webOS Auto Whitepaper

Reshaping the future of your automotive business

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LG Business Solutions

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Executive Summary

It is no longer a surprise that the automotive industry is going through a disruptive transformation, and behind that, there are four megatrends that drive the transformation – connectivity, autonomous driving, electrification, and shared mobility.

These trends shall not be understood or interpreted separately, as they accelerate and create synergy effects with one another. Connected and automated vehicles will allow drivers and passengers, together "consumers", to spend quality time in a car with media and services. When self-driving taxis and shuttles, where the autonomous driving technology is integrated into mobility services, start to run on the road, more passengers will take the advantages from them, for example, safety and convenience.

webOS Auto as an out-of-the-box in-vehicle infotainment platform helps carmakers tackle the challenges that the combinatin of these trends will bring in. It allows carmakers to adopt the platform with less efforts, while guaranteeing seamless user experiences across all touchpoints and passenger types. In line with the generational shift in vehicle architectures, it surely meets and supports all the requirements from future mobility such as connectivity and data management. By utilizing webOS Auto's ecosystem that is vertically integrated from a silicon vendor to a cloud platform, OEMs can accelerate time to market and reduce costs and also respond quickly and preemtively to ever-changing automotive consumer needs, securing long-term competitiveness in the market.

Furthermore, in the perspective of digital transformation in the automotive industry, how to create values from the collected car data is the key to hold a lead. webOS Auto enables carmakers to leverage the collected car data to provide differentiated user experiences through personalization and build their own business models such as mobility services and payment services.

Looking for a proven and reliable platform for your IVI system that will help speed up go-to-market and create unique values? webOS Auto, accompanied by rich content and a flourishing ecosystem, may be the answer. Take the shortcut with it.

Introduction

Cars become a mobile space for entertainment, communication, and productivity

Connected car, autonomous driving, electrification, and shared mobility, the four automotive technology trends recognized by industry players and research firms, together are changing the concept of a car from a transportation means to a mobile space where people can get enjoyment, communicate, and create values.

Connectivity is maybe the most tangible trend that users are seeing already in their daily lives. It is far beyond a simple Internet connection. In addition to the functions for Internet connection that allows passengers to use web and SNS services, cars are equipped with a variety of sensors to obtain data to improve in-car experience as well as safety. The data does not remain within the vehicle but can be sent to and analyzed by cloud-based services for personalization and service recommendation.

Autonomous driving is clearly making progress, and the evidence is the current level of effectiveness of advanced driver assistance system (ADAS). Some reports expect that in 2030, up to 15% of passenger vehicles sold will be fully autonomous, although the adoption rate would significantly vary by market.[1] The automated driving will free users from driving and allow them to enjoy their time with content and services on the go.

It is well recognized that electric vehicles reduce emissions and save money, but another important impact of vehicle electrification is that it gives car designers a greater freedom in their work. By removing the need for large combustion engines, electric vehicles offers spacious interiors that can be designed for a variety of purposes with creativity.

Shared mobility is in a rapid growing curve, changing the form of personal transportation from driving one's own car to hailing a mobility service. Given that the growth rate is expected to continue, changes that it brings in to all sectors across the automotive industry, such as automakers, suppliers, and mobility service providers, are to be significant in both qualitative and quantitative manners.

Thanks to the hard work of the automotive industry, it is estimated all new cars will be digitally connected by 2030.[2] And the user penetration of ride-hailing services accounts for 20.1% in 2019 and is expected to hit 28.8% in 2023, although the figure is about inside the US only.[3] Fully automated driving is projected to arrive by 2030 at the earliest, while Level 4 autonomy, high automation, is expected just several years ahead.[4]

As seen above, the trends are real and thus the changes that the combination of these trends will bring in are unavoidable. So players in the automotive industry shall have to set up a clear vision on how to adapt and even revamp themselves in line with the imminent changes. The concept of a mobile space

[1] Monetizing car data, September 2016, McKinsey&Company, https://www.mckinsey.com/industries/automotive-and-assembly/our-insights/monetizing-car-data

[2] Enabling connected vehicle solutions, July 2019, Microsoft

[3] https://www.statista.com/outlook/368/109/ride-hailing/united-states

[4] https://www.mckinsey.com/features/mckinsey-center-for-future-mobility/overview/autonomous-driving

that enables users to make the fullest use of their time in a car forces carmakers, which used to work on how to make safer and easier-to-drive cars, to think of how to serve passengers while they are being taken from one place to another. From the perspective of the carmakers, it amounts to the transformation of their nature from a car manufacturer to a mobility service provider.

