OTA Software Upgrades: Enhancing Software-Defined Vehicles
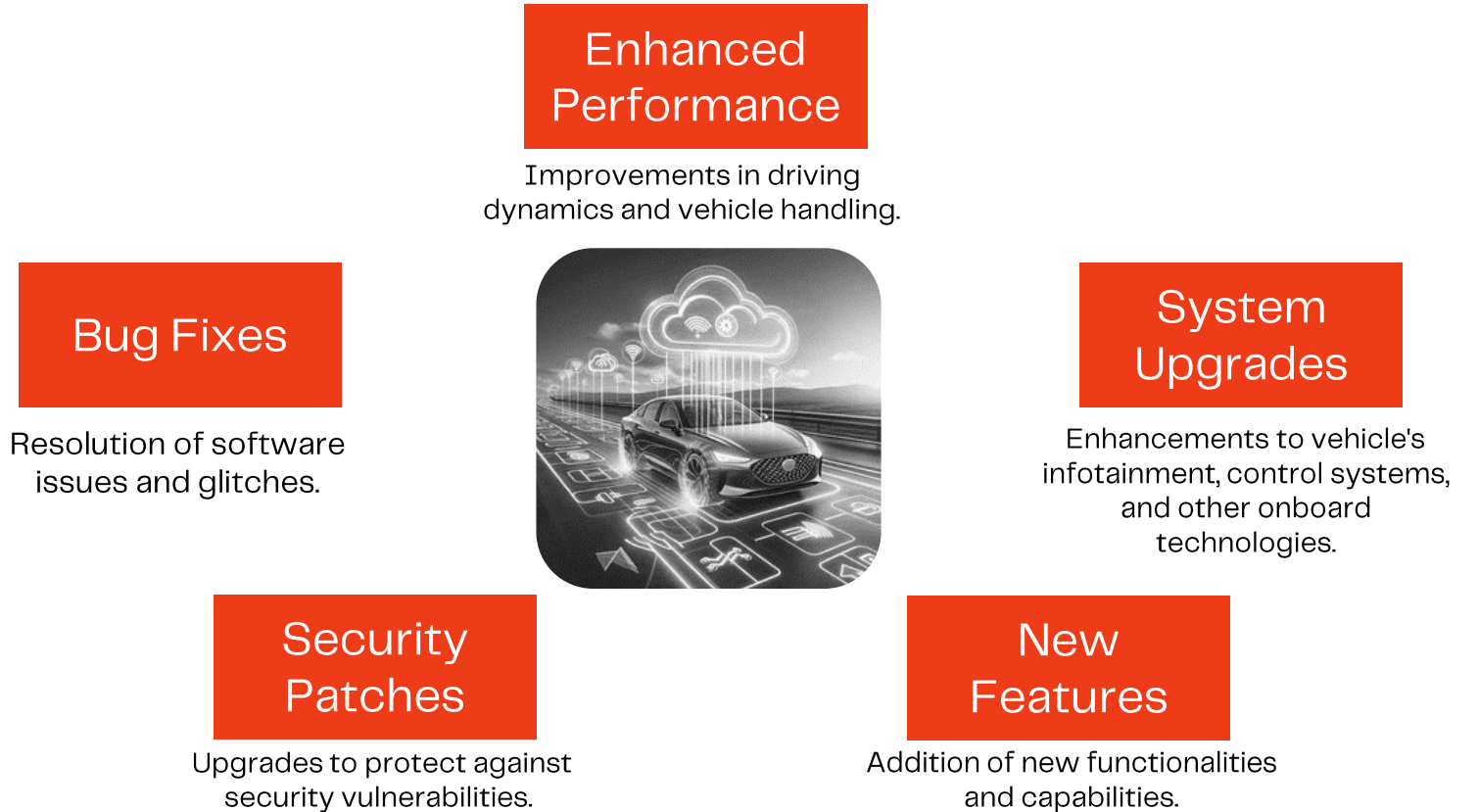
How does an SDV Ecosystem looks like?

