# WATER ORCHESTRATION PLATFORM

# RPRO


WATER ORCHESTRATION

# CHALLENGE

**WATER** is one of the most important factors for our bodies and industries. However, there are a lot of water issues around the world, including flooding, contamination in water, or even limitations of safe water access.

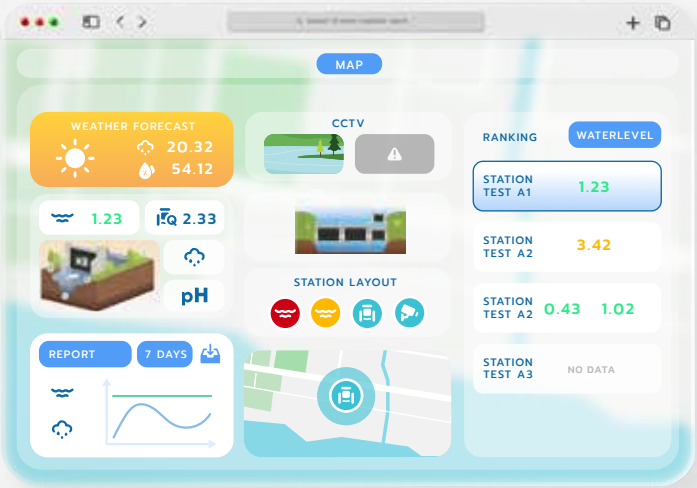
At present, the expansion of the urban society is growing rapidly resulting in the former drainage path being replaced with buildings. This caused the problem of insufficient drainage channels. Moreover, the change of weather conditions also has resulted in water volume that caused the water management to be more complex.The existing water management tools are unable to handle the current problems effectively.

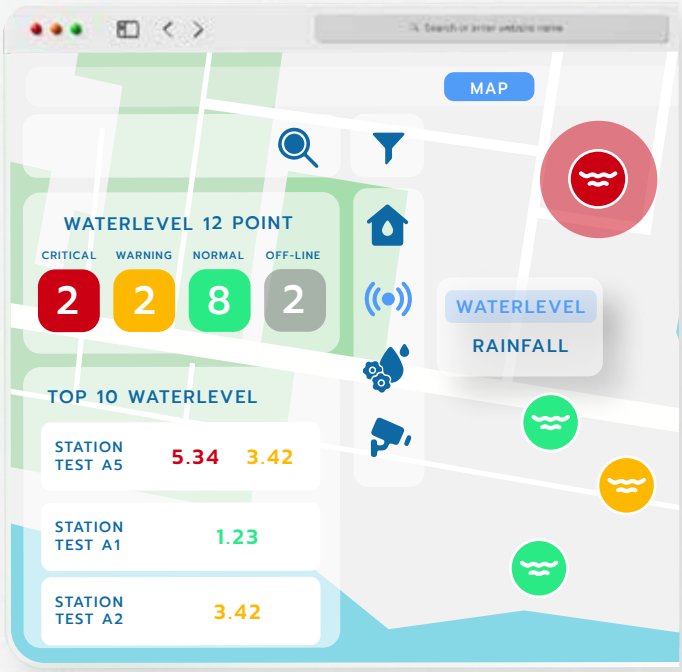
# SOLUTION

**RPRO** is a web platform which is designed with IoT technology to retrieve data/status/operation of measuring devices and machines as well as the machine'soperation. The data obtained to be processed with external data to simulate and forecast the upcoming situation by Big data technology to enhance and centralize water orchestration as well as convenience and speed in water situation assessment and decision-making to be more effective and sustainable.

In addition, RPRO has been developed by the most popular technologies in order to eliminate limitations of traditional tools. User interface is well-designed and applied user-centric methodology which transforms sophisticated data of related machines to simple and friendly graphical presentation for better user experience of water management.