In particular, an automotive infotainment system is at the core of this change as it can make over a cabin into a space of needs with screens, audio equipment, cameras, and network connection. With a well-designed and fully-functional infotainment system, a vehicle can be turned into a conference room, movie theater or even personal shopping boutique.

In addition, in terms of digital transformation which is one of the dominant trends across the industries, the infotainment system is the key factor in realizing data-driven experience and personalization in a vehicle. While acting as a channel for interaction between automakers and passengers, the in-car infotainment system allows the automakers to learn about the passengers and create revenues by offering services based on that knowledge. The advantage will be given to the passengers as well: they will be provided with consistent and seamless experiences any time, any place.

For automakers, it becomes a must to come up with a strategy to implement an effective and trustworthy IVI system to cope with these complex needs of the times. Considering the limited resources that they have and specific skill sets required in building and running an IVI system, partnering a customizable - more desirably white-labellable - IVI platform, instead of doing from scratch on their own, will be the most efficient and likely-to-succeed approach.

What To Be Changed in Automakers' Perspective

The paradigm shift is certainly happening in the automotive industry. Setting aside fully-automated vehicles which may take a bit to become real, the trends of connected vehicles and ride-hailing services are already witnessed in our lives and changing the concepts of a car and mobility in general.

To survive and not to fall behind in the market, car manufacturers and component suppliers shall strive hard to grasp the ideas: what consumers expect from a car, what they want to do in a car, or how they will use a car in the coming future. The best bet will be understanding the current status as accurately as possible and taking cues from the similar cases in other industries.

Home- or mobile-like experiences are expected in a car

As a mobile phone is no longer a mere electronic device to make a call to someone, so be a car. When a mobile phone first appeared, no one would expect we do web search and watch movies on it. The very similar is happening in car experiences.

To put it simply, users will expect from a car just the same as they do at home or with mobile. In other words, the mission of carmakers is to design and implement satisfactory in-car user experiences at the similar level to mobiles and TVs and other consumer electronics devices. And that is when and why they might look for a partnership with platforms which have been proven in the market and built an own ecosystem in the consumer electronics devices industry.

It is said that the characteristics of an infotainment system are more like those of consumer electronics devices such as mobile phones and TVs, than those of a traditional automotive component, in terms of expected experiences, lifecycle, app ecosystem, etc.

Digital transformation strikes automobiles too

Some old device manufacturers who once ruled over the global consumer electronics market had to give up the dominance, since they failed to reform themselves to a platform-based electronics company. The same or fiercer situation will rearrange the automobile landscape as well.

Digital transformation is happening across the industries, and the automotive industry is no exception. It is changing not only the way of driving to assisted driving to autonomous driving but also the way how vehicles are designed, made, and used.

When it comes to digital transformation in the automotive industry, the outcome is likely about data and personalization. Connected vehicles will collect data while driving on the road – destinations visited, routes taken, content played, etc. Data generated by the cars on the road is expected to become a USD 450 – 750 billion market by 2030.[5] By this vast amount of data, carmakers will be given not only opportunities but also responsibilities. As the data is related to safety and privacy, it should be treated

[5] Monetizing car data, September 2016, McKinsey&Company, https://www.mckinsey.com/industries/automotive-and-assembly/our-insights/monetizing-car-data

properly and carefully. Otherwise, the carmakers may be involved in serious problems. On the other hand, the data could be a valuable source for businesses such as in-car digital commerce and advertising. The better you know about your potential users, the more likely you can sell your product. It rests with the carmakers to monetize the collected data while keeping the safety and security.

Entertaining passengers is a never-asked-before mission

As mentioned several times, users' expectation for car experience is not just being fast and safe, which was the traditional slogan of automotive manufacturers, any more. Users do not want their time to be wasted to get to another place and do not want to get bored or isolated in a vehicle.

When using ride-hailing services or, in the future, autonomous vehicles, such needs gets only intense. But unfortunately, most OEMs will not be so accustomed in designing entertainment and joyful time in a car. It is a very new, and highly-likely challenging, kind of a task for them.

In fact, the solution does not need to be new, and they can learn from the existing practices. There are a variety of games, apps, and content available for smartphones, TVs, and other personal devices with which users spend time with joy and satisfaction. OEMs can learn from and borrow those apps and services for their IVI systems. Then, the remaining problems are how to find and procure apps and content sufficient to satisfy their users.

