APTIV



APTIV CONNECT QUALIFIER

PREPRODUCTION VEHICLE VALIDATION AND ANALYTICS

Hardware

Software as a Service

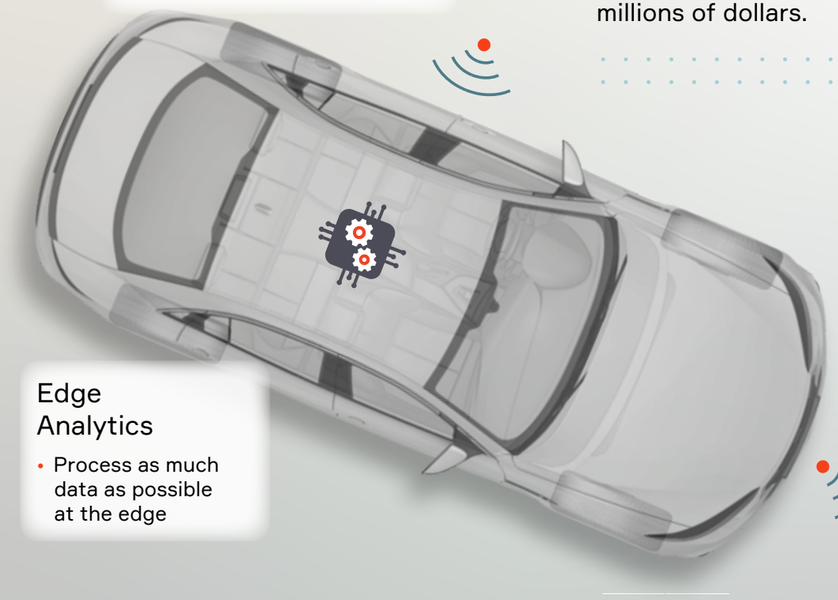
Professional Services

Qualifier Components

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How Qualifier *Accelerates* Validation

USED BY MORE THAN 70% OF THE WORLD'S LEADING VEHICLE MANUFACTURERS, Aptiv Connect Qualifier dramatically reduces the time it takes to find and fix vehicle problems, helping save millions of dollars.



Immediate OTA Updates

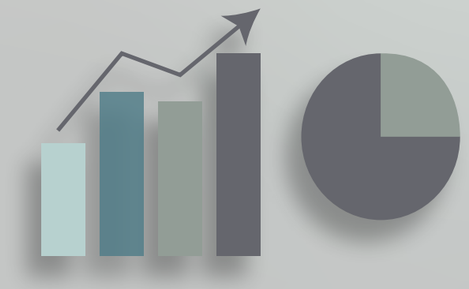
- Change your data collection strategy on demand

Edge Analytics

- Process as much data as possible at the edge

Event-Based Data Collection

- Simplify search by collecting and storing relevant data

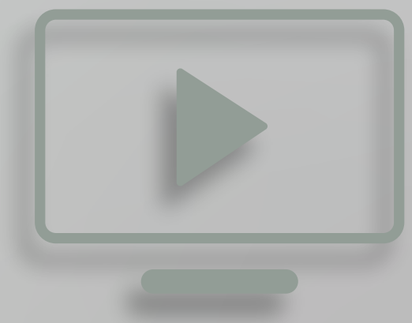


Customizable Dashboards

- See all relevant data on a single pane

AI-Enabled Video

- Reduce manual work with automatic scene labeling



Hardware

Aptiv's vehicle data recorders (VDRs) collect more signals in higher resolution than competing solutions. They perform analytics at the edge to extract valuable insights, which they transmit via Wi-Fi or cell connection.

The **EP-2000** is Aptiv's latest-generation full-featured VDR with support for up to 16 CAN FD channels, up to 6 BroadR-Reach and 3 standard Ethernet channels, up to 2 LIN channels, and up to 4 video cameras. It has 256 GB fixed storage, onboard battery backup, GNSS, Bluetooth, and an integrated security chip. The device comes with a manual trigger and antennas with harnesses available on request. It also supports multi-module over-the-air (OTA) updates. Harnesses available on request.