# CORE FEATURES OF RPRO




## MAIN DASHBOARD

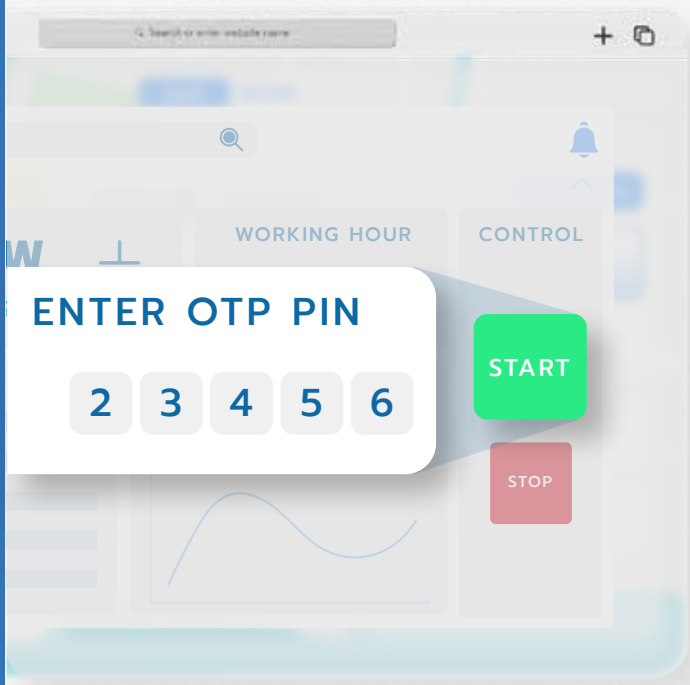
- Display overall water situation, machine and device status of each station currently by graphical table list and map with filtering.
- All stations, machines, water sensors and CCTV are displayed on their location with realtime data of their current data on a controllable map which is able to drill down into their detailed dashboard.

## STATION DASHBOARD

- Summarize the overall water situation, including water level, rainfall, or water quality, depending on the sensors installed at each station. Additionally, display essential information such as machine/device status, CCTV live stream or playback of scheduled snapshots for a specified period are available upon request and other general station data.
- Furthermore, visualize all installed machines/ devices at the station using 2D/3D graphics of the station layout, clearly indicating their statuses. This visual representation helps in easily identifying the location and operational state of each device within the station.
- All stations are allowed to specify their own specific information such as; sensor threshold, bank height or water management plan individually.
- Station reports summarizing the historical data of installed machines and devices are available on a daily, weekly, monthly, or yearly basis. These reports can also be exported in CSV format for further analysis.
- Able to predefined various types of station with different configurations depending on requirement.

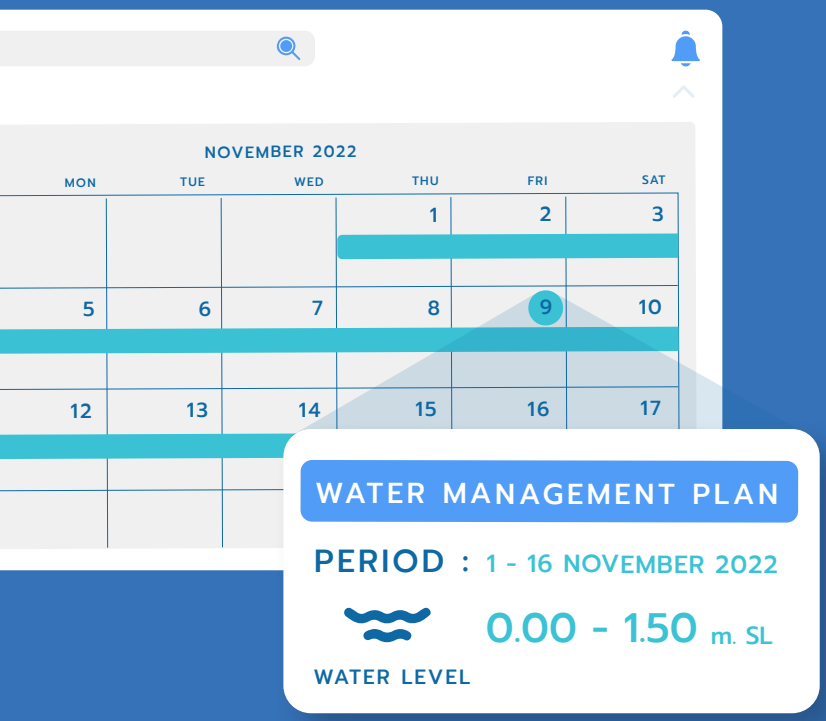
# MACHINE /DEVICE DASHBOARD

- Dashboard presents status and necessary information of a particular machine water sensor or other related devices in water management in real time and lasts 24 hours.
- In addition, necessary asset information for example; brand/model, serial no. warranty or other technical information are displayed.
- To enhance security while controlling machines at the station, CCTV live streams or playback of scheduled snapshots are available.
- Operational reports, including electrical data of water pumps and historical sensor data, are available on a daily, weekly, monthly, or yearly basis. These reports can also be exported in CSV format for further analysis.


# MACHINE CONTROL

- Easily and completely send the command to any remote machines from anywhere which authenticate with Time-based OTP for verification and identification.
- Supporting both single or multiple machine controls, the platform will operate orderly.
- All operating machine control data, including date/time, activity, and operators, are logged as history for troubleshooting and tracing back any operational activities through the platform.
- Additionally, a pairing machine is available in order to command just one machine then the platform will automatically send another command to the paired machine eg. trash screen and conveyor.
- Be an assistance to check or verify every step before sending commands to ensure that all procedures are followed.