Building a platform ecosystem is a burden if from scratch

Over a hundred million of lines of code are required to operate a modern vehicle equipped with advanced features such as connectivity, and the complexity only grows if you want to design a car of the future. It makes the software systems inside a car as important as its hardware for stable, safe, and joyful driving. Given the circumstances, carmakers are forced to make a choice on where to concentrate the efforts to raise the odds of success.

Among the software systems required to run modern and future vehicles, an IVI system, in particular, which is known to account for more than one tenth of the code, cannot stand alone: it requires an ecosystem where complements such as apps and games are created and compete against each other. A sound ecosystem is an essential factor for a platform to be widespread and prosper. Considering the time and efforts to be spent in building and stablizing an ecosystem, a rational decision for carmakers to make is to buy or partner a proven IVI system with a prebuilt ecosystem, for the sake of efficiency and effectiveness.

By doing so, carmakers can concentrate on further advancing their specialties including the driving technology, instead of splitting the efforts, while taking the advantages from the proven solutions. And at the same time, they would be able to invent new business models with the collected data, in preparation against the downward curve of the global car sales volume.

How webOS Auto Can Help

webOS Auto is a platform built for the entire IVI user experience (UX) across all touchpoints from driver to passenger to personalized and on-demand experiences, for varying individual needs and ride contexts - always with the user at the center. It offers familiar and fresh interfaces for seamless transition from mobile to personalized passenger UX that is user-oriented and future-proofed.

webOS Auto acts as digital super glue: connecting users, devices, mobility service providers, content providers, transactional providers, control centers; and supporting evolving technologies for an autonomous future. As a turnkey solution, it embraces developer experience (DX) as much as it does an end-user experience. The platform has a powerful ecosystem including software development kit (SDK), reference user interface (UI) and UX and developer support.

For those who may have heard webOS and wonder what is the difference between webOS and webOS Auto, a brief explanation about the history will help. webOS is a web-centric and usability-focused software platform that has come a long way since its inception. The platform has proven its reliability and stability in over 70 million LG smart TVs and digital signage devices, and it is now mature, stable, and ready to move beyond to other verticals. webOS Auto is the automotive grade incarnation of webOS. It positions itself as a solid direct link between operating system providers and Tier 1 suppliers, embracing the OEMs' needs for customized mobility interfaces as well as ownership of mobility services.

This section will unfold the scenarios how webOS Auto can help automotive manufacturers and parts suppliers in general and in particular for the challenges listed in the previous section.

Seamless experience at home, in hand, and in a car

The history of an IVI system throws back to a radio with a dial and a cassette tape player, but the concept of the current, and future, IVI system will be completely different. It is with high-quality displays, enhanced connectivity, and a variety of apps and contents, with which users will be allowed to consume content at home, on hand, and in a car, literally, seamlessly.

webOS Auto inherits all the features and functionalities of webOS which has long powered LG smart TVs and evolved to best meet users' needs. Needless to say, a television is one of the most representative consumer electronics in our daily lives that has been optimized for entertainment at home. Taking a step further, webOS Auto not only brings the seamless user experience from a living room into a car, especially rear seats, but also offers users a chance to create values on their journey.

- Driver experience

  An advanced IVI system allows a driver to: get updated traffic information on the navigation in real time, instead of being stuck in a traffic congestion; respond to a message or call with a voice assistant service while driving; or send an email if late for a meeting or having an urgent issue to handle.

- Passenger experience

  With ride-hailing services and autonomous vehicles, passenger experiences will become more

diversified. As users are not behind the wheel, their eyes and hands are free to do more with screens. They can watch movies or TV shows or log on to social networking accounts. They can participate in a video conference call or make a purchase using digital e-commerce services.

Enabler for transition to a service company

To be competitive in the fast-digitizing car market, carmakers needs a platform that accelerates their go-to-market strategy, allows them to quickly adapt to the changes in the market, and while doing so guarantees stability and reliability. The right platform meeting these needs will empower them to win the competition and prosper.

webOS Auto is a turn-key solution for current and future infotainment systems that can be integrated almost effortlessly with the backends of OEMs and Mobility-as-a-Service (MaaS) providers. Its coverage ranges from connectivity and media capability to artificial intelligence (AI) and cloud-based services.

- Personalization and user profile management

  webOS Auto is built around the concept of seamlessness, where the user is at the center. Enabling this vision requires a well-designed platform and cloud backend architecture with a stateless approach to where and how user profiles and personalization are managed, while adhering to the privacy regulations and security standards. The key solutions and benefits that webOS Auto provides include platform and cloud backend support for users and vehicles management, fully connected personalization and 'user profiles' framework enabling instant in-vehicle personalization, full stack and cross vertical personalization, and flexible integration with future frameworks such as Blockchain and with the security framework.

