

The logo for GadgEon, with 'Gadg' in blue and 'Eon' in orange.

Engineering Smartness

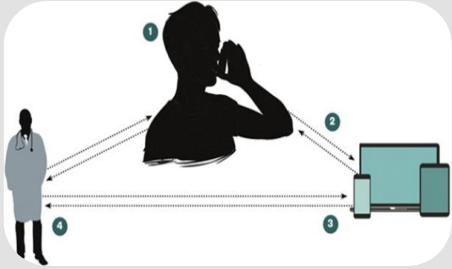
CLOUD & MOBILE APPLICATION DEVELOPMENT FOR SMART NEBULIZER

April, 2020

Version 01



Smart Nebulizer



A respiratory device manufacturer in US, wanted to develop a cost-effective portable nebulizer which would help patients to take treatment while they are away from home. They also wanted to include smart features like connectivity to cloud, IOS app, sensors to monitor correct usage of the nebulizer.

Solution Description

- The Solution consists of three parts:
 - iOS App
 - Cloud application
 - BLE firmware for the Nebulizer
- iOS mobile app connects to the smart nebulizer through Bluetooth, to collect data and send to cloud application
- The Cloud App accepts the therapy log information from the iOS App and stores the data in Database as per HIPAA guidelines
- BLE firmware interfaces the nebulizer with IOS app, to send therapy start & stop notifications along with battery level indication

Outcome and Benefits Delivered

- Complete data regarding the dosage of medicine, frequency of usage and correctness of inhalation is available for personalized treatment plans
- Separate login for patient and doctor to monitor and track the progress of treatment
- Ensured the security of personal health data as per HIPAA guidelines
- Seamless integration with third party healthcare apps

The Solution / System Description

Gadgeon collaborated with the client in developing a portable smart nebulizer.

The implementation consists of three parts:

- IOS App
- Cloud application
- BLE firmware for the Nebulizer

iOS Application

- Developed iOS mobile application which connects with the smart nebulizer through Bluetooth, to collect data and send to cloud application.
- Functionality of iOS app includes:
 - Sending notifications to patient's mobile app for start and stop of therapy
 - Automatic uploads of therapy logs to the cloud application for measuring the effectiveness of treatment
 - Maintain historical data about the therapy sessions for analysis
 - Indicates battery level of the nebulizer



System Description – Mobile App Screenshots

This screenshot shows the mobile app interface at 4:05 PM. At the top, it displays 'No SIM', signal strength, and 100% battery. Below the status bar is a 'Patient' profile icon. The main content area is titled 'X Therapies remaining' with a 'Therapy Count : 1' indicator. It is divided into two sections: 'Live Therapy' and 'Previous Therapy'. The 'Live Therapy' section shows a clock icon, a time range from 04:05:51 to 00:00:00, and a duration of 00:00:24. The 'Previous Therapy' section is empty and contains the text 'No Previous Therapy'. At the bottom, there is a 'History' button.

This screenshot shows the mobile app interface at 12:03 PM. At the top, it displays 'No SIM', signal strength, and 100% battery. Below the status bar is a 'Patient' profile icon. The main content area is titled 'X Therapies remaining' with a 'Therapy Count : 0' indicator. It is divided into two sections: 'Live Therapy' and 'Previous Therapy'. The 'Live Therapy' section is empty and contains the text 'No Live Therapy'. The 'Previous Therapy' section shows a clock icon, a time range from 11:40:12 to 11:40:14, a duration of 1 sec, and a completion status of 'Incomplete'. Below this, it also shows 'CleaningSession : Incomplete'. At the bottom, there is a 'History' button.



The System Description

Cloud Application

- The cloud application and web UI was developed using Amazon Web service, Node JS , Bootstrap UI, Postgresql database
- The Cloud App accepts the therapy log information from the iOS App over ReST APIs and stores the data in Database as per HIPAA guidelines.
- AWS was the preferred for cloud implementation as it supports HIPAA eligible services data interoperability frameworks. Leveraging AWS resulted in speedy development, personalized the patient experience and improved therapy tracking .
- Therapy download option allows the data to be analyzed for effectiveness treatment

BLE Firmware

- BLE firmware interfaced the nebulizer with IOS app, to send therapy start & stop notifications along with battery level indication
- BLE services was developed in Nordic nRF52 BLE SoC



System Description

← → ↻ Not secure | 54.167.80.148/device?deviceId=0000a1205e164a54

★ [Notifications] [Language] [Theme] [Profile]

BACK

Dashboard
Devices
Third Party Apps

Actions

Search:

| Event Id | Event Type | Event Start Time | Event End Time | Event Duration | Event Status |
|----------|------------------|---------------------|---------------------|----------------|----------------------------|
| 15 | Therapy | 2019-10-24 19:51:53 | 2019-10-24 19:51:54 | 0secs | Therapy Incomplete |
| 14 | Therapy | 2019-10-24 19:51:51 | 2019-10-24 19:51:52 | 0secs | Therapy Incomplete |
| 13 | Cleaning session | 2019-10-24 19:51:49 | 2019-10-24 19:51:49 | 0secs | Cleaning session Completed |
| 13 | Therapy | 2019-10-24 19:45:49 | 2019-10-24 19:51:48 | 5min 58secs | Therapy Completed |
| 12 | Cleaning session | 2019-10-24 19:45:47 | 2019-10-24 19:45:48 | 0secs | Cleaning session Completed |
| 12 | Therapy | 2019-10-24 19:45:45 | 2019-10-24 19:45:46 | 0secs | Therapy Incomplete |
| 11 | Therapy | 2019-10-24 19:45:42 | 2019-10-24 19:45:43 | 0secs | Therapy Incomplete |
| 10 | Therapy | 2019-10-24 19:45:38 | 2019-10-24 19:45:39 | 0secs | Therapy Incomplete |
| 7 | Cleaning session | 2019-10-24 19:42:50 | 2019-10-24 19:42:51 | 0secs | Cleaning session Completed |
| 7 | Therapy | 2019-10-24 19:42:45 | 2019-10-24 19:42:49 | 3secs | Therapy Incomplete |

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THANK YOU



For More Details, Let's Connect



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