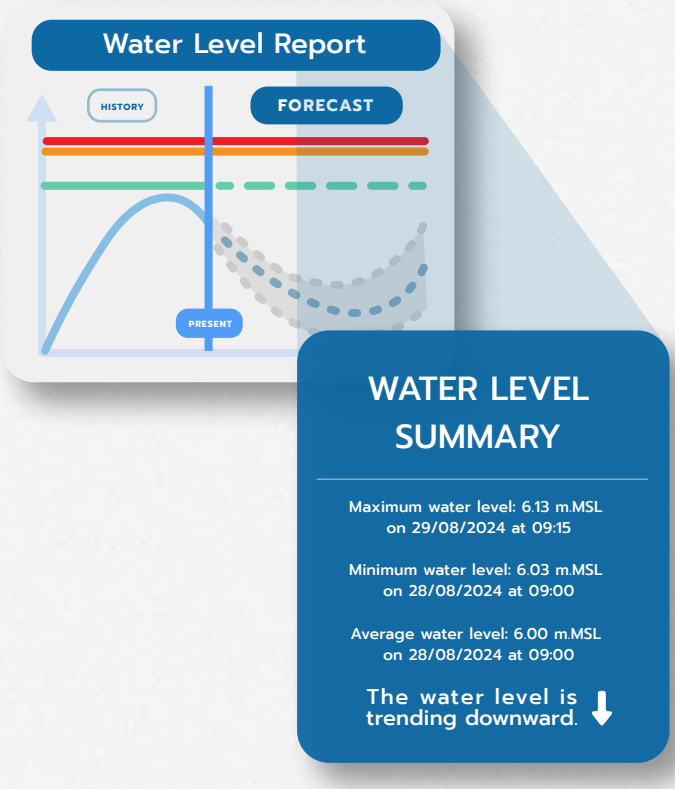

# PLAN AND SCHEDULING

Individual managed water plans depend on season, topography or water situation or landscape of each area with various conditions depending on the existing sensor of each particular station. For example, all related persons will be notified when water level exceeds the planned level.


# OBSERVATION AND NOTIFICATION

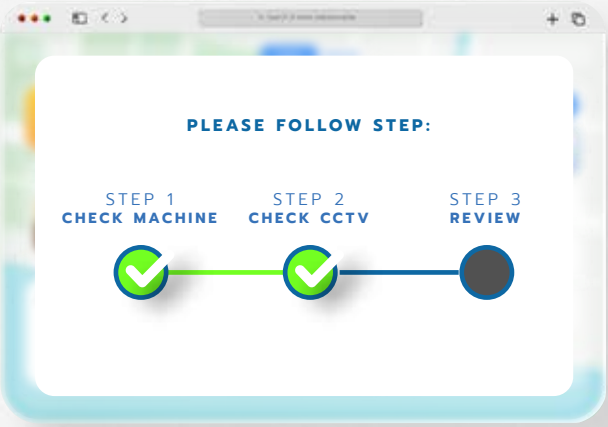
- In every event, water situation, the errors of machine as well as the malfunctions of machineand devices, the platform will monitor the events all 24 hours and promptly notify those involved.
- Traceback notification history is available with supported filtering.
- [Optional] Integrate with other channels such as Line Official Account.

*Optional features depend on requirement.




# INTEGRATE WITH AI

- Utilizing consolidated water and environmental data from each area to performs analysis, processing to forecast and summarize insight for users as follows:
  - Water Level Forecasting at Each Location Forecasts water levels over various time periods, based on historical data and current environ mental conditions. This enables users to better prepare and plan water management with efficiency.
  - Quick summarization Raw data from each sensor are analyzed and summarized into valuable, actionable insights that support decision-making.
  - User Assistance Chatbot serves as a virtual assistant for users, providing guidance, support, and summarizing reports upon request.
- Platform is designed to support further development to accommodate changing data and future use cases as user requirements.



# USER ASSISTANCE

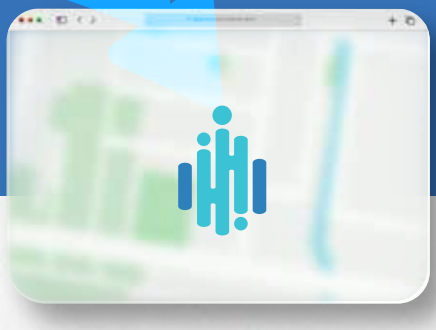
- Be an assistance of the user to instruct step-by-step and ensure important procedures such as procedures to control any machine are followed accordingly.
- Any events happening in a station, machine or any device are logged for troubleshooting and trace back in any operation activities on the platform.