- Cloud-based services and their ecosystem

  In link with personalization, e-commerce services and advertising businesses can be brought in into a car. They may surface a suggestion of points-of-interest or list up offers suitable for a passenger's appetite, preference, and history. A billing solution can be also engaged to enable in-hand transactions in a car.

Borrows or benefits from a proven platform

No one can overemphasize the importance of an ecosystem that actually provides users with values. Suppose how competitive the features and performance of a platform are is the first criterion for an automaker to consider. Then, the trigger to make a choice among available platforms will be if the platform is accompanied with a reliable and content-rich ecosystem.

webOS Auto originates in webOS Open Source Edition (webOS OSE), the open source version of webOS. Therefore, the fundamental architectures of webOS Auto, webOS OSE, and webOS are basically the same, and webOS Auto can benefit from the existing content available for webOS and webOS OSE - apps, media content, and 3rd party developers.

- Benefits from existing apps, content, and developers

Since the first launch of LG webOS Smart TV, more than 70+ million have been sold around the globe, and after about five years in the market, webOS now is running a stable app store full of content. The development of webOS OSE is expected to only expand the ecosystem.

Because the fundamental architectures are very similar, existing apps or games for webOS or webOS OSE can be easily modified for webOS Auto if circumstances fit. The entry barriers will be lower for developers with experiences in developing apps and services for webOS or webOS OSE. Both will accelerate the diversification of apps for webOS Auto.

- Partnership with next-generation automotive services

  webOS Auto has built partnerships with core services for the next generation vehicle entertainment such as location, AI, and streaming services. Through the partnership with location or map service providers, it provides the exact location, recommends points of interest, and saves the preferred routes for later suggestions. It also offers access to a variety of filmed entertainment through the partnership with over-the-top (OTT) service providers.

Shortcut to build a platform ecosystem

webOS Auto is provided with a complete guidance on owning an ecosystem from building-up to operation based on the experience of webOS. It will be accompanied with a white-labellable app store which is fully customizable in accordance with the characteristics of the automotive industry.

- White-labellable app store

  webOS Auto offers three options for OEMs to build an app store. The first option is being provided with a blueprint for an app store through consulting, while the second one is taking over an app store developed based on the requirements like a system integration project. The third option, which is the most cost-effective and time-saving one, is using or customizing webOS Auto's reference app store. OEMs can have their own app store services only by implementing the front end and database.

  webOS Auto Value Pack

- webOS Auto is not just an operating system for IVI but accompanied by a value pack including software component packages, platform services, 3rd party apps and services, and tools. In addition to deliverables developed by webOS Auto, apps and services from partners such as HERE and Sony Pictures will be included in the pack, enabling carmakers to be armed with top-notch services in the industry.

Introduction of webOS Auto

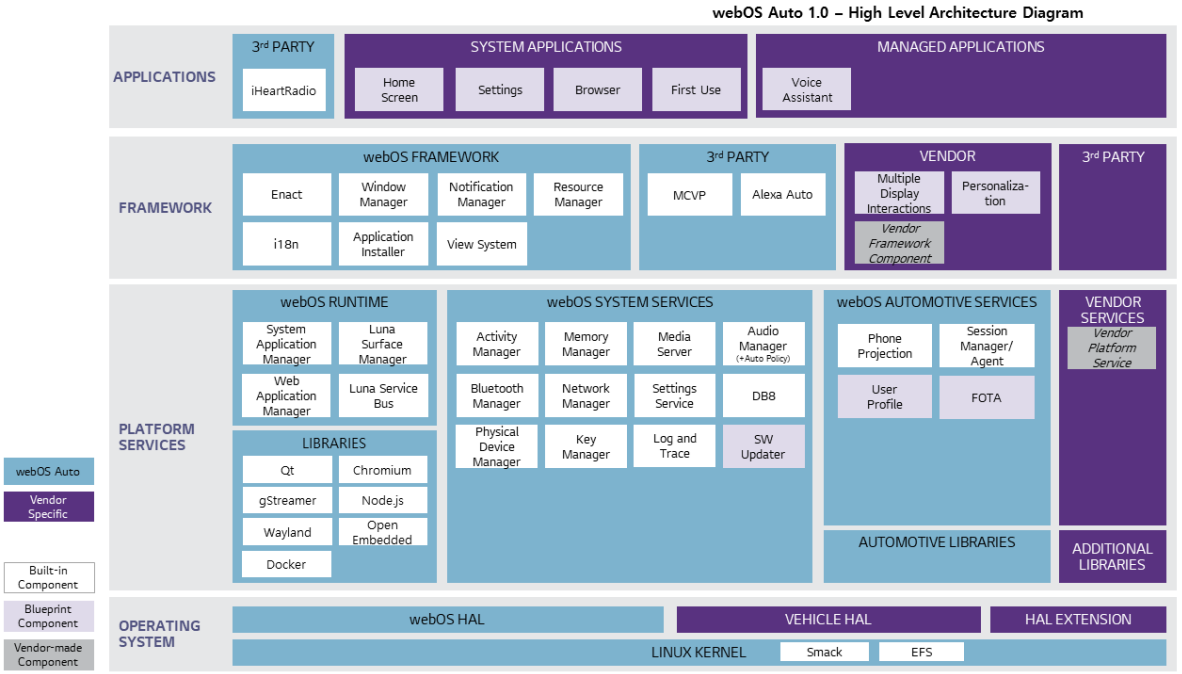
webOS Auto is built for the future of mobility on a strong foundation of innovation and partnerships. webOS has a pedigree in smart devices, over 70 million smart TVs running webOS, together with high-profile content service provider partnerships.

