

# smartTAP Operational description

## Water dispensing system for public water points

### Introduction

This document provides supplementary information about the LORENTZ smartTAP solution. The solution is designed to be part of a sustainable water system. The key uses for the solution are:

- To provide accountability for water and reduce waste
- To provide equitable use of water
- Provide mechanisms for revenue collection where shared infrastructure is used.

This could be simplified as a “pay at tap” or “pay as you consume” model. smartTAP applications are much wider than revenue collection. smartTAP uses the latest technology which means the system is very flexible and can be customized to fit any social, business or resource constrained situation.

### Roles and terms described in this document

**Water Operator:** The company, organization, or entity that owns the water revenue stream. The Water Operator is ultimately responsible for revenue.

**Water Seller:** A local agent who is responsible for selling water credits to Customers. Water Sellers can often take on additional tasks such as registering new Customers in the system and housekeeping tasks around the Water Dispensers.

**Customer:** The water consumer who is using the Water Dispenser.

**Tag:** The secure NFC (near field communication) tokens that are issued to each Customer. The tag is like a wallet that holds available water credits and some basic Customer data for identification purposes.

**Water Dispenser:** The device that provides water to the users. The dispenser replaces an existing traditional tap. As the dispenser is solar powered, it needs only a water connection and has a battery inside for use 24 hours per day.

**LORENTZ smartTAP app:** An Android based smartphone app that is used by the Water Seller. The app uses the secure NFC capabilities of modern mid-range smartphones to read and write data to the tags. Water Sellers are registered to use the App and are identified by login.

**Entitlement:** A special separate wallet held on that tag. A users entitlement is how many free water credits they receive per day. Entitlement credits reset and renew every 24 hours. Entitlement allows for the system to be used for equitable water distribution or as a mechanism to protect vulnerable members of society.

**partnerNET:** Web based portal for registered LORENTZ partners and Customers to access information.

**LORENTZ Global:** Cloud based management system for monitoring and management of LORENTZ products including solar water pumps and Water Dispensers. LORENTZ Global manages technical and operational aspects (use) of systems in the field.

**LORENTZ partner:** An organization that is approved and trained to sell, install and service LORENTZ products.

### LORENTZ smartTAP operating principles

**Credits and currency:** The system operates on water credits. 1 water credit = 1 litre. Credits are added to the Customers tag based on the price that is set by the Water Operator. This fixed “exchange rate” encourages users to add credits in advance. Seasonal or time of day tariff changes manipulate the number of litres dispensed per credit. Prices per credit are advertised throughout the scheme.

**Dispensing resolution:** Water is dispensed in 100ml (0.1 litre) increments. The exact amount of credit is held on the tag. This resolution allows for a cup to be dispensed or a for a large bucket to be filled accurately.

### Operation

**Dispensing:** A Customer holds their tag close to the target on the front of the dispenser. First the amount of credit is shown and then after 1 second dispensing starts. Dispensing continues until the tag is removed. These actions are intuitive and instantly accepted by the Customer.

**Dispenser interaction:** The dispenser has a LCD screen which explains the use of the dispenser and provides information about water credits available and the status of the dispenser. All communication is with numbers and symbols and is suitable for low / no literacy users and is accessible for people with limited vision or dexterity.

**Adding credit:** Credit is added to tags either by visiting a Water Seller or by buying credits online and visiting the dispenser.