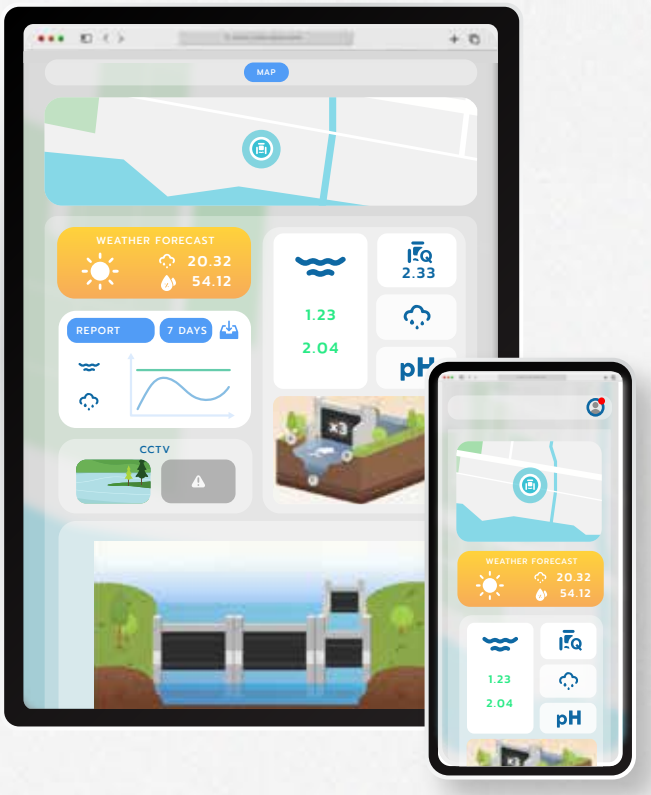

# ADMINISTRATION

- Own manage (add/edit/delete) all information of station, machine device or user in platform.
- Flexible to assign roles to users on each particular station.

*Depend on license.

ADMINISTRATOR





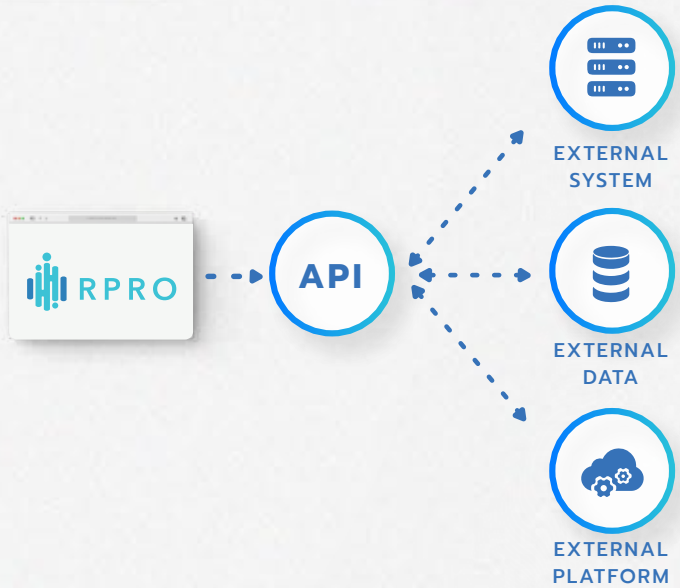

# BETTER USER EXPERIENCE

The platform supports screen displays for stations, machines, or various devices, adapting to different usage requirements for each type of mobile devices (Responsive design)

# INTEGRATE AND OPEN API

Integrate with the reliable open data from external sources for example weather forecast as well as be able to open publicly available application programming interfaces that provide for external systems.

*Optional features depend on requirement.



