



# CAPGEMINI ENGINEERING BETULA BLUETOOTH® SUITE

Simplified, secure Bluetooth connectivity for embedded applications

# Introduction

Bluetooth is the core connectivity technology in a majority of in-car infotainment systems worldwide. 54% of all cars on the road will have Bluetooth on board by 2023. Some of the key use cases of Bluetooth in automotive software are in-car infotainment systems, remote keyless systems, in-vehicle wearables, as well as under-the-hood and connected maintenance.

Capgemini Engineering offers the auto grade Betula Bluetooth® Stack targeted at automotive infotainment applications. The stack supports Bluetooth classic and low energy standards and is BTSIG qualified. The stack is licensed to leading tier 1 automotive suppliers and is in deployment for more than 25 years across the US, Europe, and APAC regions.

Target segments of the stack include in-vehicle infotainment applications for auto OEM, tier 1, and EV manufacturers. The stack can also be customized for small memory footprint and low energy IoT devices.

## Industry landscape

A mainstay in the automotive market, Bluetooth technology has created connections between car and driver, which have brought new levels of safety to our roads and more convenience to the in-car experience. Bluetooth is behind in-car infotainment systems that enable hands-free calling and audio streaming. These systems help reduce distracted driving and provide a safer way to stay connected on the road.

Bluetooth comes standard in nearly every new vehicle, and is now enabling exciting, emerging use cases that increase fuel efficiency, protect drivers from the effects of fatigue, and better connect cars and drivers to the cities around them. While infotainment will continue to account for the majority of Bluetooth automotive shipments, other use cases such as key fobs, sensors, and other in-car applications will grow to account for 24% of all shipments by 2023. With 100% penetration of Bluetooth in smartphones, automotive manufacturers are increasingly looking toward the phone to replace the key.





# Solution

The Capgemini Engineering Betula Bluetooth Stack significantly simplifies the implementation of Bluetooth connectivity in automotive infotainment systems. With ensured global compatibility of mobile phones and reduced development need, extensive and continuous customer value is achieved.

Betula SDK is a hardware independent solution that provides the flexibility to stay with the preferred Bluetooth hardware supplier. With a reduced implementation need and increased robustness, it provides an option for cost-efficient but high-quality Bluetooth implementations.

## Key features of this stack are:

### Powerful API

Betula SDK provides a high level easy-to-use platform API. The application programmer does not need to be a Bluetooth expert as all Bluetooth details are encapsulated in the platform abstracted from the user. The API also provides a mechanism – enabled operations – that tells the HMI application what functions are enabled in the specific state, i.e., which screen buttons should be enabled for the end-user.

### Modular design

To ensure a verifiable and maintainable design, the implementation of the Betula SDK has been strictly modularized. This structure allows dynamic updating of software modules, i.e., it is already prepared to support software updates. Betula SDK supports multi-process operating systems and allows partitioning in distributed systems.

### Configuration

The configuration of Betula SDK is done in run-time (post-built) using XML based configuration files that are validated against XML schemas that help the user to input correct configuration parameters.

### Interoperability

Capgemini Engineering has an extensive testing program, in which a majority of the current and upcoming mobile phones are tested against the Betula SDK.

### Diagnostics

The built-in diagnostics module provides features that can be very useful during development, such as:

- Test mode settings
- Bluetooth chip specific commands
- Debug support

### Betula client

A Windows or Linux based test Betula client is provided for test and validation purposes.

