SmartFlow

...a design solution for energy sector

Presented by

SRC TELEMETRY INC.

What is SRC TELEMETRY INC. and who are we ?

SRC- Smart Remote Communications Telemetry Inc.

Team Members and their contribution

- Shervin Asgari Pour (CMO) – Electrical Design and Development
- Yazan Shehadeh (CEO) – *Wireless Communication Development*
- Monir Pejgaleh (CFO) – *Electrical Design and Development*
- Amit Verma (COO)- Mechanical & Electrical Integrated Design
- Mark Zhou (CTO) - *Software Design & Development*

Outline

Background

System Design

- Overview
- Power Component Design
- Sensor & PLC
- Old design and failures

Business Aspects

- Budget & Financing

Future Improvements

- Applications

Acknowledgements

Conclusion

QA Session and Demo

Background

- Requirement of wireless devices for energy sector
- Oil and Gas sector uses containers to store their fluids
- Automation control system from home via cell phone or wireless device

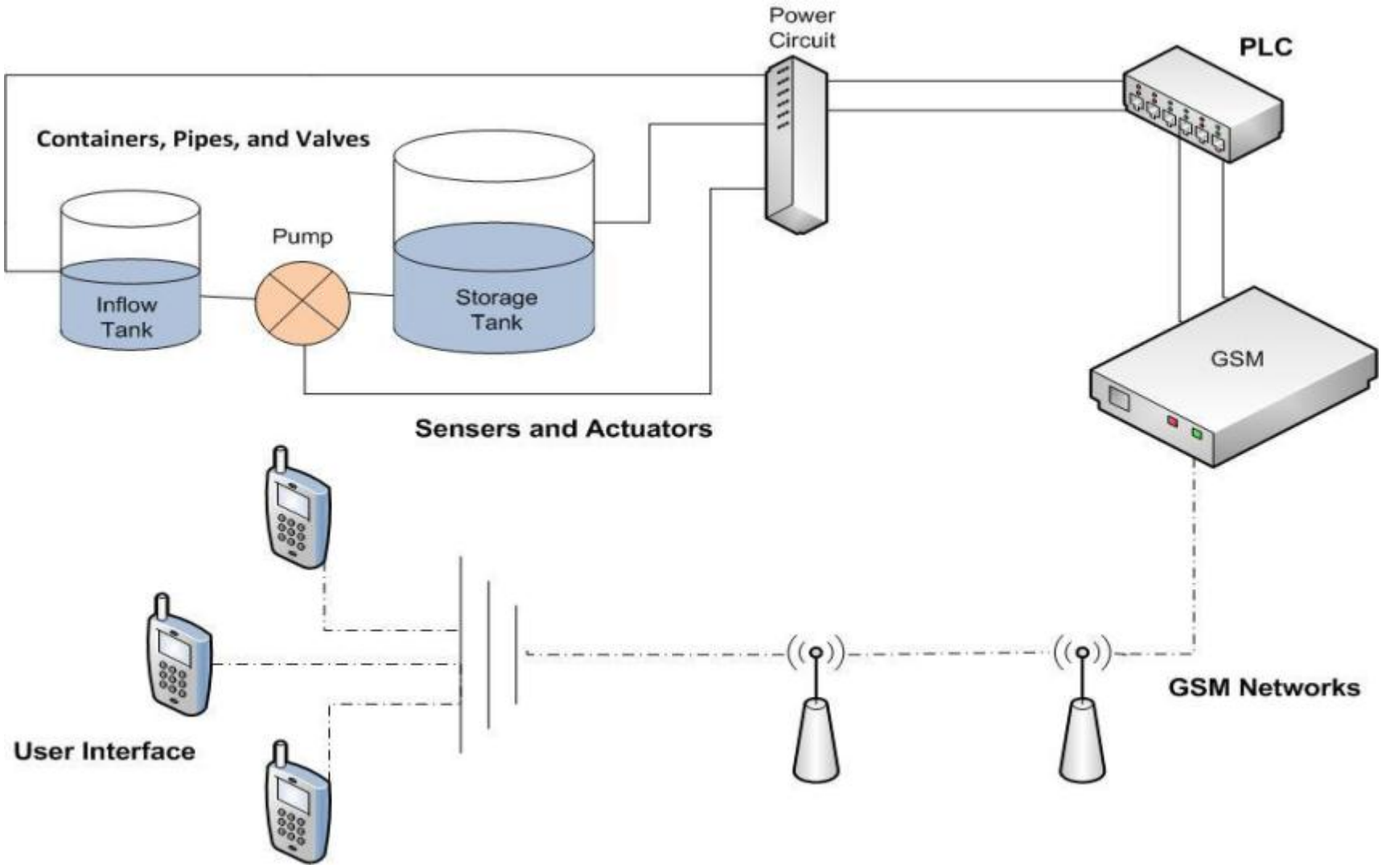
Need?

