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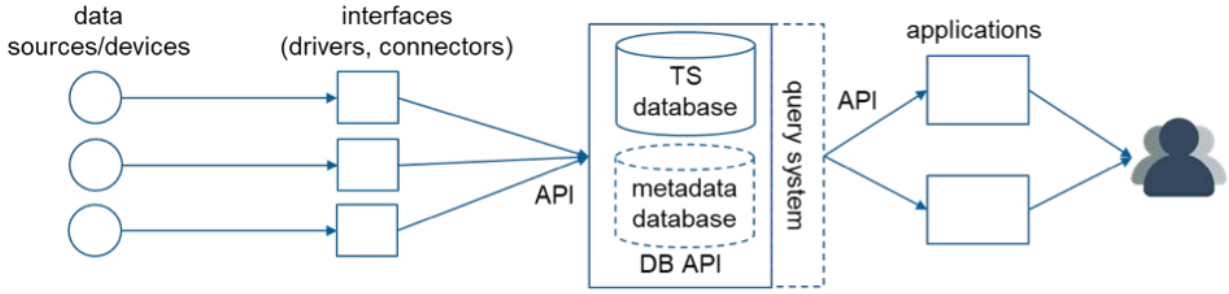
Data management is a common challenge for building owners. Most owners are dealing with a wide variety of control systems and meter infrastructure, often with proprietary hardware and communications, and they're trying to pull it all together so they can take advantage of the great analytics tools out there. In many cases data is being transferred across multiple software and storage platforms, both on-premise and to/from cloud-based infrastructure. The diagram below illustrates the main parts of a data architecture common for building analytics.



Each situation is unique, and each owner might have different ways they want to use their data, so there is no single right way to approach data management, but there are some key attributes to consider for any solution.

- **First consider what you are trying to achieve with analytics before deciding which data to integrate into your database.** Don't do the hard work to bring all the data in unless you have plans to use it. Data source examples include: Utility bills, interval meters, building automation system meters, sensors, and weather data.
- **It's more effective to have a single database than multiple versions of the same data or databases that can't communicate with each other.** A single software application may not meet all your analytics needs, so you may want multiple applications to interface with a central database. Often, when you buy different applications, you get different databases. Think about what data you'd like to have in a single location for analysis. Make sure each of these applications can use the database API.
- **Metadata – "data about your data" (descriptors of building systems such as sensor names and relationships between components) needs a consistent data tagging convention.** What are the benefits of having your data tagged? It allows you to manage your data better, avoid hard coding analysis routines and instead run queries and write general rules that will pull in all the correct data points based on their tagging. It saves a lot of time and troubleshooting headache for analytics in the long run! Make sure your metadata scheme supports your analytics goals (so think about what analytics you want to do first). Examples of metadata tagging schemes include Project Haystack and Brick, but any consistent scheme within your organization is better than no consistency.
- **Look for points of failure from the device to the database and implement a data quality review/data cleaning process.** Points of failure may include meter installation (transducers installed wrong), insufficient memory in the field data collection device, database firewalls preventing data transfer, and units/meter multipliers wrong. Make sure the data connectors work with the database API. Data interface examples include data collectors such as Tridium JACE, Modhopper, and Obvius Aquisuite, and other gateways. *(Continued on next page)*

- **Involve your IT department early to determine what will meet IT and cybersecurity requirements.** Many EMIS technologies require data to be transferred to internet-hosted analytics software, and although less common, some applications may even 'push' control signals from the internet to building systems. If on-premise databases are required, this will limit options for EMIS selection.

Many Smart Energy Analytics Campaign participants (both for pilot and full scale EMIS installations) work with third party providers to install the meters, propose the network architecture, implement data tagging, and set-up the analytics. There are service providers that do this for a living, so this can be a good way to go, but be sure that your organization's EMIS champion is highly involved to help the implementer understand your needs and make sure you get the configuration that will work for your organization. For more information on data management, review the webinar: Building Data Management: Best Practices and Lessons Learning from EMIS Installations.