### Core version supported

- Bluetooth 2.1+EDR
- Bluetooth Low Energy 5.1

### Key profiles supported

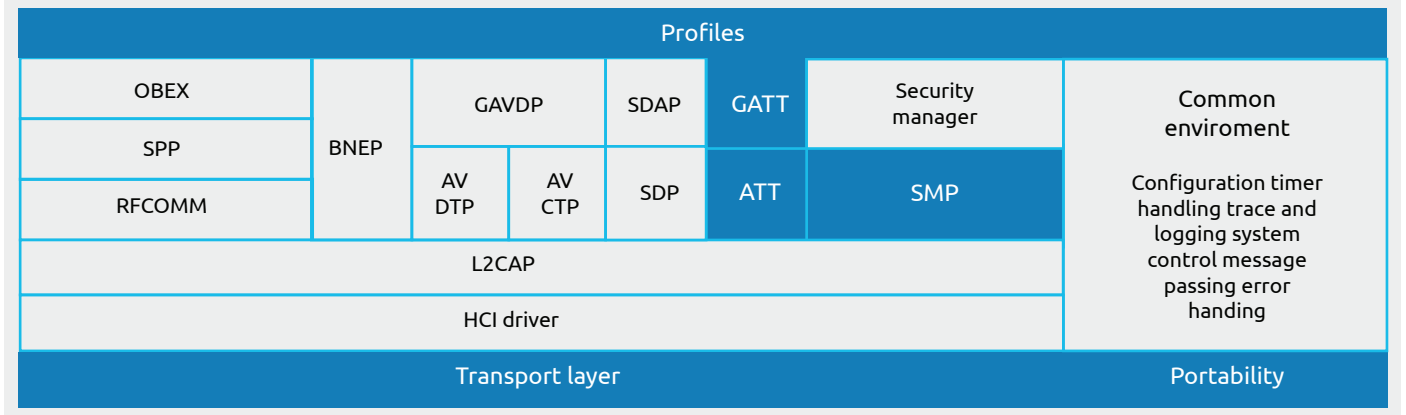
- Hands Free Profile (HFP)
- Advanced Audio Distribution Profile (A2DP)
- Audio/Video Remote Control Profile (AVRCP)
- Phone Book Access Profile (PBAP)
- Audio/Video Distribution Profile (AVDTP)
- Audio/Video Control Transport Profile (AVCTP)
- Serial Port Profile (SPPP)
- Debug support

### Platforms supported

CPUs: ARM7, ARM9, NECV850, TI DSP 54xx, 55xx and Jacinta family, SH2/SH3/SH4, 8051 (8-bit), TriCore, Infineon, C166, PowerPC, TI Jacinto, etc.

OS/RTOS: Windows, WinCE, Linux, Nucleus, VxWorks, QNX, OSE, ultron, TI DPS/BIOS, etc.

Declaring ID	QDID	Company	Products	Specification name	Listing data
D050860	150257 - Host subsystem	Capgemini Engineering GmbH and Co KG	Betula8, Betula8.X	5.1	2020-06-19



# Why Capgemini Engineering

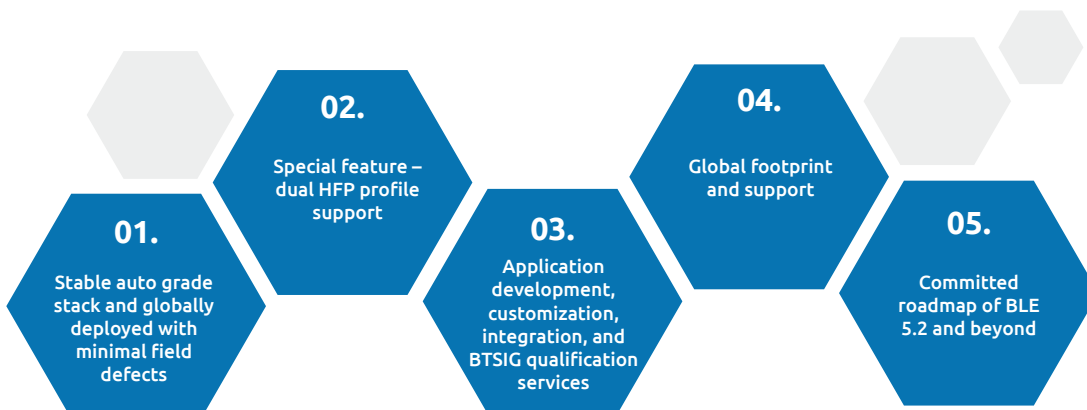
Our software frameworks offer best-in-class solutions that significantly reduce the total cost of ownership and time-to-market. We are a trusted partner with over 25 years of experience in technology and engineering, and up-to-the-minute expertise in the domain.

We also deliver unique in-car user experiences by leveraging a strong pedigree in communications (short and long range),

multimedia, and embedded domains, and partnering with leading automotive forums and platform providers.

With a strong culture of innovation, we offer continuous experimentation with newer technologies and collaboration with leading standards bodies and forums, along with a global delivery model for optimized cost and timely delivery.

## Key differentiators



## About Capgemini Engineering

Capgemini Engineering combines, under one brand, a unique set of strengths from across the Capgemini Group: the world leading engineering and R&D services of Altran – acquired by Capgemini in 2020 – and Capgemini’s digital manufacturing expertise. With broad industry knowledge and cutting-edge technologies in digital and software, Capgemini Engineering supports the convergence of the physical and digital worlds. Combined with the capabilities of the rest of the Group, it helps clients to accelerate their journey towards Intelligent Industry. Capgemini Engineering has more than 52,000 engineer and scientist team members in over 30 countries across sectors including aeronautics, automotive, railways, communications, energy, life sciences, semiconductors, software & internet, space & defence, and consumer products.

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