- Extremely helpful to employees of industries located in remote areas
- Great assistance to old and disabled people

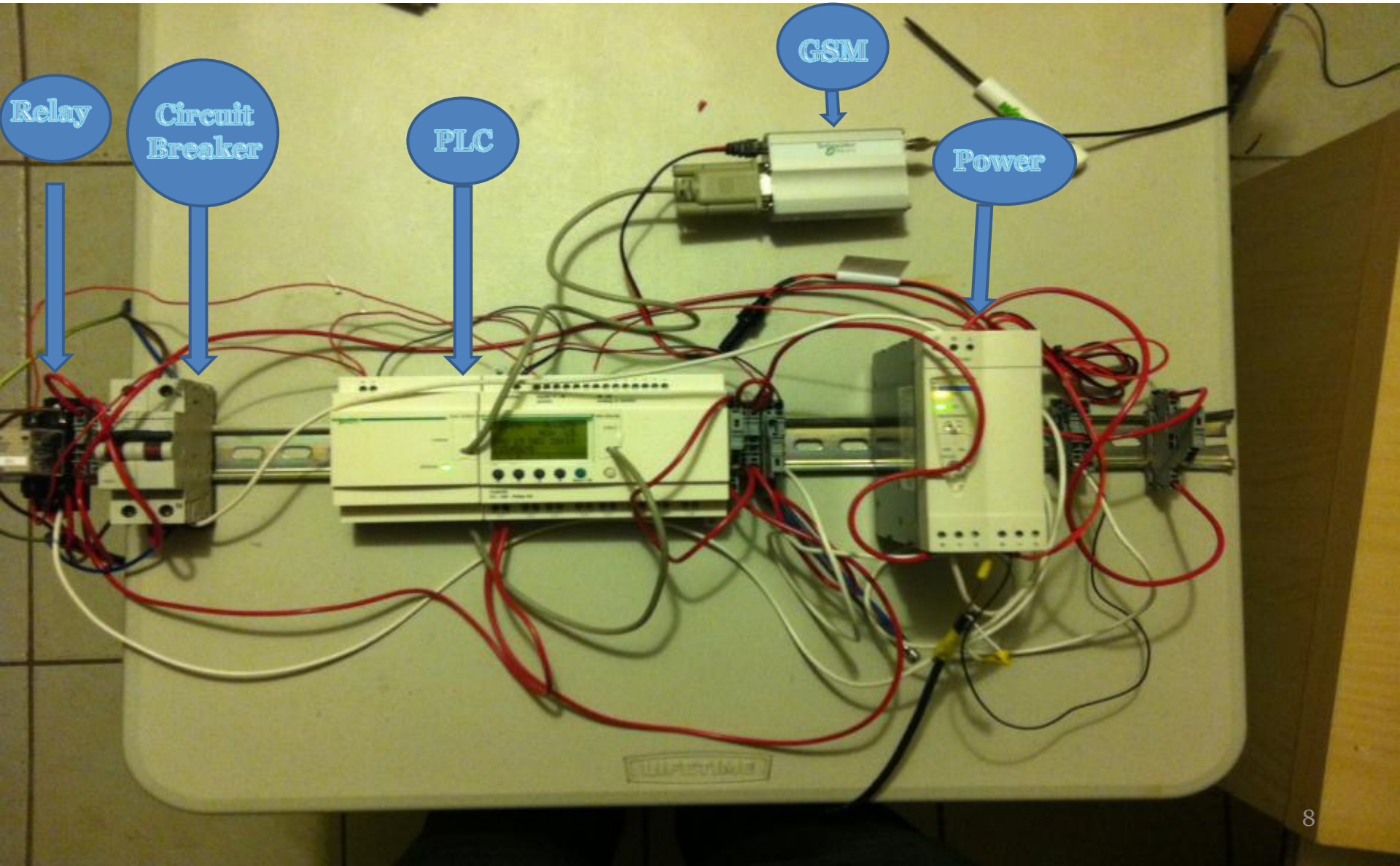
I can’t stand this bloody cold winter

It’s too hot here brother!!.
We need some technology.

