



Conference

INTERNET OF THINGS ENABLING TECHNOLOGIES FROM VIRTUAL NETWORKS AND CLOUD COMPUTING TO SMART INTEGRATED COMMUNICATION SYSTEMS

SensiStep – “IoT in Action” in Healthcare



Dr. Hendrik R. Schwietert
Evalan BV
The Netherlands

02nd of April, 2014,
09:0-17:00, Telenor, Oslo, Norway.

Auditorium Voice, Telenor Expo,
Snarøyveien 30, 1331 Fornebu

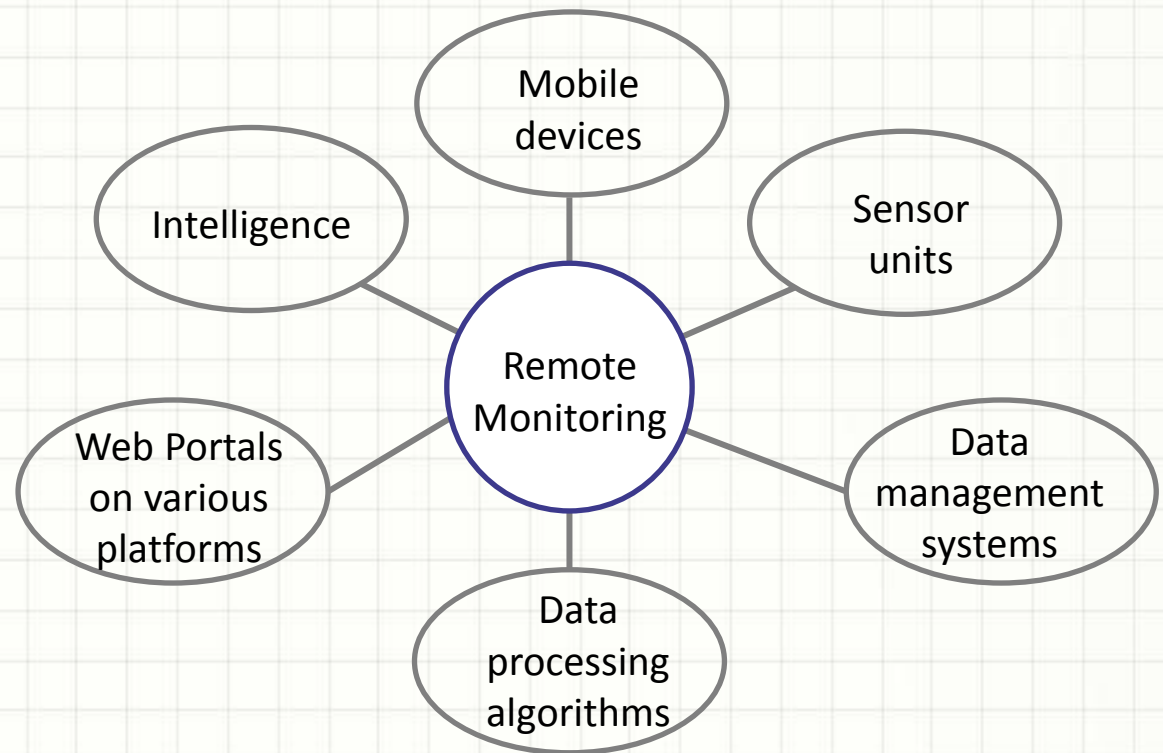


Presentation Outline

- ❖ Introduction Evalan
- ❖ SensiStep System – e-Health IoT application
 - Objective
 - Configuration
 - Current Application
 - Demonstration
 - Future Applications
- ❖ Conclusion and Summary