To enable OEMs and MaaS providers to succeed in the new world of shared, pooled, multimodal, autonomous and evolving mobility, webOS Auto embraces new supply chain needs, new models for data ownership and security, new user journeys and new ways for end-users to interact with ease and delight.

webOS Auto is built to support the generational shift in vehicle architectures: from cloud and electrical architectures; to the accelerating demands in data management, connectivity and computational needs; and key connected vehicle requirements such as over-the-air (OTA) updates.

Architecture

webOS Auto features an extensible and pluggable architecture. The architecture provides a defined boundary for customization and facilitates additions of vendor-specific features. Furthermore, the platform features a framework, blueprints, and patterns to support product customization. The UI/UX is developed with technologies that enable multi-process application rendering across multiple displays. The user experience is highly customizable to the automakers' needs, while the development tools and skinning features ensure consistent look and feel across native and web applications. The webOS Auto application development experience has been extrapolated from the lessons learned in deploying and developing webOS for smart TVs and digital signage devices.



In a broad sense, the architecture of webOS Auto can be partitioned into two parts, webOS Auto and Vendor-specific, depending on whether it is essential or not.

- webOS Auto - This partition is a set of platform services and framework extensions developed in addition to the webOS reference platform in order to support the automotive requirements. Components under this partition are provided by default and are essential elements of webOS Auto. However, those marked as blueprint components are still customizable upon each manufacturer's needs.

- Vendor-specific - This partition includes software components that are highly specific to each automotive manufacturer and depend on the platform design and implementation. By using the guidance provided by webOS Auto, including reference UI/UX and guidelines, automotive manufacturers can easily create their own services and integrate them with their existing platform. Furthremore, the webOS platform's flexible and pluggable architecture allows 3rd party services and applications to be easily deployed.

At the component level, components of webOS Auto are categorized into three groups : built-in, blueprint, and vendor-made.

- Built-in components – webOS Auto incorporates essential automotive-grade components required by the industry as well as the core components of the webOS reference platform as built-in components.

- Blueprint components – Blueprint components are created as references and examples for automotive manufacturers in order to ease their own component development and integration. Since these components highly depend on individual vehicle manufacturers' needs and as such cannot be generalized, webOS Auto provides blueprints so that they can easily fill the gap.

- Vendor-made components – By adding this kind of components, carmakers can invent their own driver and passenger experiences and create revenues on webOS Auto. Even for these components, design and development guidelines will be provided to help them save time and efforts to go to market.

Another way of looking into the architecture is by layer. In this perspective, the architecture of webOS has total four layers: application, framework, and platform services, and each layer communicates with one another.

- **Applications**

  webOS Auto supports graphics application development in both native and web technologies. It supports powerful native technologies and provides reference UI/UX for web app development. The consistency of the look and feel and internationalization between native and web applications can be maintained by adopting one of the available frameworks.

- **Framework**

  UI applications are running on top of the webOS framework layer that provides windows, notifications, events, resources, access control and application management capabilities. Automotive manufacturers can extend the functionalities of webOS Auto with 3rd party components. Multi-modal and multi-display interaction features are provided as blueprints that can be extended depending on the vendor requirements. A variety of development frameworks such as

Enact, React, Vue, and JQuery can be used for development of web based applications, among which Enact is optimized for web app development on webOS Auto. The application framework is complemented by security features, such as resource and access management.