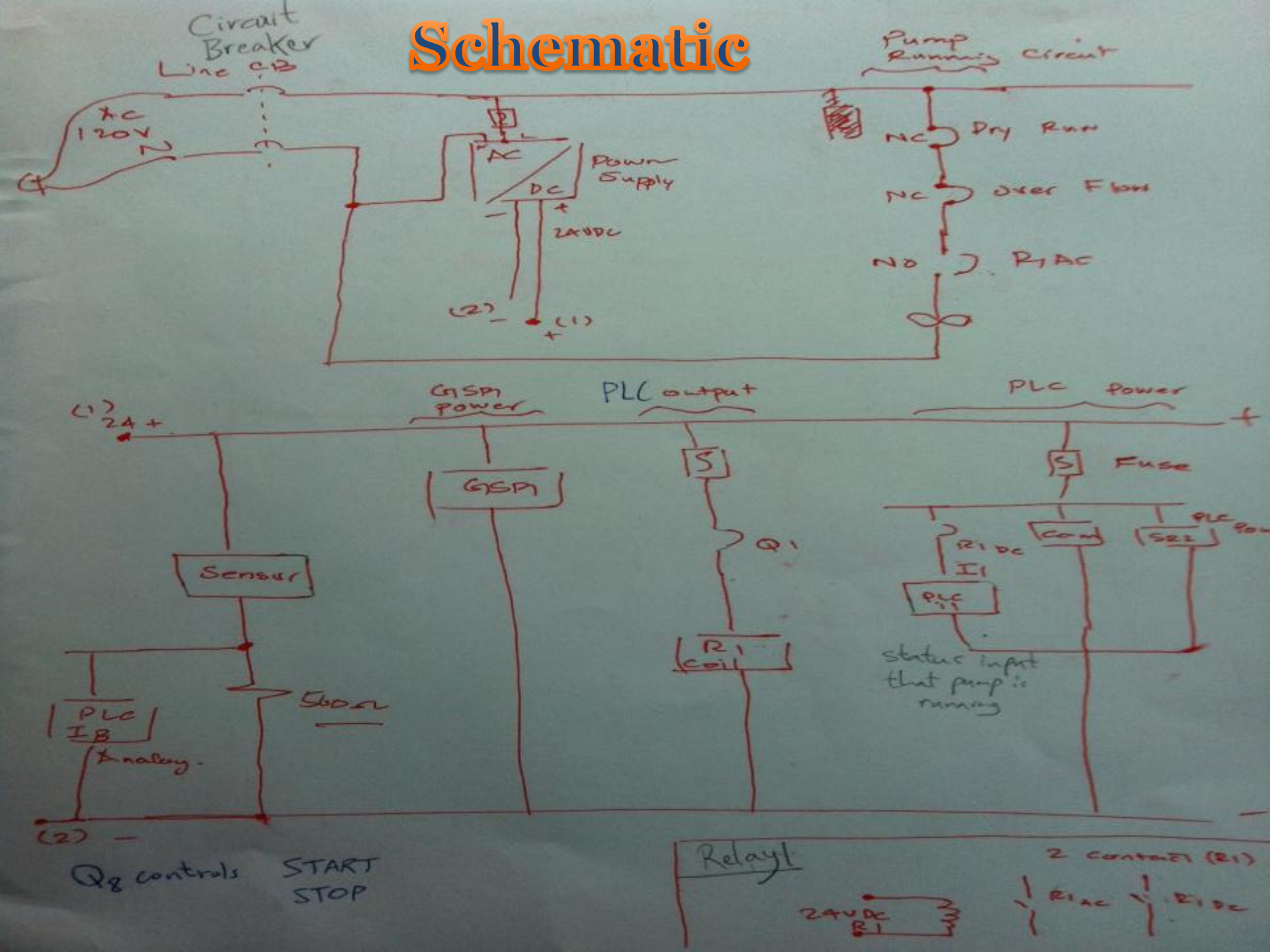
System Overview



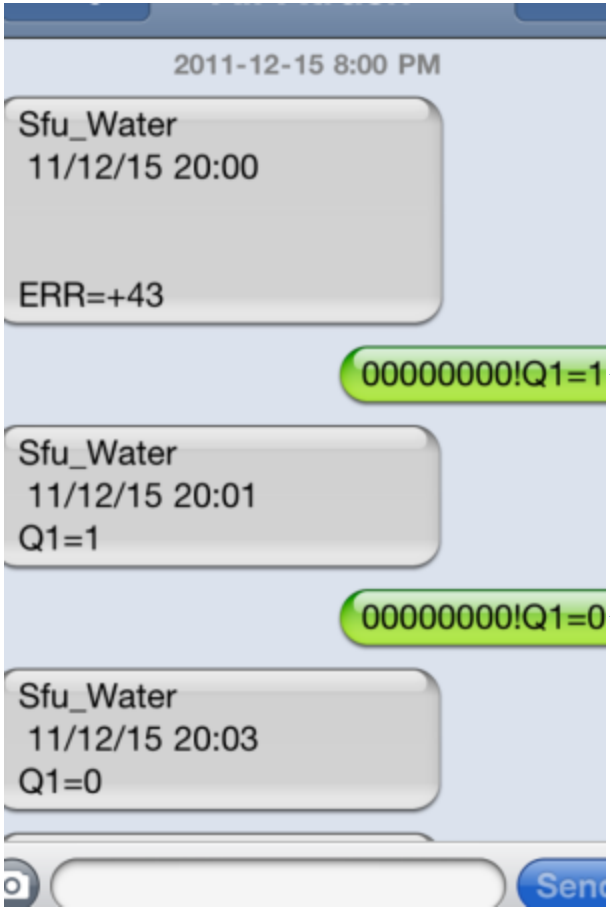
Power Component Design – New Design



Schematic


Circuit Breaker
Line CB
AC 120V N
AC
DC
Power Supply
24VDC
(2) −
(1) +
Pump Running Circuit
NC Dry Run
NC over Flow
NO R1 AC
(1) 24 +
GFCI Power
PLC output
PLC Power
Sensor
GFCI
Q1
R1 Coil
Fuse
R1 DC
I1
PLC I1
status input that pump is running
PLC I8
Analog
Sensor
(2) −
Q8 controls START STOP
Relay1
24VDC R1
2 contacts (R1)
R1 AC
R1 DC