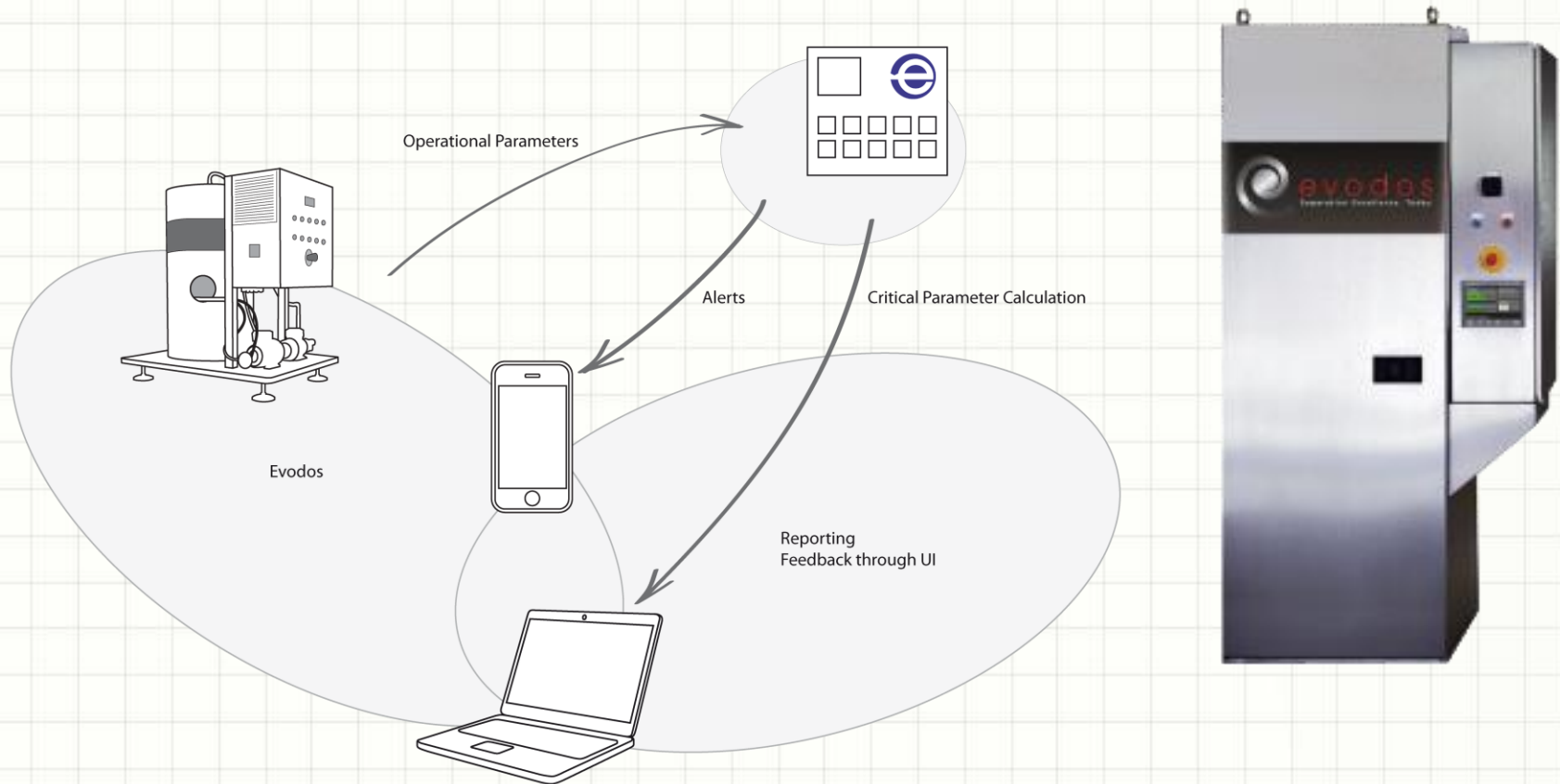


Evalan develops, markets and sells services and solutions that use remote monitoring and telemetry solutions.