- Platform Services

webOS Auto's services are either native or Node.js based. webOS Auto extends the classical services such as the network, media, and database managers and provides a set of automotive-specific components to the platform, such as the location manager, parking assistance service, and phone projection service.

To support multiple UI processes, webOS Auto includes a central window compositor called Luna surface manager (LSM), whicl also works as a graphics manager. It not only manages the composition of surfaces but also handles events from various input devices such as keyboard, pointer, and touch and controls the system UI, such as Home menu display and notifications. Using the LSM, webOS Auto can composite applications, either native or web, seamlessly.

webOS Auto provides media pipelines for media playback. The media pipelines are created as separated processes, and the Media Server is responsible for handling multiple pipelines. One of the key points of webOS Auto' media framework is that it can manage hardware resources. Furthermore, the media framework executes actions when resources are running out according to the policy, of which the performance has been proven in the domain of home entertainment.

The software update subsystem enables distribution and application of updates using over-the-air mechanisms, allowing vehicles running webOS Auto to get new functionalities and security fixes. Different update schemes including A/B upgrade, normal/recovery, and in-place upgrades are available.

Regarding the Diagnostics, Log and Trace (DLT) protocol, webOS Auto incorpoates logging, diagnostics, and error reporting components in compliance with the AUTOSAR protocol standards. Those components can connect to a remote server and report issues along with important trace information and can be further tailored for automakers' use cases.

The Access Control Groups (ACG) is a security model of webOS Auto that provides fine-grained access control of permissions for services. This categorizes services into security groups with different set of methods allowed to use, based on their functionality, for example, media, control, and administration, or security level, for example, system applications, bundled applications, or 3rd party applications.

webOS Auto facilitates exchange of data with other electronic controls (ECU) inside a vehicle to provide integrated mobility user experience. The vehicle integration services connect the infotainment domain to the rest of the vehicle through Diagnostics, Ethernet AVB, and AUTOSAR Adaptive communication channels.

- Operating System

As previously mentioned, webOS Auto is based on Linux, Yocto, and OpenEmbedded. The open source and silicon vendor drivers are optimized in order to provide unparalleled user experience and immersive media content. A porting layer is provided to make the webOS Auto platform

hardware agnostic. This enables development, benchmarking, and profiling of multiple hardware setups during the product development phase.

webOS Auto' fastboot solution optimizes the system boot performance. It enables quick initialization and execution of early functions such as rear view camera and surround view display in an IVI system. This fastboot solution can be changed depending on the SoC specification, as the optimization is highly coupled to the target hardware.

- Communication

The communication between the service layer and other components is enabled through the highly-optimized IPC mechanism created as a part of the webOS project, the Luna Service Bus. The services support a load-on-demand mechanism, for example, they are exited when not needed to save system resources. The Luna Service Bus is highly modular and supports a subscription-based model as it has a service-oriented architecture.

By leveraging web technologies, webOS enables communication through WebSockets. The WebSocket protocol enables interaction between a web client and a web server with lower overheads, facilitating real-time data transfers from and to the server. Furthermore, the trends in microservice and cloud computing architectures heavily rely on RESTful communication. webOS seamlessly integrates these web communication channels and provides a unique entry point for target-device application developers.

One of the key challenges of bringing consumer-grade technologies to automotive applications is how to efficiently integrate them into electrical architectures. The communication between vehicle ECUs is paramount, and with an emerging standard of Adaptive AUTOSAR, the communication pattern is shifting from a signal-oriented to a service-oriented architecture. webOS Auto integrates SOME/IP and provides communication patterns for vehicle integration to support future in-vehicle architectures. The common architecture of a communication between an IVI CPU and a vehicle signal CPU is described and patterns are provided for production development. Furthermore, the vehicle communication stack is provided as an integration blueprint for manufacturers to modify during development.

Features & Benefits

- **Superiority in Media Playback Performance**

webOS Auto shows excellence in media playback performance as it originates from webOS that has proven its performance and stability in over 100 million LG Smart TVs. It supports a wide range of Codec, up to 4K streaming protocol, and also allows playback of DRM-protected media content using S/W DRM, offering more options for entertainment for passengers.

- **Multi-Display Support for Personalized In-Vehicle Entertainment**

Passengers in a vehicle can enjoy video and audio content on one's their individual, touch display with separate audio output connected via Bluetooth. They can share content on the display with or play different apps and content from others. All these can be done using voice commands via voice assistant services.