5. SDV System Architecture

6. Digital Twins

7. Real-Time Data Processing

4. Connected and Intelligent Cabin

8. Predictive Fault Diagnosis

3. Vehicle-to-Everything (V2X) Communication

9. Cybersecurity in SDVs

2. User Personalization

10. AI-Driven Features in Vehicles

1. OTA Software Upgrades

11. Software-Controlled Powertrain Systems

12. Software-Defined Digital Chassis
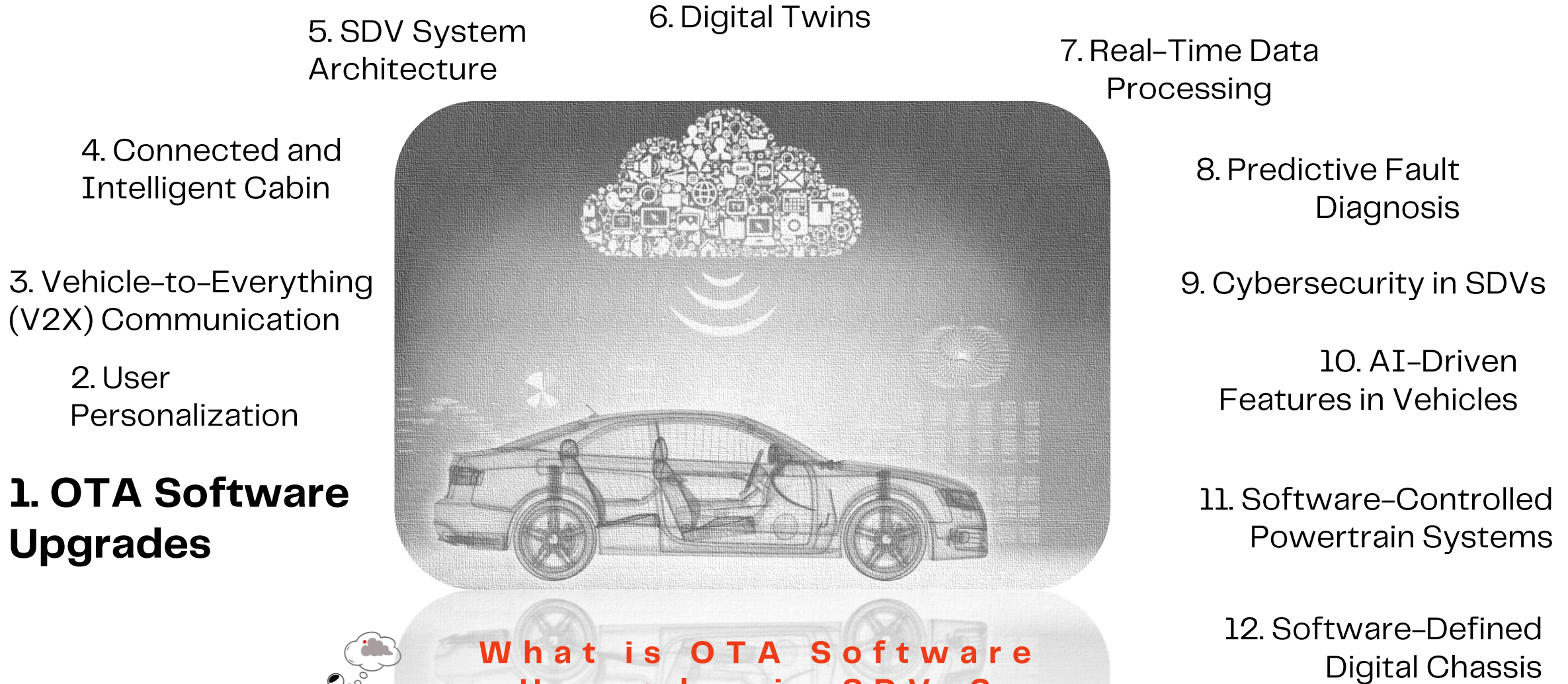
What is OTA Software Upgrades in SDVs?
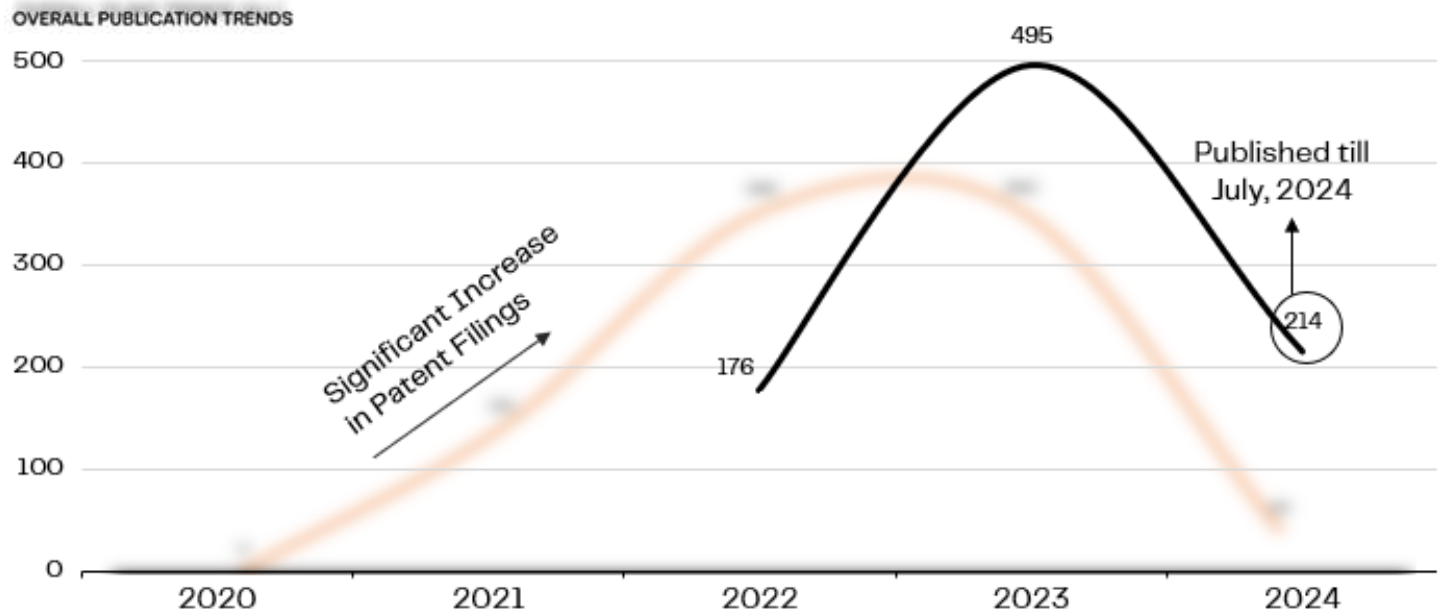
What is OTA Software Upgrades in SDVs?

