# Growth partnership for a self-care centric lifestyle

Innovation | Acceleration | Growth



## HCL mobility services
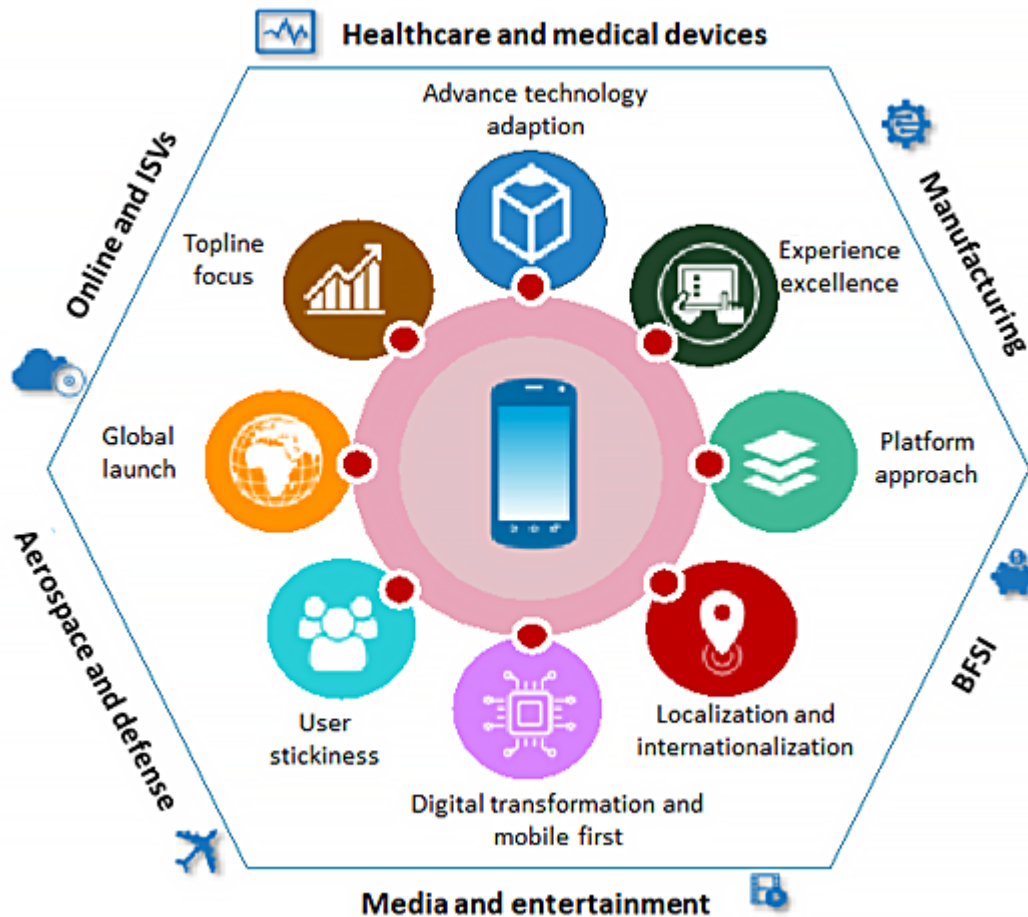
# HCL Experience

**Healthcare and medical devices**

- Advance technology adaption
- Experience excellence
- Platform approach
- Localization and internationalization
- Digital transformation and mobile first
- User stickiness
- Global launch
- Topline focus

Online and ISVs · Manufacturing · BFSI · Aerospace and defense · Media and entertainment

