

The logo for GadgEon, with 'Gadg' in blue and 'Eon' in orange, set against a background of a modern glass skyscraper and a bright sky with clouds.

**GadgEon**

Engineering Smartness

# IOT ENABLED MARINE WATER PURIFIER

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Version 01

# IoT enabled Marine Water Purifier



A world leader in marine water purification systems needed a next generation control unit with new LCD display and cloud application to monitor the status of their units.

## Solution Description

- The purifier system was based on i.MX6 based TS4100 SoM. Gadgeon developed the Embedded Linux application with following features
  - C / C++ application development to control and monitor the water purification process involving several sensors, valves and motors
  - Multiple error conditions checking and failsafe mechanisms to protect against system failures
  - Touch screen enabled GUI for intuitive control and status
- Web based application (Javascript, JQuery, websocket) to monitor and control the system via internet
  - Supports all functionalities supported locally on the touchscreen GUI
  - Tested on Android and iOS Mobiles

## Outcome and Benefits Delivered

- IoT capabilities enables our customer to monitor the purifiers in field and recommend maintenance and filter replacements
- New features can be rolled out dynamically since the system supports remote firmware upgrade
- Purifier system with new generation user interface enabled customer to maintain the leadership position in the segment.



# The Business Context and Challenges of the Customer

- Our customer is a world leader in marine water purification systems. They had existing systems in the market. However, the products were having limited processing capabilities, older type of user interfaces and no IoT facilities for remote monitoring and management. Moreover, customer had lost the documentation on the sensors used in existing design.
- Customer had entered contract with a SoM vendor for supplying the hardware. They wanted to develop the embedded Linux application which controls the purifier and web application for remote monitoring and management.



# The Solution / System Description

## Embedded Linux Application

Technologies Used: C, C++, Sqlite DB

Gadgeon team analyzed the flow diagrams supplied by customer for control application and developed the embedded Linux application C++ with following features

- U boot, Linux board bring up on i.MX6 based TS4100 SoM.
- Developed the control and monitoring application for the water purification process. This includes close / open valves, switching and speed control of motors at different times based on sqlite DB settings. Application monitors various error conditions and failsafe mechanisms are included to protect against system failures.
- The system monitors temperature and salinity of water, pressure at various parts of the system, water level in tanks, and controls valves and motor to achieve the required level of water purification. The system protects the itself against faults like clogging and pressure build up.
- Nextion custom display firmware. Page creation using nextion IDE. Full duplex serial communication with host CPU for display and touch screen commands.

## Web based application

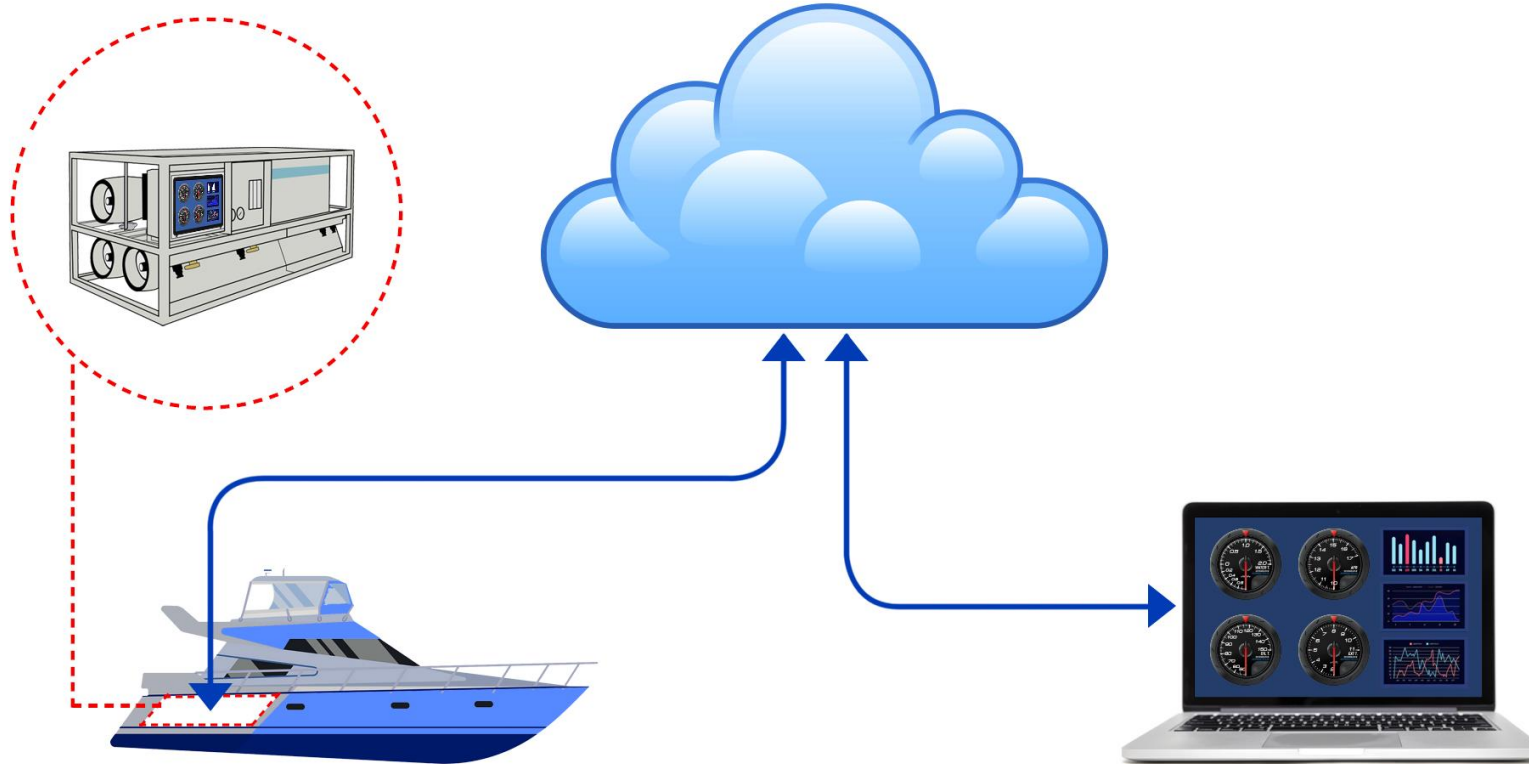
Technologies Used: libwebsocket, javascript/ JQuery

Web based control of the controller board including all functionalities provided by Linux application for monitoring and control. Included remote firmware upgrade feature.

# System / Architecture Description

Purifier System

Web Application



Remote console

# THANK YOU



For More Details, Let's Connect



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