OTA (Over-the-Air) software Upgrades refer to the process of **remotely** sending and installing software Upgrades to a vehicle's systems, enabling:

Enhanced Performance

Improvements in driving dynamics and vehicle handling.

Bug Fixes

Resolution of software issues and glitches.

System Upgrades

Enhancements to vehicle's infotainment, control systems, and other onboard technologies.

Security Patches

Upgrades to protect against security vulnerabilities.

New Features

Addition of new functionalities and capabilities.

How is the patent filing trend evolving for OTA software Upgrades in SDVs?

How is the patent filing trend evolving for OTA software Upgrades in SDVs?

Based on patent data from the last two years, there has been a significant increase in both filings and publications related to OTA (Over-The-Air) software Upgrades, reflecting growing innovation and interest in enhancing remote software upgrade technologies.

OVERALL PUBLICATION TRENDS

Significant Increase in Patent Filings

495

176

Published till July, 2024

214

2020   2021   2022   2023   2024

Who are the key players driving innovation in this domain?

Who are the key players driving innovation in this domain?

Key players driving innovation in OTA software upgrades include OEMs, chip manufacturers, IT and software providers, automotive suppliers, and academic institutions. **The leading contributors among these are:**

What are the top patents related to OTA software upgrades?

What are the top patents related to OTA software upgrades?

Here are the top 5 standout patents related to OTA software Upgrades in the automotive industry, with **Huawei and China FAW** owning several of these key innovations:

1. [WO2023108566A1](#) (Upgrade method, apparatus and system)
2. [WO2023000320A1](#) (Over-the-air (OTA) upgrade method and apparatus)
3. [US20220365530A1](#) (Systems and methods for operating an autonomous vehicle)
4. [CN115225492A](#) (Remote upgrading method and system)
5. [CN114895947A](#) (Software upgrading method, device, equipment and storage medium of vehicle-mounted controller)

What are the fundamental technologies related to OTA software upgrades?

What are the fundamental technologies related to OTA software upgrades?