GSM – Communication with the tanks

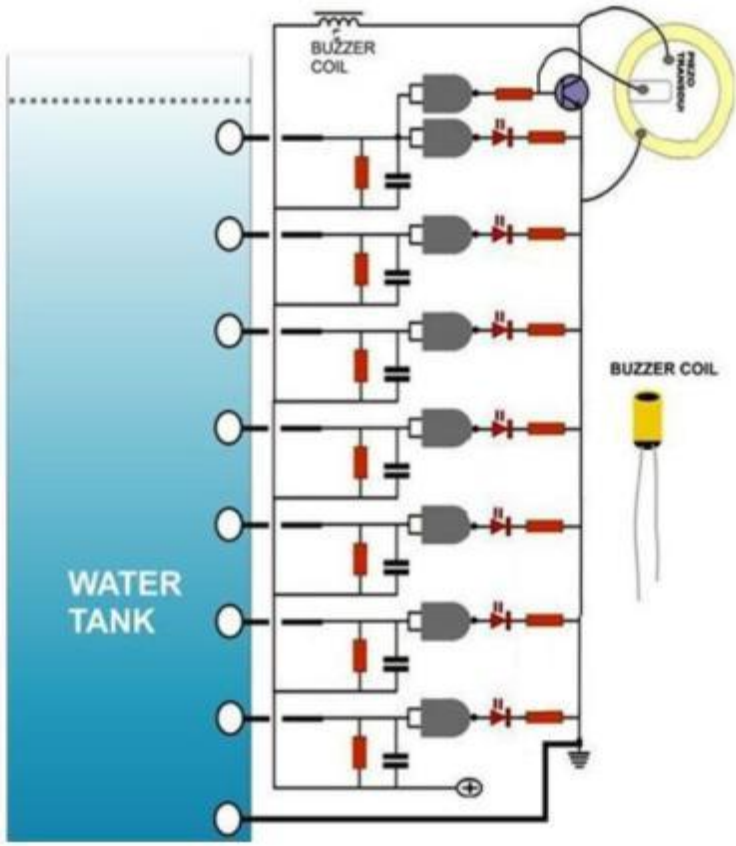


PUMP ON

PUMP OFF

Sensor : First Idea

- Level Measurement Sensor
- Discrete Output
- Why not use it?



Sensor: Second Idea

500 psi range, ProSense pressure transmitter, 4-20mA output

Sensor Cont'd: Technical Difficulties.

- Sensor output : 4 – 20 mA
- Linear voltage output from resistor
- Resistance limit
- Small voltage output range
- Different output range for each measurement

Power Component Design

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Pumps- Used two pumps

- 110V/60Hz AC UL/CSA approved submersible water pump for large fountains, waterfalls, ponds or water features. Grounded for use indoors or outside

- watts: 70
- max flow rate: 792 gal/hour (3000 litres/hour)
- max height: 11.5 feet (3.5 metres)

flow control: yes outlet connection: 1/2", 3/4" or 1" tubing

Power Component Design cont'd

Float switches

- To prevent mechanical wear down of the rotor of motor.
- To keep the level in check for the tanks.
- Prevent overflow of the liquid tanks.

Working of float switch

- A float is equipped with powerful, permanent magnets.
- As the float rises or lowers with liquid level, it actuates a magnetic reed switch mounted within the stem.
- The permanent magnet can be reversed to change the circuit.

Power Component Design cont'd

Circuit breaker

- A circuit breaker is an automatically operated electrical switch designed to protect an electrical circuit from damage caused by overload or short circuit. Detects a fault condition and, by interrupting continuity, to immediately discontinue electrical flow

Contactor

- For safe running of motor sand to prevent any short circuit in our power circuit

- A contactor is controlled by a circuit which has a much lower power level than the switched circuit