## Front end development



## Backend development



## Database
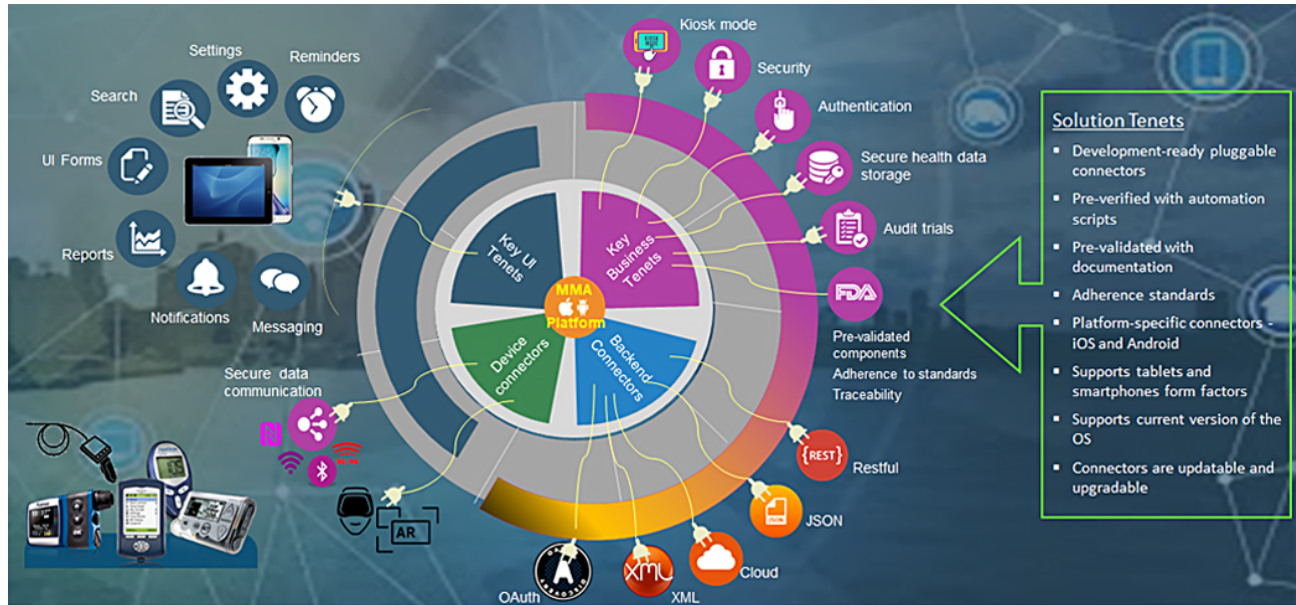


## Cloud

# MMA platform – HCL Accelerator



# HCL SaMD experience

## Medical device extensions

- BGM device and CGM sensor
- AED
- Home care devices like BP, Scale, etc.,
- Insulin patch
- Research devices
- ECG

## Connectivity handled

- BLE
- Bluetooth 2.0
- USB
- WIFI
- NFC

## Development approach

- Native development for Class II
- Hybrid development for Class I and II Apps

## Risk-based approach

- Hazard analysis and mitigations
- Clear segregation of modules based on the classification
- Access controls, security
- Secure local data management

## Business goals achieved

- Multi-country launches with approval from country-specific regulations
- Advance technology adaption
- Experience excellence
- Partnership enablement

## Services

- Design and development
- Risk assessment and mitigations
- Project management
- Launch support
- Sustenance

## Methodology and QMS

- Agile
- Iterative
- Waterfall
- HCL MQMS
- Customer QMS

## Customer profiles

- Leading medical device companies in North America
- Leading pharma company in North America
- Leading healthcare company in Europe

# Delivering large-scale programs mobility services platform approach

### Finance

**Facts**
- 0-40% digital revenue transformation
- 40 transaction countries
- 4.4+ app ratings
- 3M app downloads
- 12 different payment gateway integrated
- Peak size of 100 People

**Business goals**
- Digital transformation and mobile first
- Platform approach
- Global launch
- Topline focus
- Advance technology adaption
- Localization and globalization

**Solution**
- Redesigned the architecture
- Developed hybrid framework for multi-country launch
- 70% test automation
- CI/CD pipeline built
- Distributed agile development

### Manufacturing

**Facts**
- Enterprise and business enablement
- Multiple apps deployed across different business units
- IOT platform integration

**Business goals**
- Advance technology adaption
- Digital transformation and mobile first
- Localization and globalization
- Partnership enablement
- Platform approach
- User stickiness

**Solution**
- Mobile strategy defined
- Developed hybrid framework for multiple app development
- CI/CD pipeline built
- Distributed agile development

## Entertainment

- 30+ products integrated
- Global launch
- First fan engagement platform deployed
- Live match experience
- 1M downloads of app within a week of launch
- Revenue opportunities through platform
- Sponsorship enablement
- 4.8+ app rating

- Digital transformation and mobile first
- Advance technology adaption
- Experience excellence
- Creating revenue stream
- Global launch
- Localization and internationalization
- Platform approach