The **EP-800** is Aptiv's latest-generation lightweight VDR with support for up to 4 CAN FD channels, 1 SWCAN channel, 1 LIN channel, 1 DoIP channel, and 1 BroadR-Reach channel. It includes 32 GB storage, Bluetooth, GPS, an LCD display, and an integrated security chip. Includes manual trigger, antennas, and necessary cables.



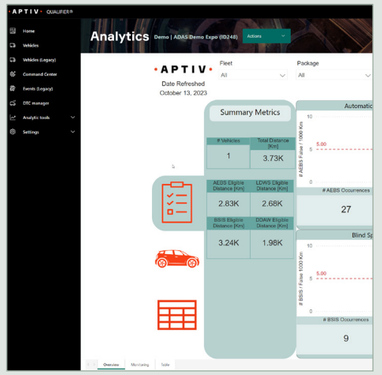
The **Qualifier Video Solution** incorporates up to 4 video cameras, a video unit, power supply, cabling, and mounting hardware as needed. Multiple camera designs are available to support interior or exterior use with fixed, varifocal, or fisheye lenses. Requires an Aptiv VDR in the same vehicle. Note that the Video Solution is required for Video Insights.



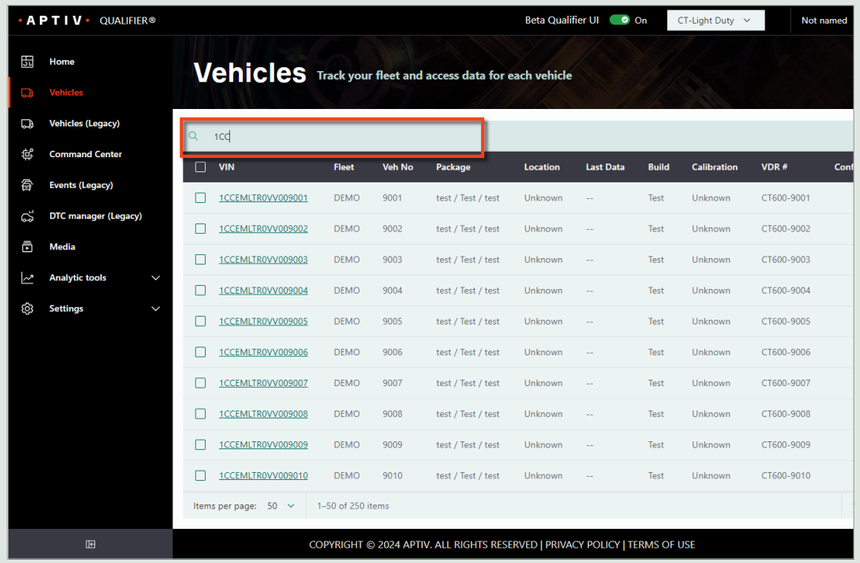
Software as a Service



Connect Edge software runs on every Aptiv VDR. It enables simultaneous logging of CAN history, trip data, high- and low-speed event triggers, and event- and time-based snapshots with microsecond precision. It supports complex event trigger logic, synthetic variables, multiple file formats, and multiple protocols. It has remote configuration and monitoring capabilities, and supports over-the-air (OTA) updates.



The **Qualifier web application** streamlines the process of analyzing vehicle data. It includes issue management, reporting, fine-grained filtering, mapping, custom visualizations, video support, and role-based access control. It also allows you to have recurring reports sent to your inbox and receive alerts when pre-defined events occur.

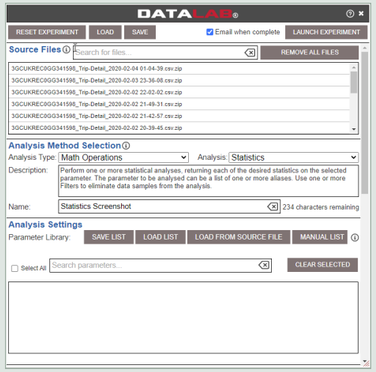


Recently redesigned, the **Next-Gen Qualifier** web application features omnisearch, which dramatically reduces the time it takes to find data. Start typing in the search box, and Qualifier will immediately bring up the corresponding vehicles.