- **Full-Featured and Up-to-Date Development Environment**

webOS Auto provides a variety of development tools including Command Line Interface (CLI) and VirtualBox Emulator. Furthermore, it supports modern web app frameworks such as Vue.js and React as well as Qt application framework, so that automakers can easily adapt to development with webOS Auto.

- **Highly Customizable**

As it supports both native and web applications., choose and make one appropriate for the circumstances and tailor the reference UI/UX as needed. There are guidelines to assist you, but they do not restrict the scope of customization. Deploying 3rd party applications is also quick and easy thanks to the pluggable architecture.

- **Guaranteed Reliability**

It adopts verified OSS components such as Linux, Yocto, Qt, Chromium, and Enact, a JavaScript framework for app development. New versions of webOS Auto will be released regularly every six to eight months with security and bug fixes. webOS has demonstrated its reliability especially in the B2B sector such as commercial TV and digital signage where the reliability is critical.

- **Time- and Cost-Effectiveness**

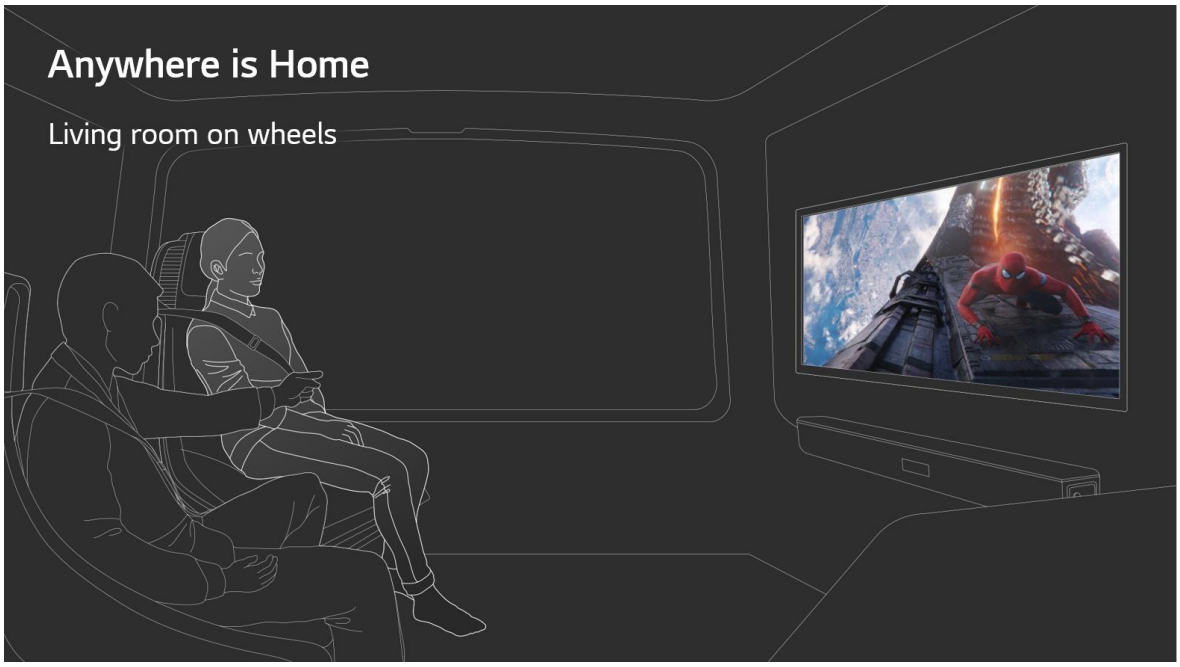
The documentation prepared, development infrastructure built, and tools available will save time and efforts for initial setup as well as reduce costs. Make the most of what is provided with webOS Auto.

- **Excellence in UI/UX Implementation**

The experiences with smart displays in implementing simple-but-beautiful user experiences and high-quality media streaming services from 3rd parties are the proof and good references. By adopting technologies such as Qt/QML and Enact, it facilitates collaboration between designers and developers, accelerating UI/UX prototyping and enhancing its quality and performance.