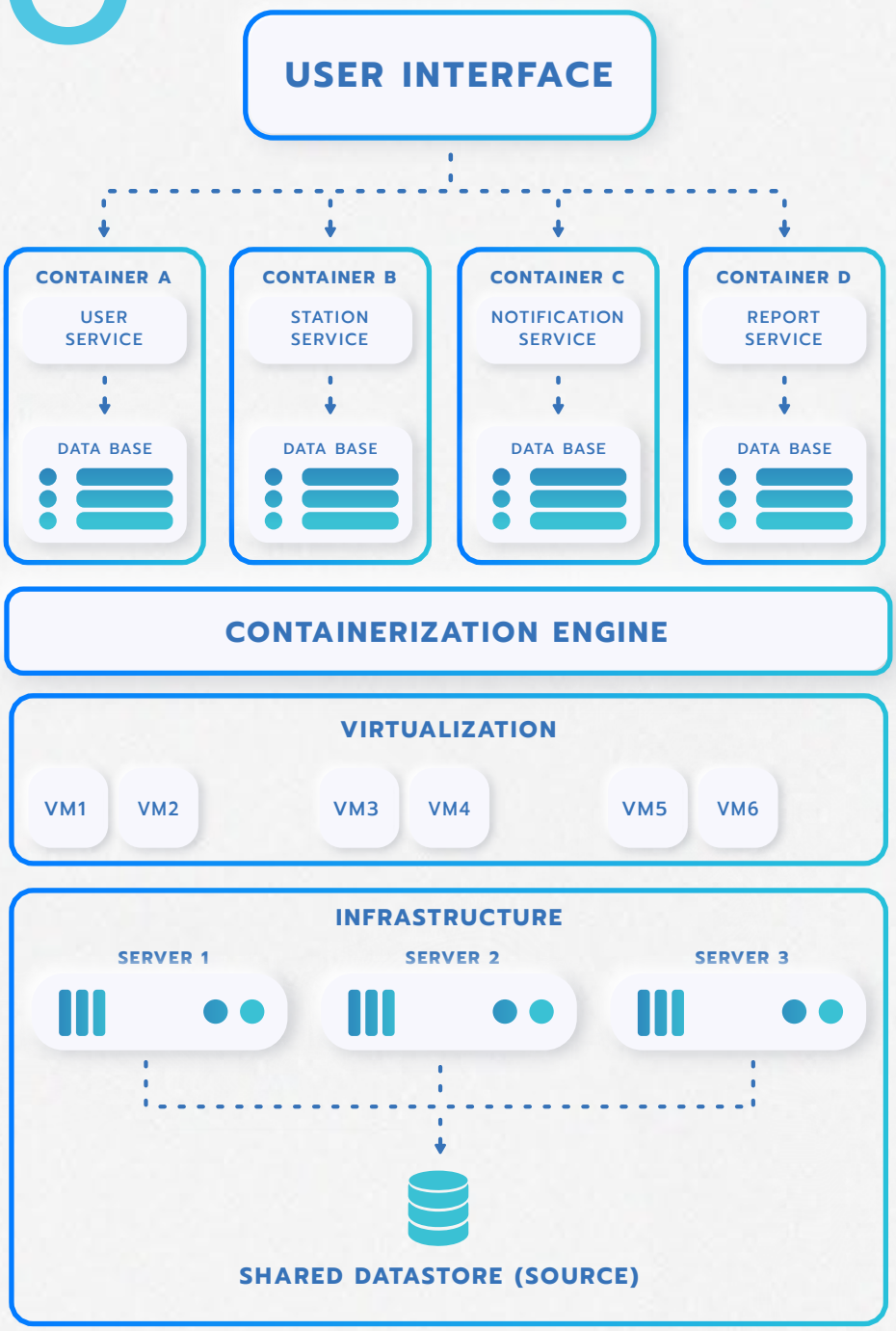
# SCREENSHOTS OF RPRO

## MAIN DASHBOARD

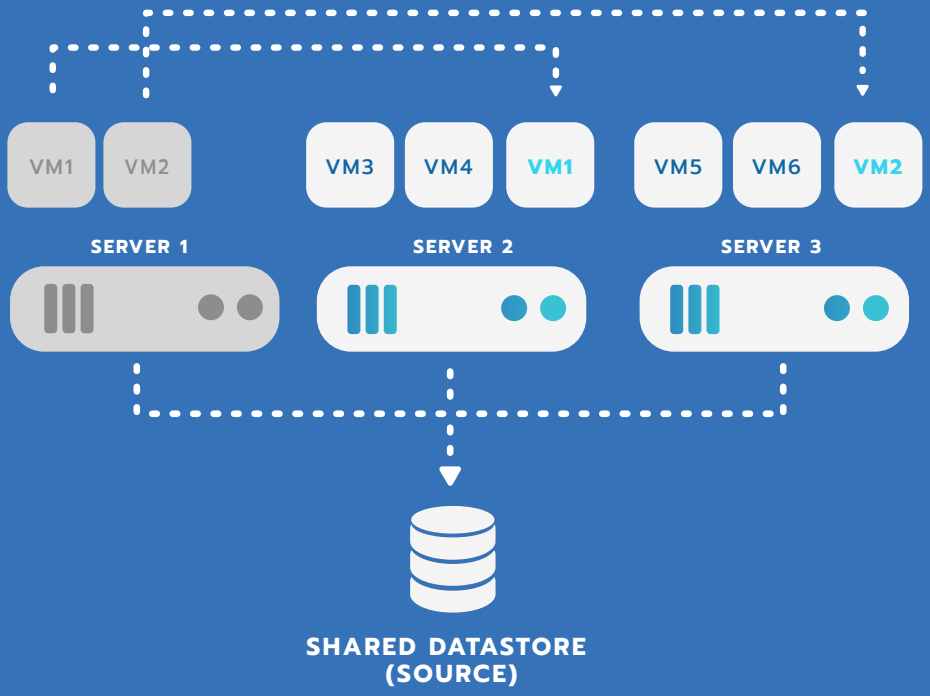
## STATION MACHINE OR DEVICE DASHBOARD

# SOFTWARE ARCHITECTURE OF RPRO

Utilize Microservices architecture together with containerized technology as a design principle each particular services and their database in platform for:

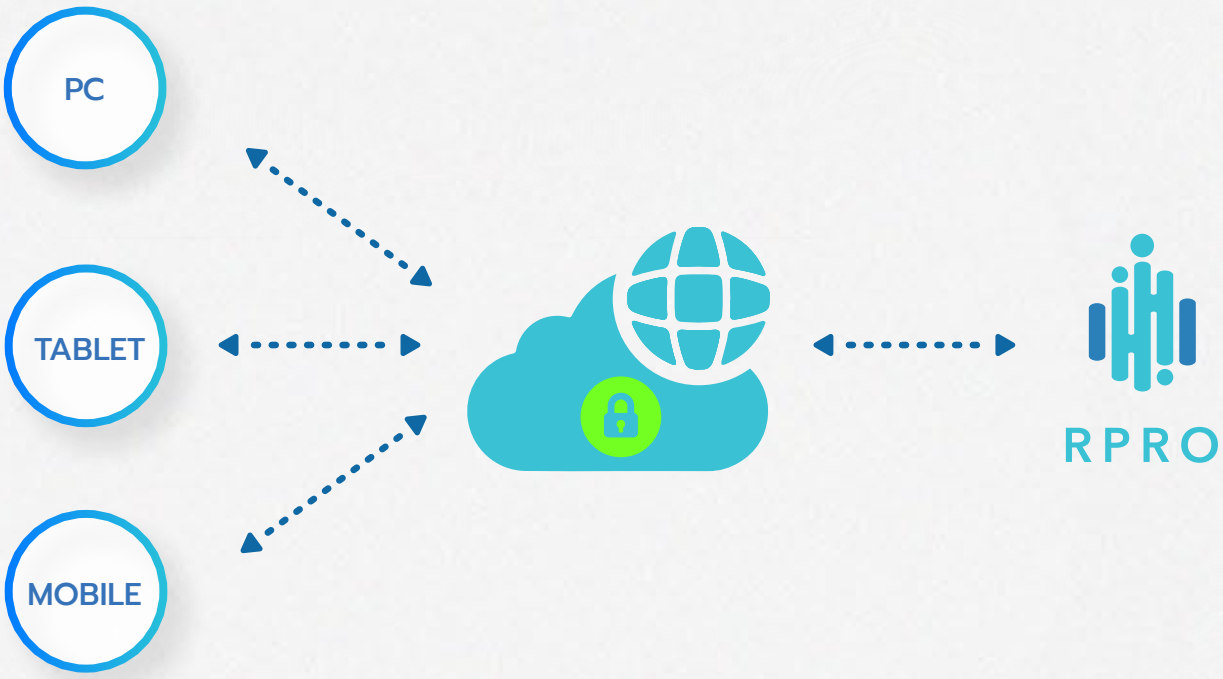



- Low coupling and independent deployment between microservices when changes caused to one service will not impact other services.
- High independently scaling each service (Scale up/scale out) at a time instead of scaling the entire application.
- Flexible approach to the choice of the tech stack individually while communicating by using well-defined APIs causes easy maintenance and expansion.
- More efficient resource consumption and dependent on hardware.




Platform running on clustering infrastructure where  provides the fundamental for a group of server for:

- Load balancing distributes a workload across multiple servers to improve performance
- Increased system high redundancy and availability components such as cluster nodes and resource pool availability in a cluster.
- High scalability, and low latency without affecting the existing system.