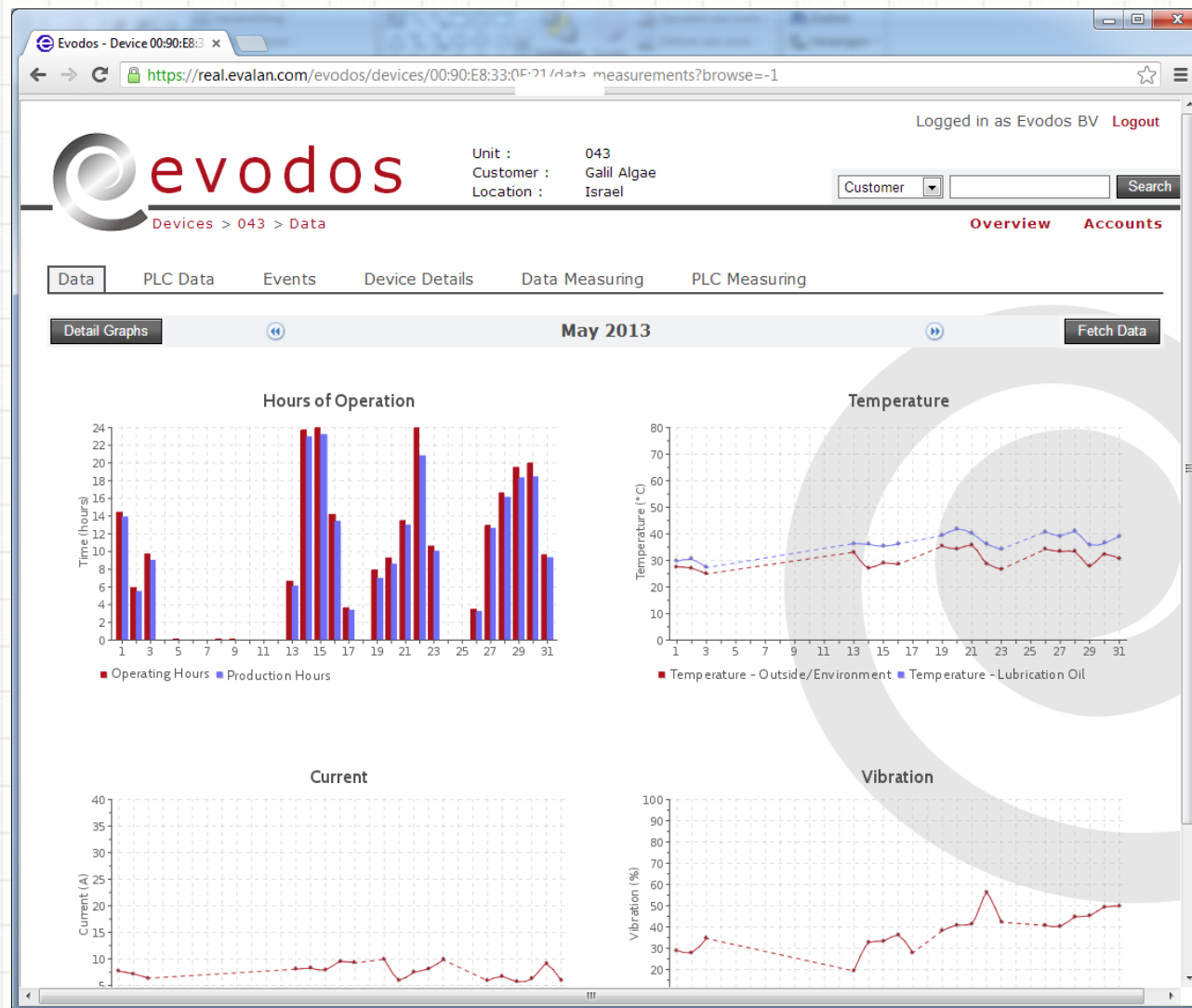




Example – Industrial Services – Joint Development Partner

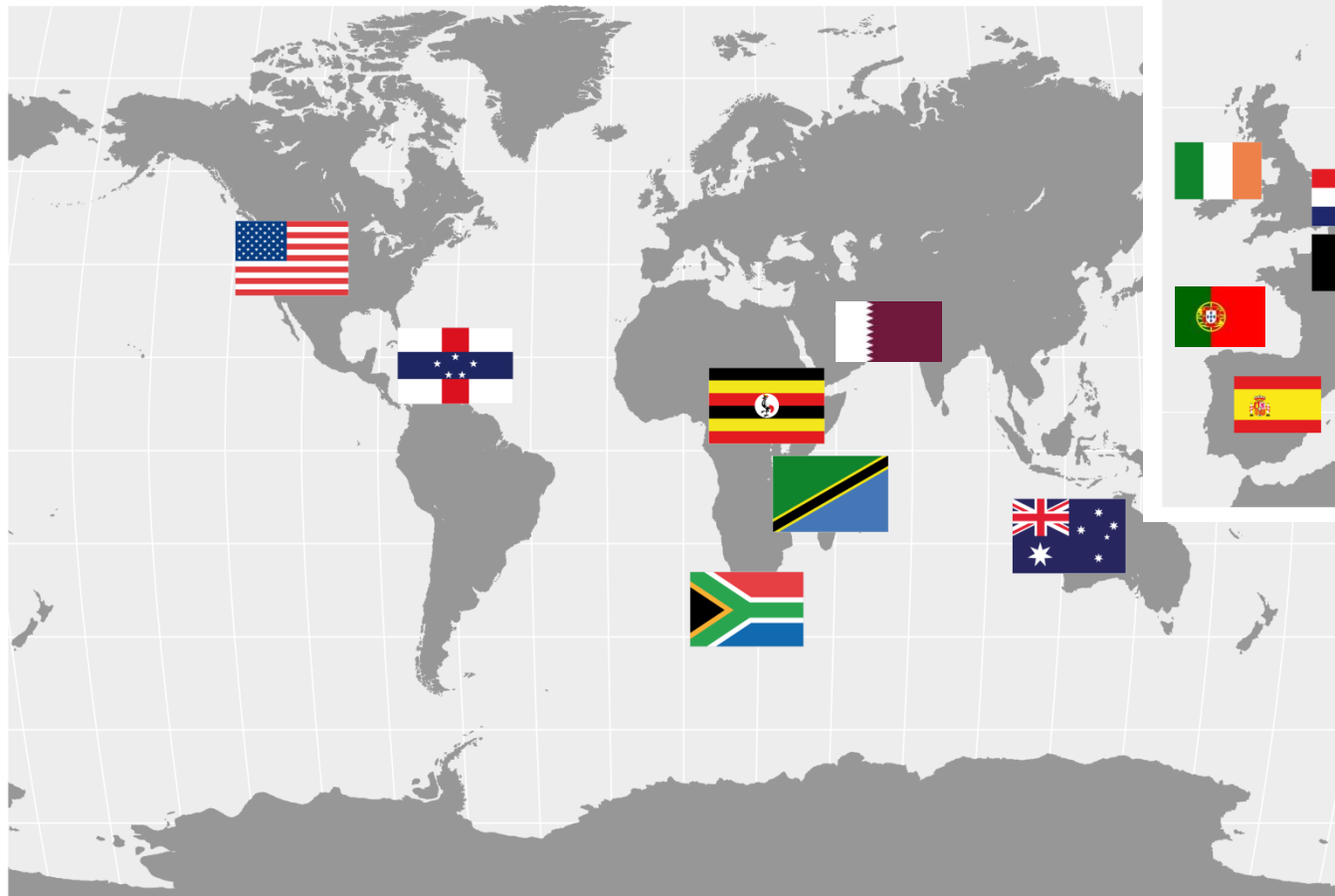


Evalan developed turn-key and now operates 24/7 a telemetry system for the separation machines of Evodos, with units in 10 countries





50% Industrial – 50% Healthcare





Evalan offers **SensiStep**, an innovative system to monitor the force patients exert on their legs. SensiStep was co-developed with UMC Utrecht.



www.sensistep.com



Introduction

❖ Quote from an Orthopaedic Doctor:

- The system can work as a weight bearing guide in the progression of treatment of lower limb fractures. Especially in fractures where the weight bearing status post-op is not full. This progression is the most subjective issue in orthopaedics and would greatly benefit from an objective measure.



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Introduction

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- 750,000 per year (Europe)
- 10% are “complex”



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Requires surgery →





Introduction

❖ Some Facts about Broken Legs:

- 750,000 per year (Europe)
- 75,000 “complex”



Introduction

❖ Some Facts about Broken Legs:

- 75,000 “complex”
- > 25% experience complications:
 - Slow healing
 - No healing (~10%)



Introduction

❖ Why 25% ?

- Doctors traditionally focus on process inside the hospital
 - Surgery
 - First days of healing
- Limited focus on the process outside the hospital
 - There is little information about this process



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General Belief that the loading that patients exert on their leg during the rehabilitation is an important factor in the success of the healing.