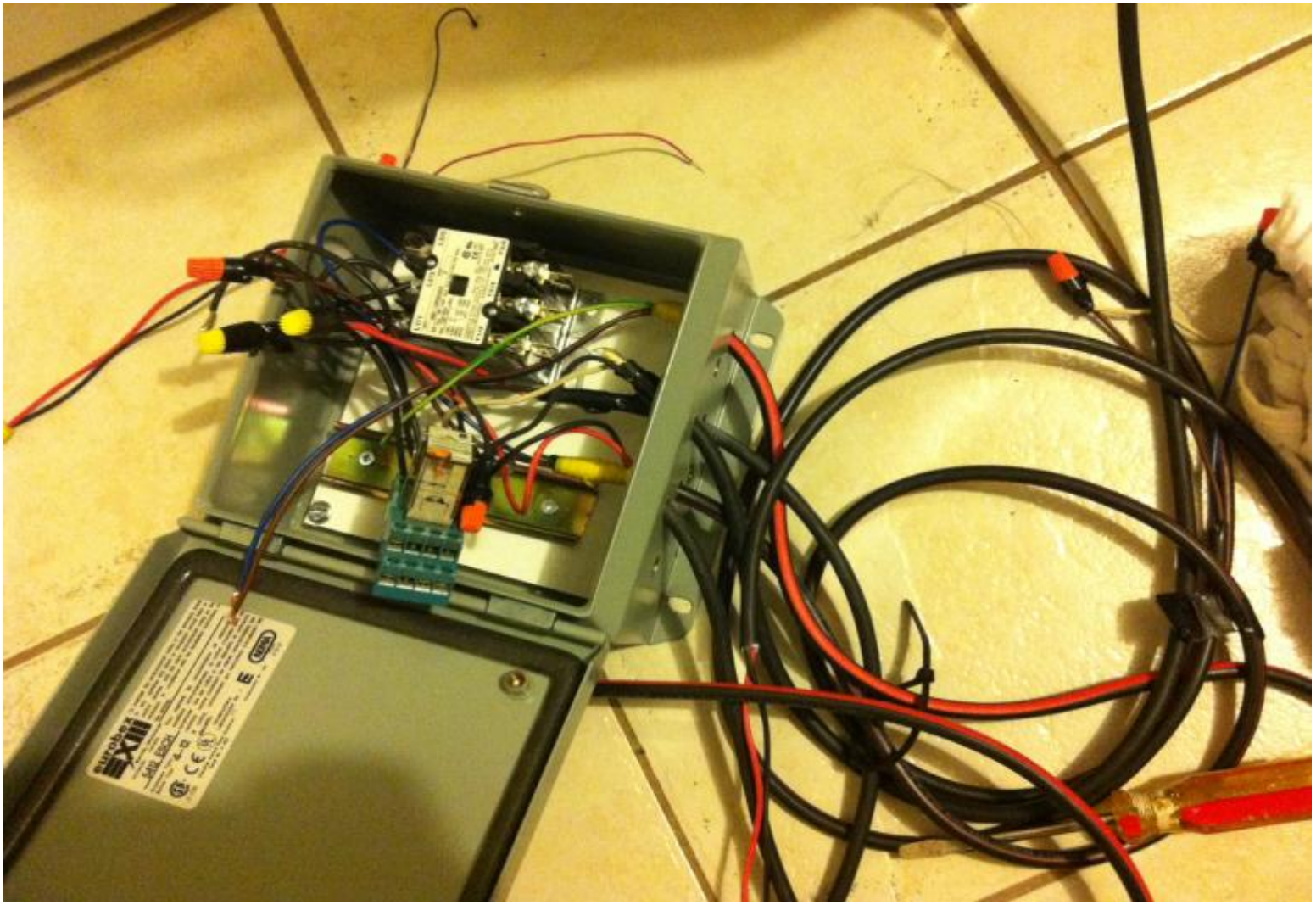
Initial Design

- Two submersible pumps attached to the tanks
- Float switches in series with the pumps via contactor

Issues with old design

- Compatibility
- Fail safe issue
- Redundancy
- Complexity

Power Component Design cont'd and failures



Development Costs

GSM modem development board	x1	$700
Ethernet adapter board	x1	$50 - 100 each
Pressure Sensor	x1	$200
Float switches	x2	$30 each
Software	x1	$100
Relays and Contact Switches	x2	$10 -15 each
Water Pumps	x2	$15 -30 each
Liquid Tanks	x2	$20 each
Pipes, Hoses and Valves	x6	$20 Total
GSM SIM card with SMS Service	x1	$60 -80
TOTAL		**$1120**

Financial and Social Gain

- Financial Gain

- Social Benefit

Future Improvements and aspirations

ENVIRONMENT

- Automation and remote control of ground de-pollution. Monitoring of groundwater and soil cleanup system. Monitoring of river water levels. Mobile Station for the control of water storm overflows. Remote surveillance of avalanches. Atmosphere status monitoring. A system for the remote analysis of groundwater.

IRRIGATION SYSTEM

- Via SMS Irrigation Control. With the SMS text message it can also now deliver alarm information on pump conditions, reservoir levels, pipe leaks or flows. With the SMS text instruction can stopped, starting or running of irrigation process. Monitoring weather conditions and soil moisture affecting the irrigation schedules and pump controls. Remote control and telemetry water pumps. Remote control and telemetry water tanks. Remote control and monitoring of food control and irrigation soil moisture monitoring systems.