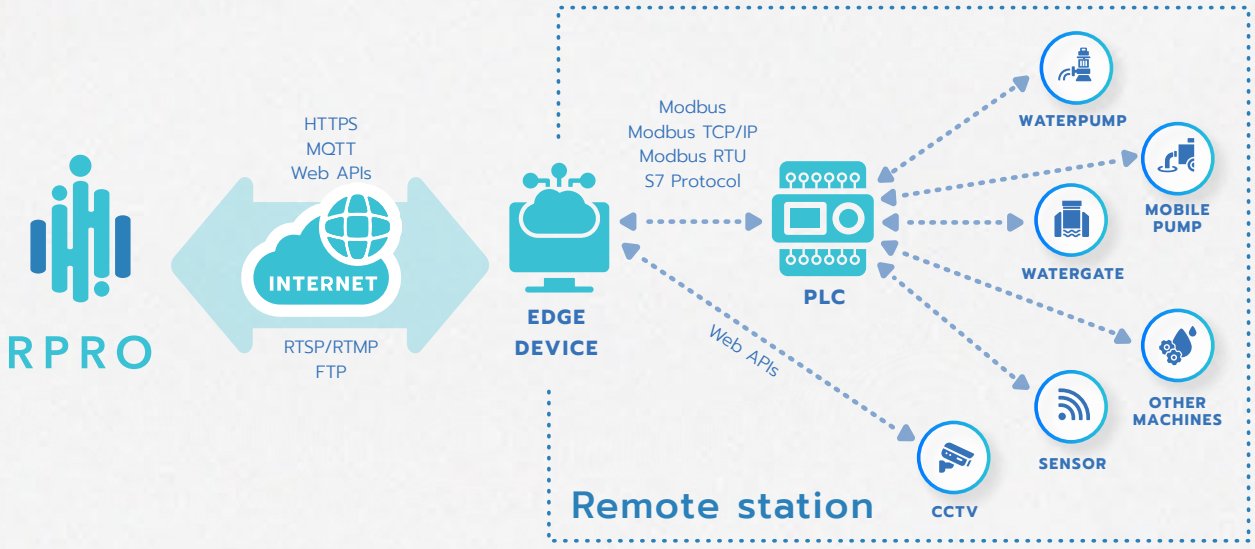

- Be an assistance of the user to instruct step-by-step and ensure important procedures such as procedures to control any machine are followed accordingly.
- Users to connect to and use platform over the Internet with HTTP over SSL protocol or HTTPS

# COMMUNICATE WITH RPRO

- Edge devices seamlessly integrate with PLC controllers at each remote station using international standards such as Modbus, Modbus RTU, Modbus TCP/IP, and S7 protocol. They also connect with CCTV cameras to retrieve live streams and scheduled snapshots through their API.

- Edge devices provide a distributed connection, bringing computation and data manipulation closer to the sources at each remote station. This approach reduces the size of data before sending it to the platform using well-known protocols:

  - For machine/IoT devices: Message Queuing Telemetry Transport (MQTT), Hypertext Transfer Protocol Secure (HTTPS), Web API, or WebSocket
  - For CCTV live streams: Real-Time Streaming Protocol (RTSP) or Real-Time Messaging Protocol (RTMP)
  - For CCTV snapshot pictures: File Transfer Protocol (FTP)