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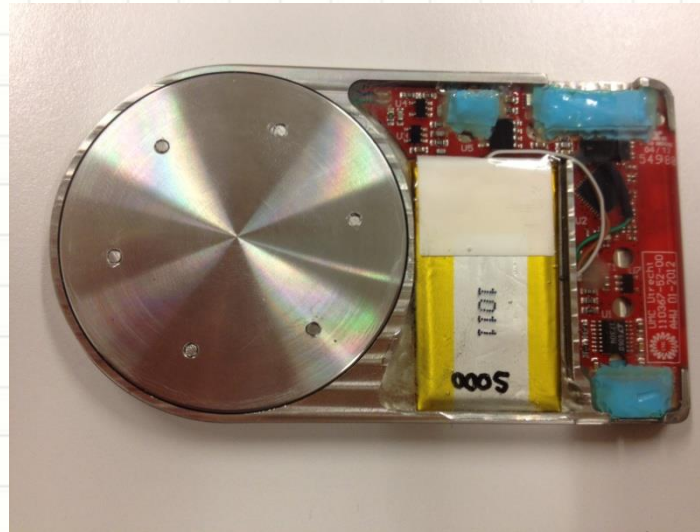
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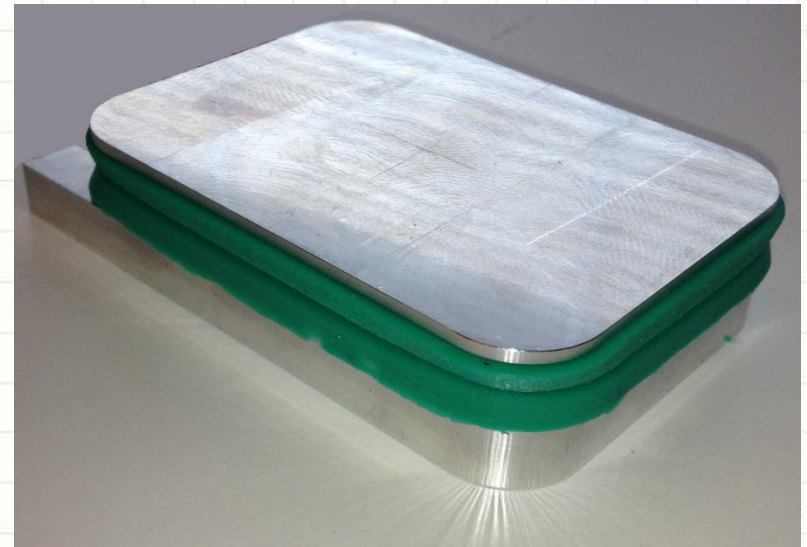
Doctor's Advice: varies from "no loading" to "full loading"

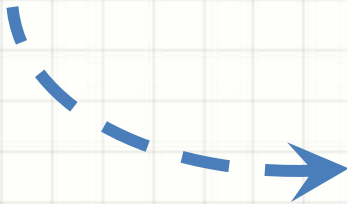


SensiStep



SensiStep





SensiStep's **Force Sensor** fits inside the Heel of a specially designed **Sandal**



The **Force Sensor** sends measurements to the **Sensi** in Real-Time, wirelessly





The Sensi:

- **Collects** measurement data from the Sensor
- Provides **Feedback** to the Patient, through LED's and Audio
- **Sends** measurement data to the Tablet, wirelessly

SensiStep – Web Portal

Value Creation Network

Internet of Things



Measurements can be viewed
on the Tablet in **Real-Time**

Measurements from **Previous Sessions** can be viewed
through an on-line **Web Portal**

SensiStep
WEB PORTAL

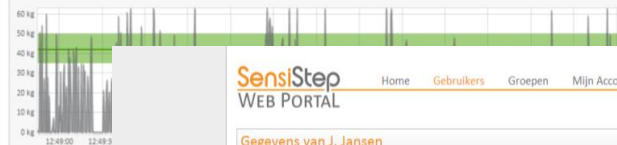
Home Gebruikers Groepen Mijn Account

Ingelogd als hatdemo
(Log out)

Welkom hatdemo

Laatste belastingsgegevens van Jansen, J.