- Technology and product assessment
- Rich UI development in native
- End-to-end platform development
- Scalable architecture
- Completely configurable app
- Plugins to products for enhancing editorial experience
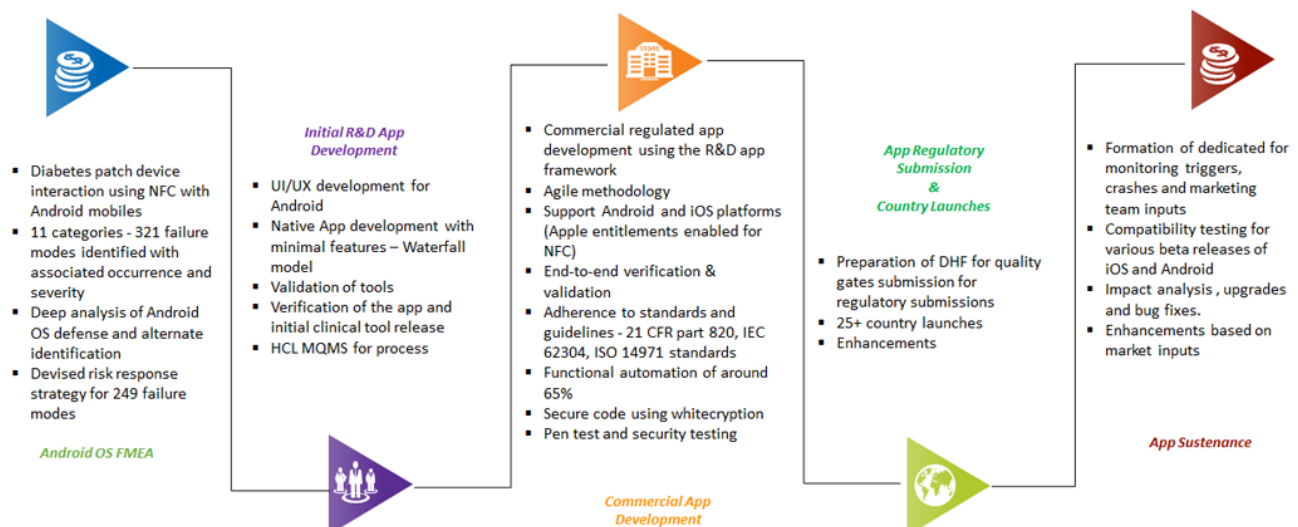
## Healthcare

- Class II approved mobile medical app
- 25+ countries launched
- Partnership enablement
- Replacement to existing medical device accessory
- 250K app downloads

- Digital healthcare
- Advance technology adaption
- Regulations and compliances
- Global launch
- Localization and internationalization
- Top line focus

- Risk based approach
- Medical quality process and documentation
- Scalable architecture
- Segregation of modules based on classification
- Security Framework built in

# Case study deep dive – CGM major

A complete digital enablement of continuous glucose monitoring for a diversified medical device manufacturer

**Android OS FMEA**

- Diabetes patch device interaction using NFC with Android mobiles
- 11 categories - 321 failure modes identified with associated occurrence and severity
- Deep analysis of Android OS defense and alternate identification
- Devised risk response strategy for 249 failure modes

*Initial R&D App Development*

- UI/UX development for Android
- Native App development with minimal features – Waterfall model
- Validation of tools
- Verification of the app and initial clinical tool release
- HCL MQMS for process

*Commercial App Development*

- Commercial regulated app development using the R&D app framework
- Agile methodology
- Support Android and iOS platforms (Apple entitlements enabled for NFC)
- End-to-end verification & validation
- Adherence to standards and guidelines - 21 CFR part 820, IEC 62304, ISO 14971 standards
- Functional automation of around 65%
- Secure code using whitecryption
- Pen test and security testing

*App Regulatory Submission & Country Launches*

- Preparation of DHF for quality gates submission for regulatory submissions
- 25+ country launches
- Enhancements

*App Sustenance*

- Formation of dedicated for monitoring triggers, crashes and marketing team inputs
- Compatibility testing for various beta releases of iOS and Android
- Impact analysis, upgrades and bug fixes.
- Enhancements based on market inputs

# Case study - population health management for leading healthcare device manufacturer

## Business problem

- Health insurance companies offer population
- Health management (PHM) programs for chronic disease elderly patients
- Through PHM programs patients need to do testing at home using self-testing devices and will share the vitals with health care organizations
- In turn, these organizations will follow up with patients for further checks or activities to stay healthy and in stable condition and achieve certain goals

## Solution

To provide a Kiosk mode based mobile solution on the Android platform to help users to
- Aggregate vitals using self-testing devices over BLE/Bluetooth
- Easy to use UI focusing on elderly patients and auto-connect with self-testing devices.
- Syncing of the vitals with cloud to share with healthcare organizations

## Key highlights

- Google COSU – DPC-based kiosk mode setup for Android platform
- • Prevention of
- • SMS reception
- • Call reception
- • Alarm
- •Push notifications
- •Volume up/down
- •System notification bar
- •Home, multitasking softkeys
- •OS updates