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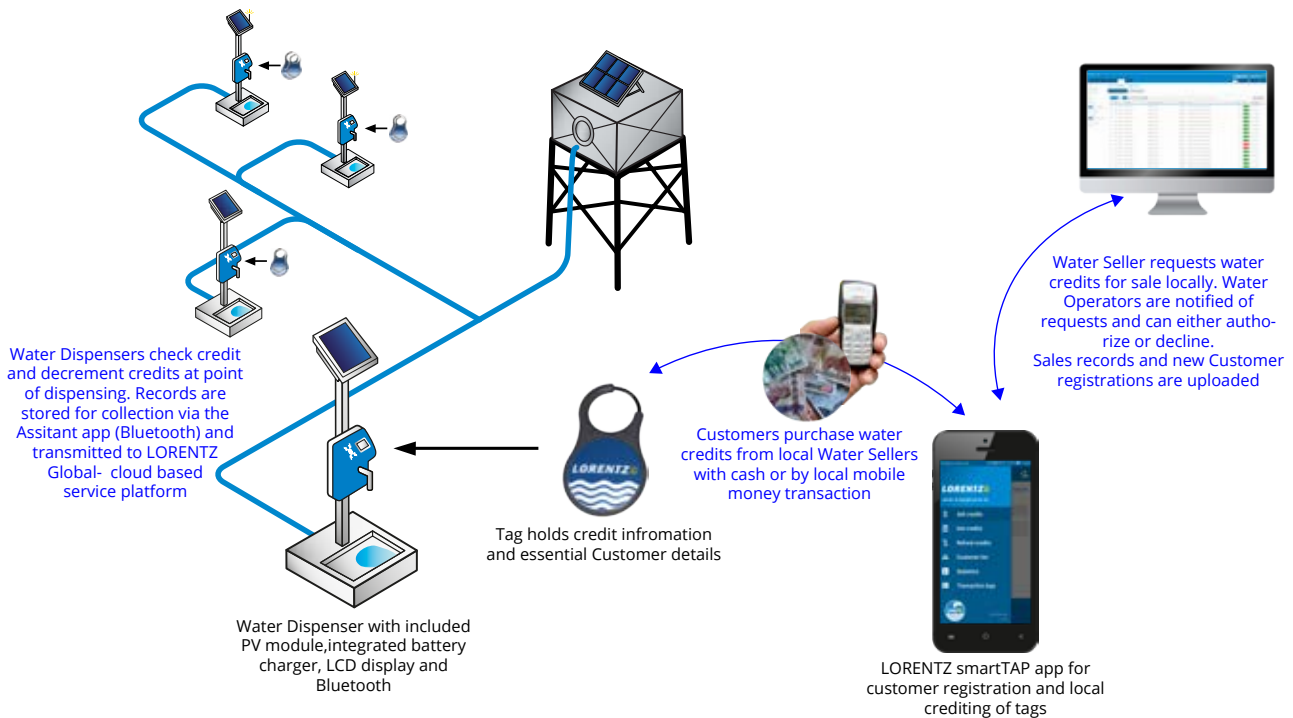


photo may differ from actual product

### Offline working

#### Introduction

The offline working model allows a sustainable water dispensing network to be implemented simply and quickly.

Offline working requires only 3 components.

- A Water Dispenser
- Tags
- A Water Seller with the LORENTZ smartTAP App

#### Setup and configuration

Water Dispensers are installed where required. Installation only requires a water connection. The Water Dispenser is supplied with a small PV module and cables.

The Water Dispensers are registered by an approved LORENTZ partner who will install the configuration on the dispensers using an engineering application. The process is fast and secures the dispensers to the Water Operator. Unique security

keys are deployed across the Water Operators network ensuring that tags, dispensers and Water Sellers are all in the same pricing structure. This means that only credits that are sold on the network can be used on dispensers on the network.

Water Seller accounts and Water Operator accounts are configured.

#### Customer introduction

Tags are issued to Customers within the community. Each household or Customer has a tag and their details are registered using the smartTAP app. This can be done offline. Tag issuing is normally done in one of two ways:

- Tags are purchased and a credit added (like a pre-paid SIM card) where revenue collection is the priority.
- Tags are given to Customers where equitable access to water is the priority.

#### Water Seller credit handling

Water Sellers request more credits using their app. Credit requests are received by the Water Operator (email alerts). The Water Operator checks payment (cash or mobile money) and accepts or rejects the request. Credits are passed to the Water Seller automatically. The Water Seller needs an internet connection to collect their credits, but does not to sell them, daily operation is offline.

#### Customer adding credits

The Customer first visits a Water Seller, presents their tag and appropriate payment. Following this, the Water Sellers smartphone app assigns the credits instantly to the tag.

#### System data

Each dispenser records all transactions and technical data. Each Water Seller app records transactions. All transactions can be simply uploaded to the LORENTZ Global management system for viewing and consolidation.