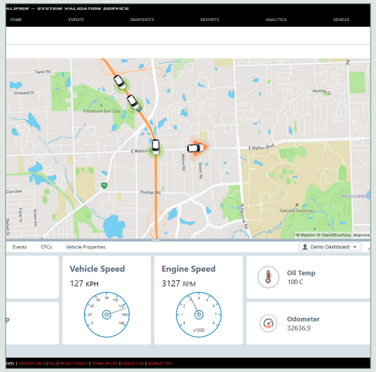
AC-Graph is an advanced visualization tool included with the Qualifier web application. It plots selected signals on a graph, and it can also synchronize GPS maps and video files to provide a comprehensive view of conditions in and around a vehicle. For customers that purchase Video Insights, AC-Graph can also display AI-generated labels on top of video.



DATALAB adds offline analysis capabilities to the Qualifier web application. It can generate parameter statistics, 1D and surface histograms, event counts (rising, falling, logical), parameter aliasing, distribution identification, file concatenation, user-defined aggregation (VIN, calibration, data ranges), and custom analysis. It supports CSV, MAT, and MDF file formats.

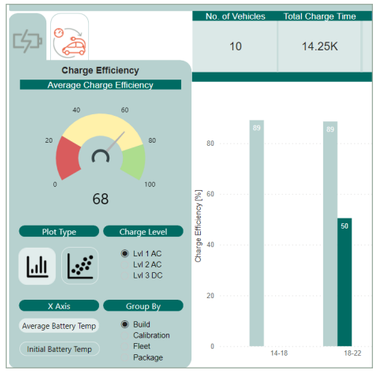


Command Center brings real-time vehicle monitoring to Qualifier. It plots vehicle locations on a map and allows you to monitor a subset of data signals. It also provides immediate alerts when pre-defined events occur.

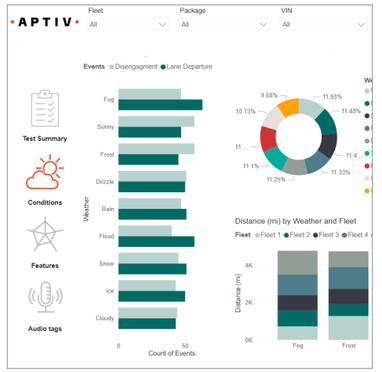


Qualifier supports all types of passenger and commercial vehicles, including EVs and hybrids, traditional ICE vehicles, trucks, vans, SUVs, motorcycles, scooters, ATVs, agricultural equipment, and emergency vehicles.

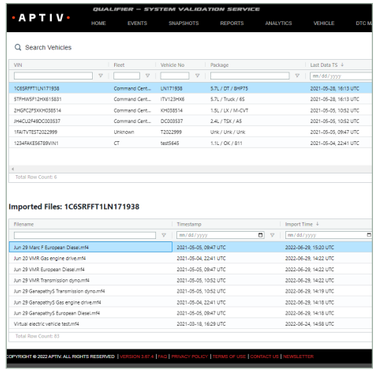




Qualifier Analytics provides near-immediate access to key performance indicators (KPIs) across your test fleets, helping to maximize efficiency. These dashboards can also incorporate data from other Qualifier services, including Video Insights, Environmental Insights, and data science services. Aptiv customers report that it helps their engineers become much more efficient, cutting the amount of time spent creating reports by 50% or more.



Environmental Insights incorporates road and weather data into Qualifier. It allows you to determine whether external conditions are triggering any vehicles and to ensure that you have adequately covered all test conditions.

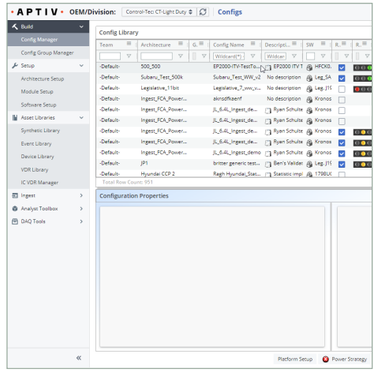


Qualifier Ingest imports data captured with non-Aptiv data loggers into Qualifier for centralized analysis. It allows you to set up triggers that run retroactively so that you can easily see when pre-defined events occurred in any test vehicle, whether or not it had an Aptiv VDR installed.