12:48 - 17-09-2013



Nieuwste Sessies

Jansen, J.
Jansen, J.
Jansen, J.
Jansen, J.
Jansen, J.
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SensiStep
WEB PORTAL

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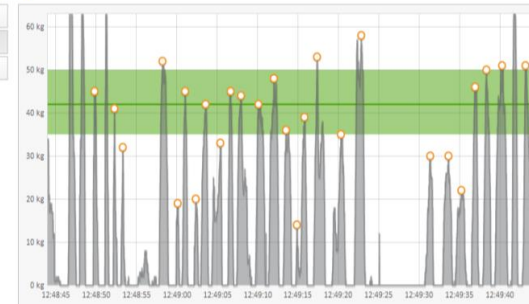
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Gegevens van J. Jansen

Gebruikersinformatie

Meetseries

Groepen



| Sessie | Duur | Stappen | Gem. belasting | Systeem |
|-----------------------|----------|---------|----------------|-----------------|
| 2013-09-17 - 12:48:44 | 00:06:56 | 114 | 39.67 | SensiStep #0001 |
| 2013-09-17 - 12:45:16 | 00:01:24 | 29 | 40.31 | SensiStep #0001 |

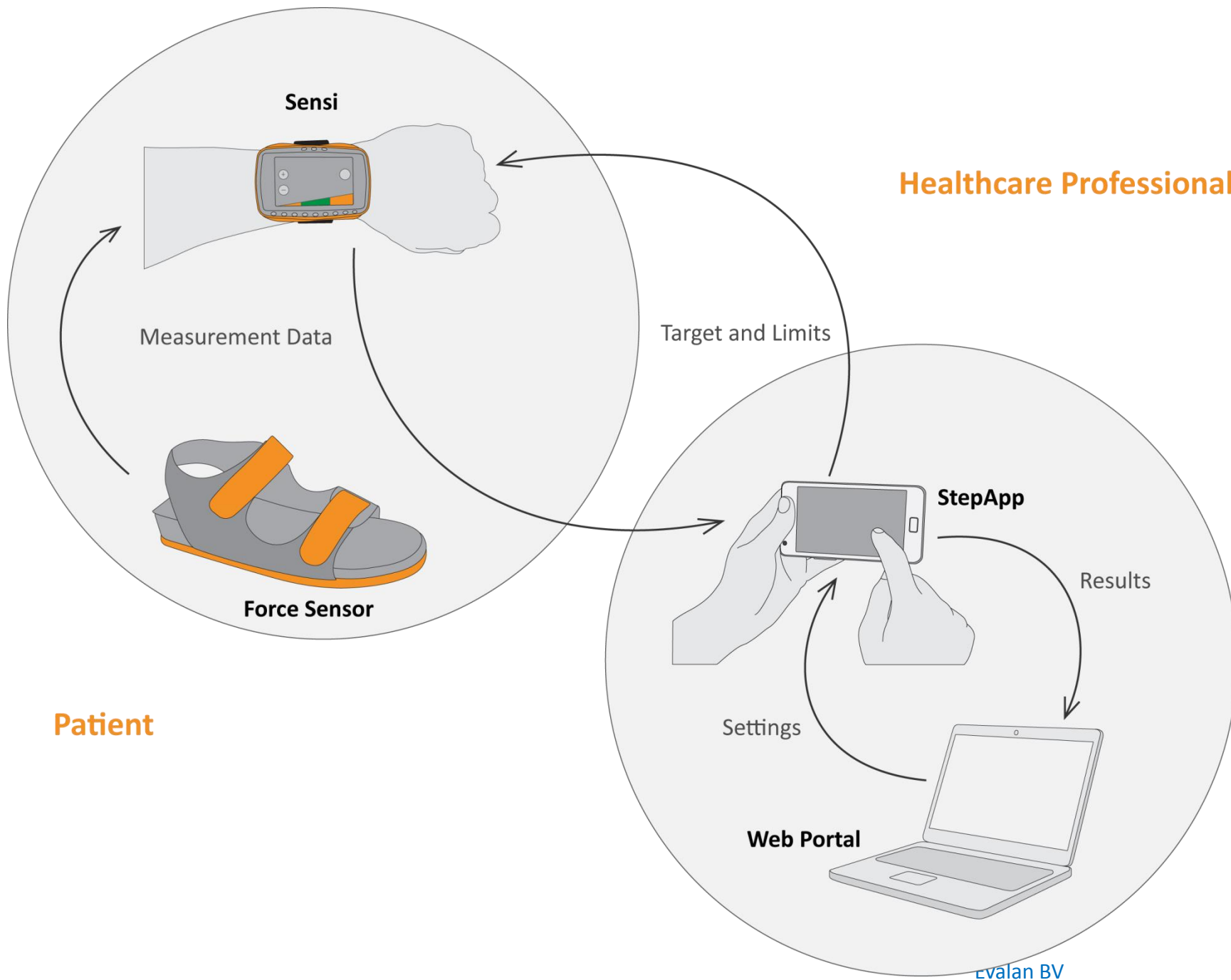
SensiStep Architecture



| Sensor | Aggregator | Phone | Back end | User Interface |
|--------------------------------------|--|---|--|--|
| Connectable for aggregator | Connect to phone and sensors | Connect to aggregator | Exchange data with phone via XML protocol over https | Retrieve data from back end |
| Communicate with aggregator via BTLE | Exchange data with sensor via BTLE | Exchange data with aggregator via BT | Store data in database | Create, show and adjust patient details |
| Register data | Exchange data with phone via BT | Exchange data with back end via XML protocol over HTTPS | Assign and secure data to patients- and useraccounts | Note connection-, memory- and battery statuses |
| Store data in memory | Process data and give feedback via LEDs or audio | Create, show and adjust patient details | | Assign device to users and/or groups |
| | Store data in memory | Set measurement settings Start measurement | | Set measurement settings Start measurement |
| | Note connection- and battery statuses | Visualize data realtime | | Vismeasurment data and -overview |
| | | Calculate averages Give an overview of averages | | |