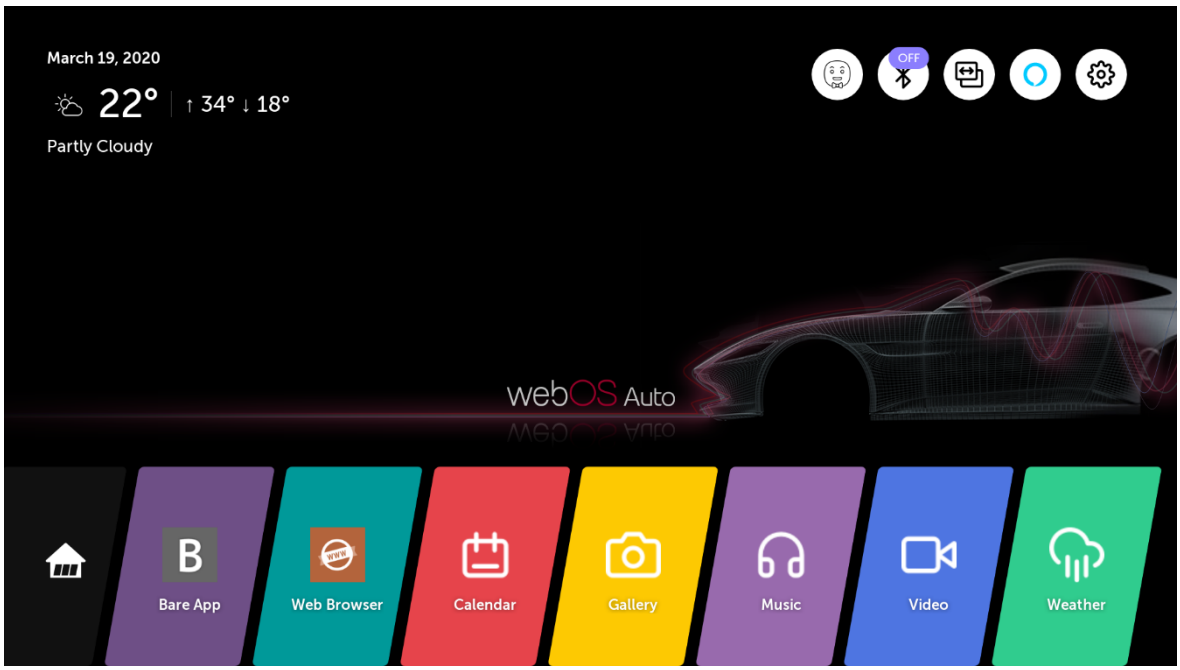
Why webOS Auto

Living Room On Wheels



webOS Auto guarantees passengers familiar, intuitive, and easy-to-use experience of entertainment in a car as if they are in a living room. It will make literally anywhere a home. With its vibrant ecosystem full of games, apps, and contents, proven user experience in home entertainment by more than 70+ million devices, as well as a wide range of partnerships with industry-leading service and content providers, webOS Auto ensures users can enjoy in a car what they do in a living room – comfort, nest of personalization, and enjoyment of content.

Carmakers Act on Their Own Initiatives



The key goal of webOS Auto is to empower carmakers to form the shape of the future mobility. It will enable carmakers to achieve their business goals through an easy and straightforward transition from webOS Auto to a white-labeled IVI system. To that end, the development infrastructure blueprints are provided as a complement to the base platform, along with the documentation and state-of-the-art tools for testing, verification, and performance profiling.All of these will facilitate the carmakers' development process.

But still the baseline is clear; carmakers act on their own initiatives. Carmakers are given the rights to decide what to do with it and next. By offering them a reliable, content-rich, and technologically advanced platform and development environment, webOS Auto allows them to focus on creating differentiated values, instead of being tied to platform plumbing and project infrastructure setup.

Conclusion

As presented in this document, carmakers are driven to make a strategic decision on how to own and operate an IVI system to tackle the challenges. And considering the effectiveness and efficiency, the best chance will be to employ an IVI platform equipped with what they demand.

webOS Auto is more than just a platform. It is a project accelerator equipped with state-of-the-art documentation, development and testing tools, and collaboration methodologies that ensure unmatched productivity and flexibility. It provides an abundance of possibilities when tailoring the platform into a product according to your needs. It leverages both native and web technologies, allows you to modify user interface and experience straightforwardly, and supports extensions through 3rd party and vendor specific software. To help speed up the development, webOS Auto presents best practices and design patterns on how to deliver stunning graphics content and presents reusable software blocks.

It is unquestionable that the automotive industry is going through the paradigm shift driven by digital disruption. Employ webOS Auto. It will be the first step to win that battle and stand one step ahead of the competition - the industrial leader.

Next Step

- Visit https://swsolutions.lge.com/solutions/connected-car/automotive-infotainment-platform/ for more information about webOS Auto .
- Contact us at webosauto@lge.com for further discussion on technical or business development.