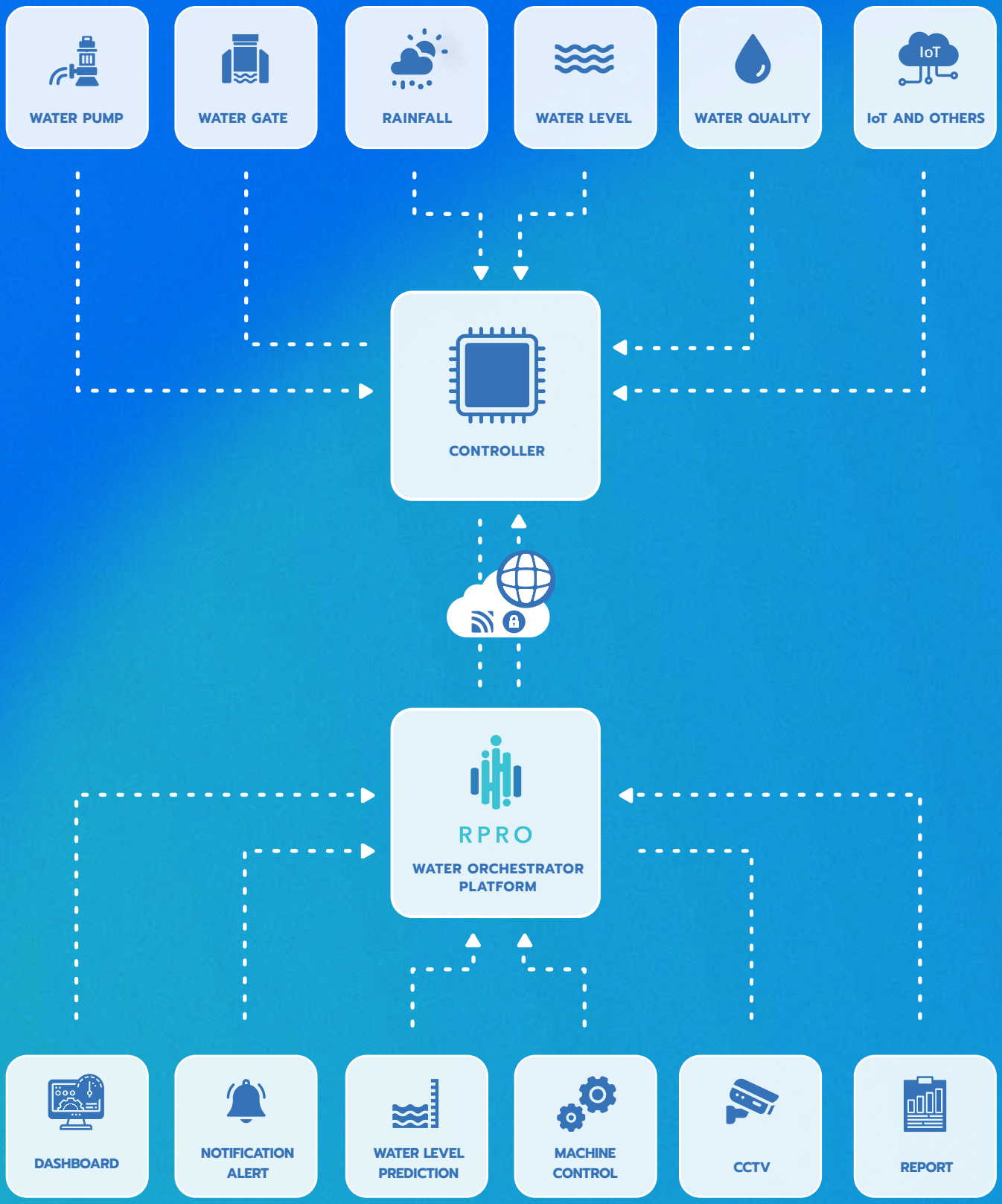

# STANDARD & CERTIFICATION

**RPRO** has quality approved by ISO/IEC 29110 and has also been listed on Thai Innovation list from National Science and Technology Development Agency (NSTDA). As a result, the platform development process qualifies international standards which ensures high performance for the long-term water orchestration platform.

Made in Thailand
MiT6706000382

PROCESS CERTIFICATION
ISO/IEC 29110
SGS

# TOPOLOGY OF RPRO



# KEY BENEFITS OF RPRO

## CENTRALIZED AND CONSOLIDATED DATA

Consolidation and digitalization of all related data from any remote station to the centralized platform for data exploration and analysis is to knowledge extraction in water management.

## INTEGRATION OF MACHINE LEARNING AND AI

Utilizing centralized and consolidated data together with external sources such as weather forecasts and historical and current rainfall data to simulate potential future sce narios by applying Machine Learning and AI technologies.

## DISTRIBUTING AUTHORITY

Distribute role-based users for enabling and delegating remote controlling systems to each remote station. Each station does not need to have their own separated system.

## LOCATION AND MAPPING

Integrate controllable map to represent water situation observation to increase convenience in assessing the situation, planning, and execution of the operation.

## SECURITY ON CONTROLLING

- Apply 2-steps verification with time-based OTP through mobile authenticator to enhance security on any controlling command.
- All controlling operations history available for daily, weekly, monthly or yearly for traceability.

## USER-CENTERED DESIGN

- User interface has been designed meticulously with design thinking methodology. The numeric, friendly graphical color with Thai language to represent a better experience of the water orchestration platform.
- Responsive design support on various devices

## USER CAPABILITY IMPROVING

- Transform manual operation tasks by user to automate operation by platform.
- Minimize cognitive load of users to learn various systems and maximize usability of a centralized platform.

## PLATFORM EXPANSION

- With containerization architectural and microservice development design, the platform is able to expand with dynamic traffic change without any service interruption.
- In order to keep pace with your growing requirements, visualization is expandable at any time–without technology discontinuities and need for complete reconfiguration of the existing system.

## IT RESOURCE OPTIMIZATION

- Shared centralized platform advantages and reducing the resource and cost of installation and maintenance separately.
- Enabling each station to securely manage and control individually from any location, on any device, at any time with zero client installation and maintenance system.

## TAILORED VOLUME LICENSING

- Make it easier and more affordable to enjoy the platform no matter how small or large your sensor points are without expiration.
- Any growing requirements of yours, add-on license is the right answer without hardware cost*

*Depend on hardware capacity.

## EASILY DATA ADDING

Adding on new stations machines devices or users are able to do without affecting the existing system.*

*Depend on license.

## DIRECTLY SUPPORT AND MAINTENANCE

The platform has been developed and maintained by in-house local developers. This is to guarantee the maintenance and support services.

RPRO

Scan me

Line Official Account

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