| | | Note connection-, memory- and battery statuses | | |
| | | Intelligent 'data processing and feedback' module | | |

BTLE - Bluetooth Low Energy

BT - Bluetooth





Business Proposition

- ❖ @ Physio
- ❖ @ Clinic
- ❖ @ Home
- ❖ @ Balance



Business Proposition

| | |
|-------------|---------------|
| ❖ @ Physio | December 2013 |
| ❖ @ Clinic | July 2014 |
| ❖ @ Home | Late 2014 |
| ❖ @ Balance | July 2015 |



@ Physio



Healthcare professional:

- Receives **insight** in the loading pattern and therapy **adherence**
- Can use SensiStep during existing rehabilitation programs

Patient:

- Maintains **better control** during exercises
- Receives **instantaneous feedback**, which removes uncertainty



One SensiStep Set consists of:

- Sensor
- Dummy Sensor
- Sensi with wrist strap
- Tablet with SensiStep-application
- Chargers for Sensor, Sensi and Tablet
- Sandals (4 pair)
- User Manual, Quick Start Guide
- Safety information
- One year free use of Web Portal

Price € 3,900

Excludes VAT, Subject to Change

Purchase SensiStep at **Evalan**

+31-20-7790344

info@sensistep.com



Conclusion and Summary

- ❖ Each year ~20,000 persons in Europe experience problems with fracture healing in a leg



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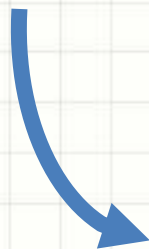


Conclusion and Summary

- ❖ Each year ~20,000 persons in Europe experience problems with fracture healing in a leg
- ❖ There is no information about actual or optimal loading progression during healing
- ❖ SensiStep measures the actual loading in Real Time
- ❖ SensiStep can guide patients to their prescribed loading



SensiStep

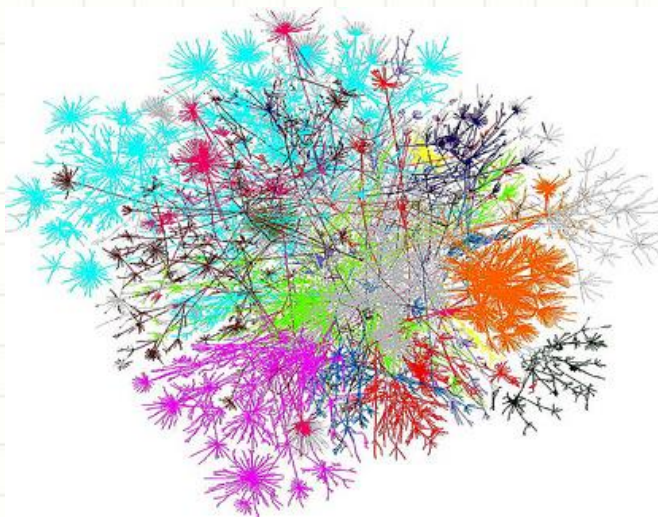


Distributors Wanted

Contact Evalan: +31-207790344



Thank You!



**INTERNET OF THINGS:
INTERNET OF ANYTHING, ANYTIME, ANYWHERE**