Content Distribution Network Integration

Centralized OTA task controller is integrated with a CDN to manage and execute OTA Upgrades

Sequential Upgrade

Includes multiple steps to be followed in sequence ensuring complete upgrades

Dual-Channel Communication

Use of two distinct communication channels for managing risk in autonomous vehicles

Remote Upgrade Management

Integration of Over-The-Air (OTA) capabilities for managing and executing upgrades remotely

Event-Driven Architecture (EDA)

Ensures that upgrades are only performed after biometric identification

What are the recently filed patents in OTA software upgrades?

What are the recently filed patents in OTA software upgrades?

Here are five patents related to OTA software upgrades in the automotive industry that have been filed in the past 3–4 months.

1. CN118175535B (Storage yard network access method based on mobile AP base station)
2. CN118259947A (OTA upgrade package protection method, device, equipment and readable storage medium)
3. CN118153061A (Upgrading method, device, equipment and storage medium)
4. CN118210533A (Vehicle OTA upgrading method, device, server and storage medium)
5. CN118264559A (Vehicle OTA upgrading method, device, equipment and computer readable storage medium)

What is the current focus of innovation in OTA software upgrades?

What is the current focus of innovation in OTA software upgrades?

Real-Time Fault Reporting

Detect and report faults in real-time to enhance reliability

Mesh Networking

Utilizing a network of RSUs (Roadside Units) arranged in a Mesh network to facilitate communications

Cloud Integration for Cryptographic Operations

Use of cloud technology in the context of OTA upgrade security

Secure URL Management

The use of a TEE for storing the upgrade URL to secure upgrade process

Patch File Generation

Creating a patch file that includes only the differences between the original and target versions of the software

Is this technology being adopted by the automotive players?

Is this technology being adopted by the automotive players?

Yes!!

Over-the-Air (OTA) software upgrades are becoming more widely adopted by vehicle manufacturers (OEMs). OEMs are prioritizing remote OTA upgrades to cut costs and improve the customer experience. Prominent OEMs leading in this domain include:

What are the recent developments in the OTA software Upgrades?

What are the recent developments in the OTA software upgrades?

Several companies are making notable advancements in the Over-The-Air (OTA) software update industry, improving vehicle performance, functionality, and overall user experience.

Tesla has released the **'Energy Boost'** OTA update for Model Y RWD owners in the U.S., enhancing driving range for longer journeys.[SOURCE3]

Fisker is set to release the Ocean OS 2.0 software update, which will enhance performance, SolarSky, energy management, and other features. [SOURCE4]

Hyundai Motor Group will keep all vehicles updated with OTA software upgrades by 2025, improving safety, convenience, and performance through their new EV platform and Connected Car OS. [SOURCE3]

XPENG, a leading Chinese smart electric vehicle company has rolled out their latest Tianji XOS 5.2 Over-the-Air (OTA) upgrade worldwide, unveiling the Smart Cockpit and Intelligent Driving features. [SOURCE4]

What are the latest collaborations in OTA Software Upgrades?

What are the latest collaborations in OTA software upgrades?

New significant alliances are highlighting the future prospects for OTA software update technology.

T·Systems 🤝 **AURORALABS**

For next generation OTA software upgrades

TATA ELXSI 🤝 **Red Hat**

Enables OEMs to provide subscription services and advanced fleet management with real–time OTA upgrades.

Airbiquity 🤝 **BlackBerry**

Enables automakers to deliver OTA upgrades and meet high security standards.

SIBROS 🤝 **MARELLI**

To implement its OTA software and data management solutions on Marelli's next–gen CDC Unit

HOW WILL OTA SOFTWARE UPGRADES EVOLVE IN THE COMING YEARS?

How will OTA software upgrades evolve in the coming years?

According to market projections, the Automotive OTA software update market will grow from **US$ 5,670.80 million in 2024 to US$ 25,604.20 million by 2034**, driven by rising demand for connected devices, IoT advancements, and efficient remote management. The market is set to **expand at a 16.30% CAGR**, fueled by the spread of smart devices, 5G technology, and increasing cybersecurity concerns.

Wants to have conclusive insights on the topic?

Wants to have conclusive insights on the topic?

For more in–depth insights into OTA Software Upgrades including technology ecosystem in context of IP and market, please reach out to us.

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