## HCL scope

- Design and development of Android mobile app
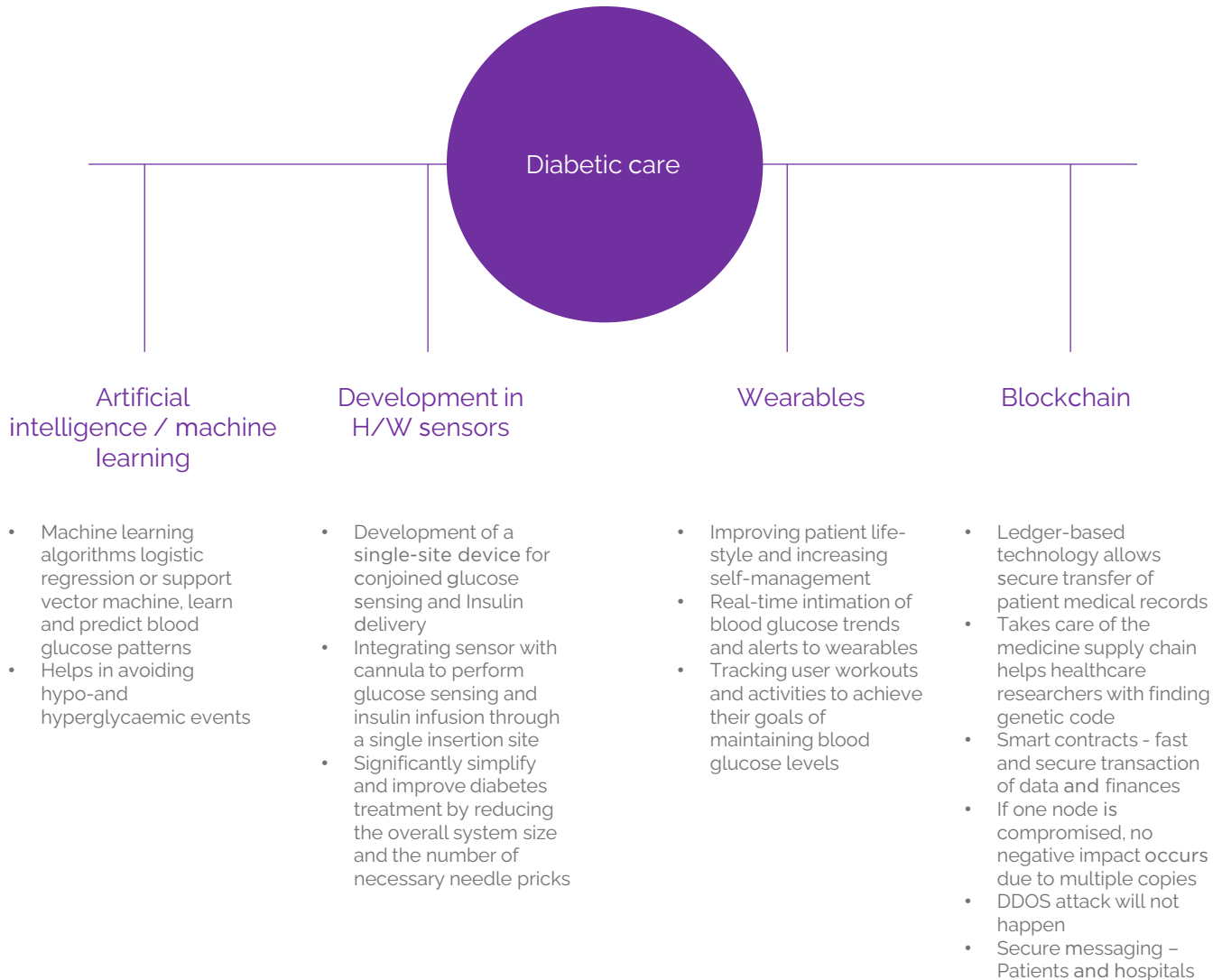- Risk assessment of Android mobile app
- Verification

## Technology and tools

- Android
- Kotlin
- Jacoco
- Junit
- Jenkins

## Value delivered/benefits to client

- Dedicated kiosk mode
- Reduce the time spent on aggregating vitals from chronic disease elderly patients to ease population health management
- Auto-connect of self-testing devices for ease of use by elderly.

# Technology trends in diabetic care

**Diabetic care**

## Artificial intelligence / machine learning

- Machine learning algorithms logistic regression or support vector machine, learn and predict blood glucose patterns
- Helps in avoiding hypo-and hyperglycaemic events

## Development in H/W sensors

- Development of a **single-site device** for conjoined glucose sensing and Insulin delivery
- Integrating sensor with cannula to perform glucose sensing and insulin infusion through a single insertion site
- Significantly simplify and improve diabetes treatment by reducing the overall system size and the number of necessary needle pricks

## Wearables

- Improving patient life-style and increasing self-management
- Real-time intimation of blood glucose trends and alerts to wearables
- Tracking user workouts and activities to achieve their goals of maintaining blood glucose levels

## Blockchain

- Ledger-based technology allows secure transfer of patient medical records
- Takes care of the medicine supply chain helps healthcare researchers with finding genetic code
- Smart contracts - fast and secure transaction of data and finances
- If one node is compromised, no negative impact occurs due to multiple copies
- DDOS attack will not happen
- Secure messaging – Patients and hospitals

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