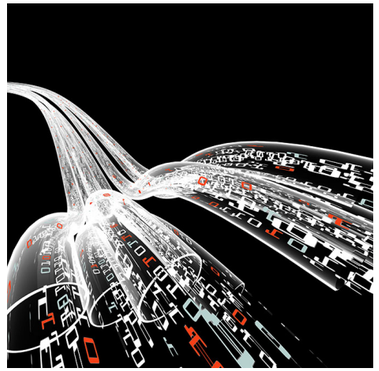


AC-Dash is an optional Android tablet app that allows you to start troubleshooting during test drives. It can monitor signals and record driver comments, which are then transcribed into the Qualifier web application. AC-Dash can run on any ruggedized tablet with Android 4.0 or later. Aptiv has suitable tablets available for purchase or lease. Requires an Aptiv VDR in the same vehicle.

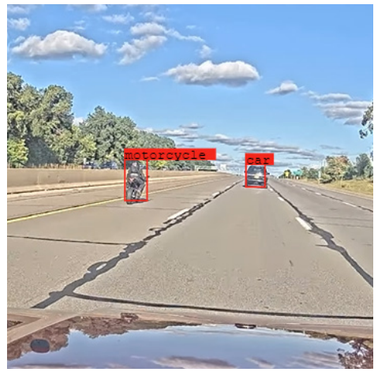
Developer is Aptiv's data collection configuration application, which is used primarily by our internal CSE team. (See page 9.) Most Qualifier customers choose to have Aptiv's CSE team manage their data collection configuration, but some customers, especially those who use Ingest, choose to have their own engineers use the Developer tool to set up triggers, ingest files, and more.



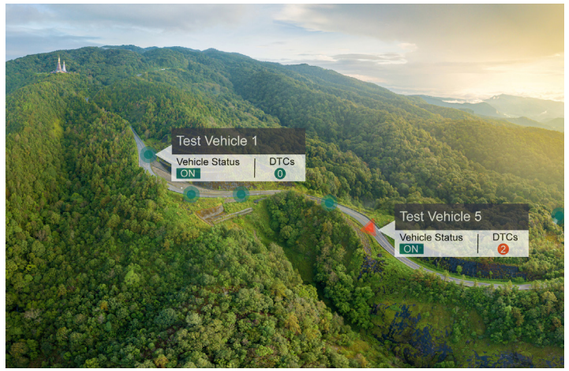
API access is available for customers who need data for machine learning or other purposes. Aptiv offers RESTful APIs following the OpenAPI standard, with authorization handled by OAuth2.



Video Insights uses AI technology to label ground-monitoring video, reducing manual effort. It can identify a variety of objects and conditions, such as poor lane marking, bridges/overpasses, tunnels, traffic jams, cloud cover, rain, snow-covered streets, cars, trucks, buses, motorcycles, speed limit signs, and more. It enables consistent performance measures for ADAS features while providing the context necessary to understand how those features are performing in a variety of different conditions.



For ADAS validation, Aptiv recommends a solution that includes the EP-2000, Video Solution, Video Insights, Analytics, Environmental Insights, and Command Center



Qualifier subscriptions include professional services provided by Aptiv's Customer Success Engineering (CSE) team. Aptiv's CSEs have deep domain expertise and decades of experience implementing industry best practices.



Hardware setup services come standard with all VDRs. Aptiv will make sure your VDRs are correctly configured and installed in your vehicles.

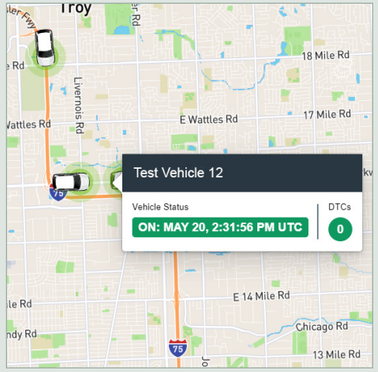


Data collection configuration services come standard with a Qualifier subscription. Aptiv's CSEs will ensure that your VDRs are collecting the desired signals from your vehicles, and they will set up event triggers.