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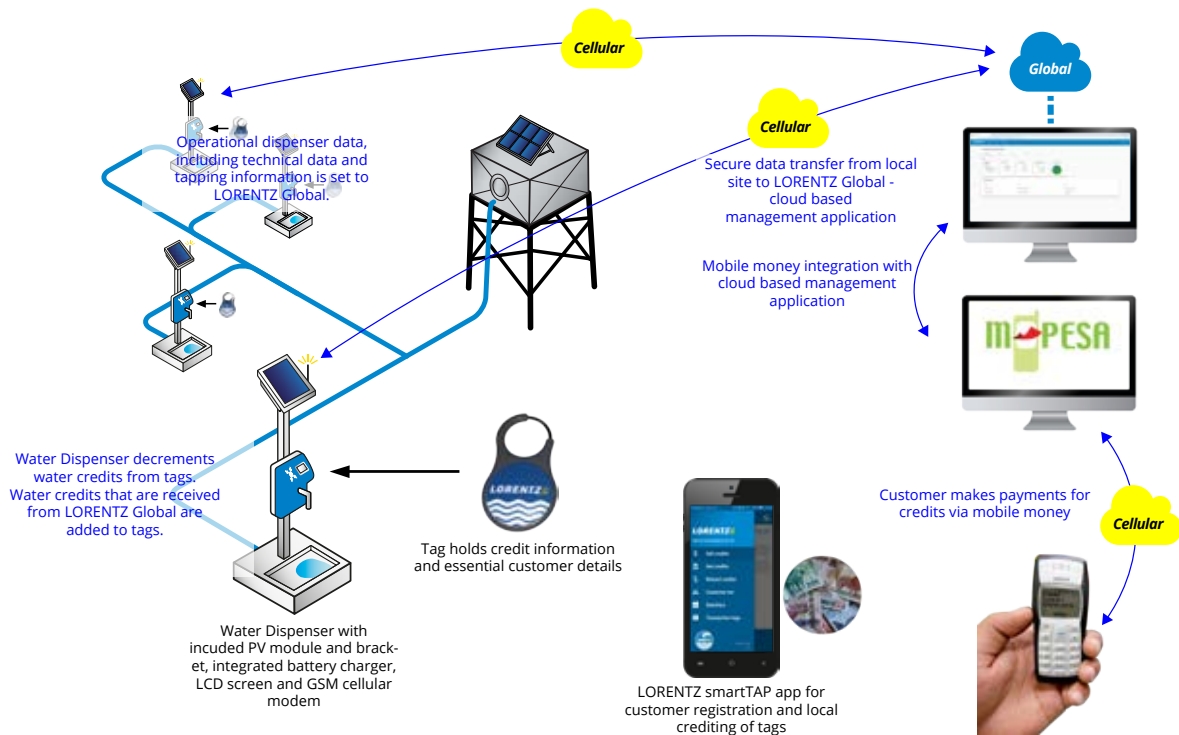


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### Online working

#### Introduction

The online working model provides all of the same functions as the offline model. By adding the following additional components the system allows for remote monitoring and management and for Customers to buy water credits directly from the Water Operator.

- Adding the optional GSM cellular modem to each smartTAP Water Dispenser
- Integration to a mobile money provider
- A LORENTZ Global online account and monthly Water Dispenser management credits

#### Additional setup and configuration

Water Dispensers are registered by an approved LORENTZ partner who will install the configuration using the Assitant app. The process is fast and secures the dispensers to the Water

Operator.

Users within the Water Operators organization have accounts setup on the LORENTZ Global platform by the LORENTZ partner.

Mobile money integration with the Water Operators wallet is handled either directly or through a 3rd party aggregator.

#### Customer introduction

Tags are issued to Customers within the community in the same way as for the offline model. At registration the mobile money details (typically telephone number) are also added to the Customer profile to allow payment for credits by mobile money.

#### Water Seller credit handling

Water Sellers can still operate locally in the online model. This provides maximum flexibility for cash or mobile money payments and ensures

water is available even if cellular services are not.

#### Customer adding credit

The Customer sends a mobile money payment to the Water Operator, payment is confirmed and the credits are sent to all taps in the Water Operator network. The credits are added to the tag at the next visit.

#### System data

Each Water Dispenser sends real-time transactional and technical data via GSM cellular services to LORENTZ Global.

Offline and online transactions are combined to a single view in LORENTZ Global.

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### Planning Considerations

#### Households per Water Dispenser

The number of Customers or households that a Water Dispenser will support is based on the typical Customer water use and the pressure of the water at the dispenser.

#### Example

200 households in a community  
6 persons per household  
15l per person per day  
Daily water to be dispensed is  
 $200 \times 6 \times 15 = 18,000\text{l}$

Measuring the pressure at an existing tap shows 1 bar of pressure.

The dispenser will deliver 34l/min at 1 bar.

Assuming 6 hours of dispensing in a day  
 $6 \text{ hours} \times 60 \text{ mins} \times 34\text{l} = 12,240 \text{ l per dispenser.}$

So  $18,000 / 12,240 = 1.47$  dispensers.

2 dispensers would allow this community to have their water needs dispensed in  $(18,000 / (34\text{l/m} \times 60 \text{ mins} \times 2 \text{ dispensers}))$  4 hours and 24 mins

4 hours  $(4/24 = 17\%)$  load is good to have low queuing times.

Consideration should also be made on how water would be provided in the event of a failure. It is good practice to have multiple dispensers that are available within a reason-

able travel distance if this is the only source of water.

From analysis, having a water dispenser within 200m of a customer's house means water is collected more often. This reduces the potential for water pollution due to water being stored for long periods in open containers.