and co-workers throughout the project. Once you're up and running your monitoring process probably includes several steps, from the first point of measurement to data arriving at its final destination in your database. At each stage, describe how variables are being monitored or manipulated with respect to time stamps and accuracy in particular. The sooner this documentation is in place, the better!

9. Automated data requests require careful attention

Automated data requests, such as APIs (Application Programming Interfaces), are useful tools for data transfer between systems, but require robust management. Process power limitations and hidden bugs can stop you in your tracks. Be sure to establish that the servers involved are capable of handling the frequency of requests, and that the API process is collecting the exact data you've intended – nothing less and nothing more.

10. Remember your "before" and "after"

Chances are you will only get one good opportunity to gather data relevant to "before" a trial – and that's before you get started. Whilst it is important to get a project up and running, make sure you give yourself enough time prior to and during installations to consider what base case data you want to gather, the purposes of "before and after" analysis. Your project Partners may have additional requirements or suggestions in this area.

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