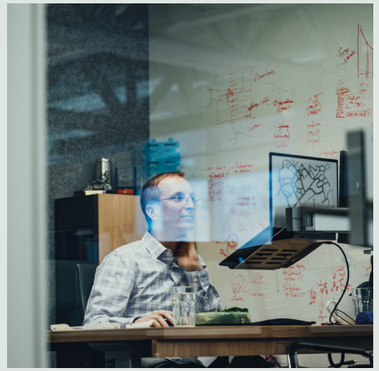


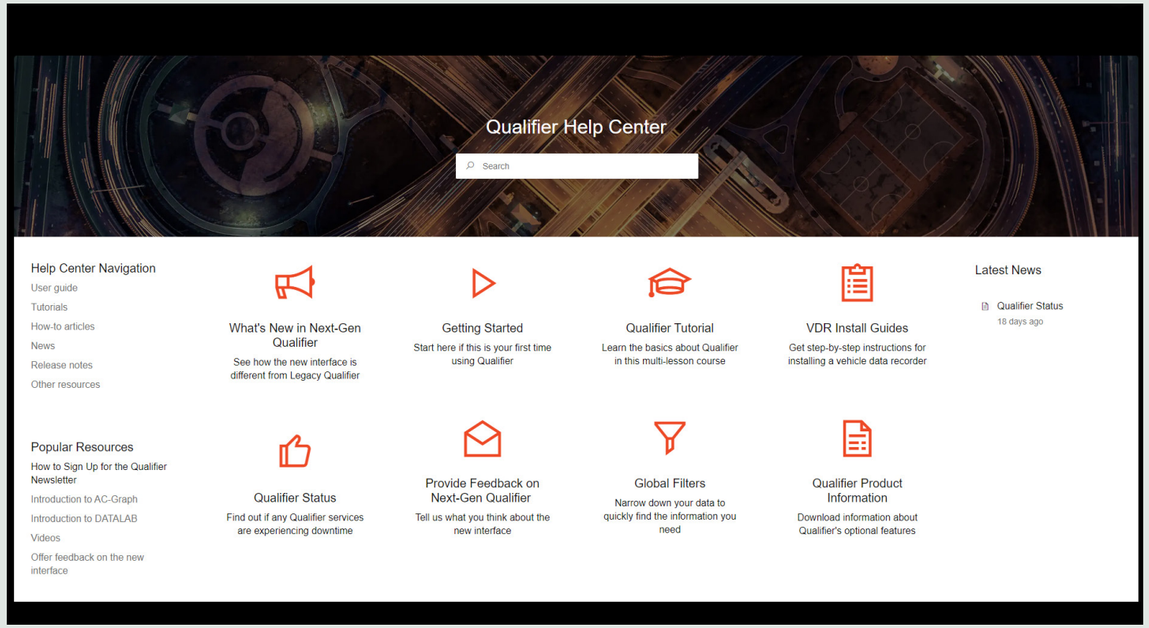
Analytics customization services adapt Qualifier dashboards to meet your unique needs. Aptiv has created custom dashboards related to ADAS, EVs, advanced vehicle health, advanced transmission health, calibration robustness, module software, NOx and GHG tracking, feature tracking, drive characterization, and off-road performance.

Command Center setup configures your VDRs and vehicles to provide real-time data via Qualifier. This service includes defining the necessary synthetic signals for dashboard data monitoring.



Data science services can help you build models and applied machine learning techniques to solve complex challenges. For example, our data science team has created models that accurately determine the weight of a commercial truck without using a scale. Other models classify drives into highway, rural, urban, or mountain routes. Aptiv can apply these same techniques to meet a wide variety of different needs.





The **Qualifier Help Center** includes tutorials, user guides, release notes, outage status, and other information to assist your team in using Qualifier.

Aptiv's Movimento Group provides reflash services at every stage of the vehicle lifecycle. More information is available at **www.movimentogroup.com.**



Universal reflash services are available 24/7, anywhere in the world. Movimento teams can affordably update vehicles or loose modules faster than manufacturers can do it themselves. An industry leader, we provide emergency reflash services for millions of vehicles every year.



Preproduction fleet reflash services keep your vehicles in sync during design, testing, and validation processes. Our Nuvolo software provides complete traceability, so you'll always know which software version a particular vehicle is running.



In-plant flash brings Movimento staff to your production line. Our personnel will integrate with your existing processes, using our portable PUMA devices to flash vehicles or loose modules.

Module reflash rigs are also available for use in module production or vehicle assembly facilities. These stations provide fast reflashes under controlled conditions to provide accurate, reliable results.

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www.aptiv.com/connected-services