Future Improvements and aspirations

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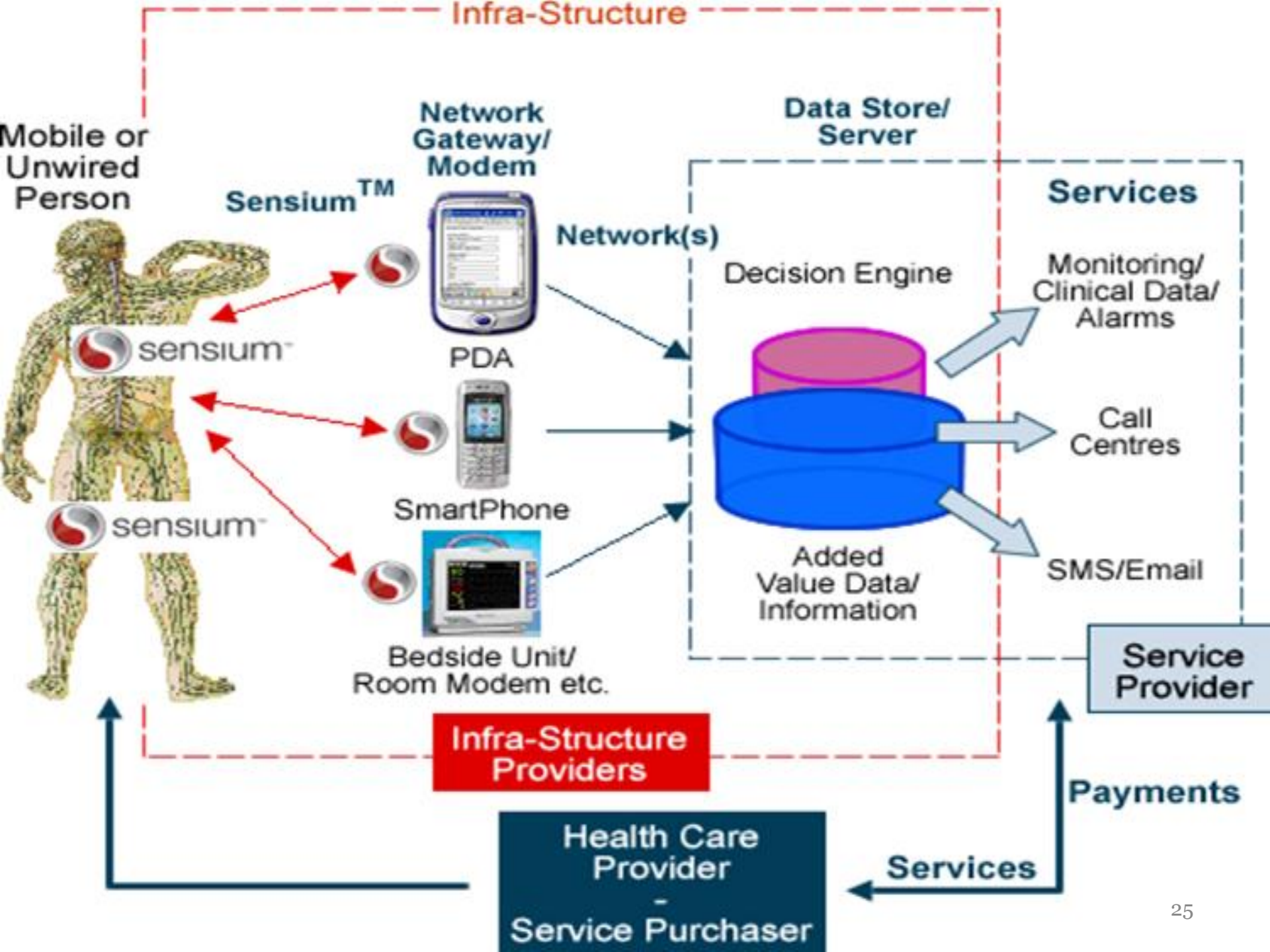
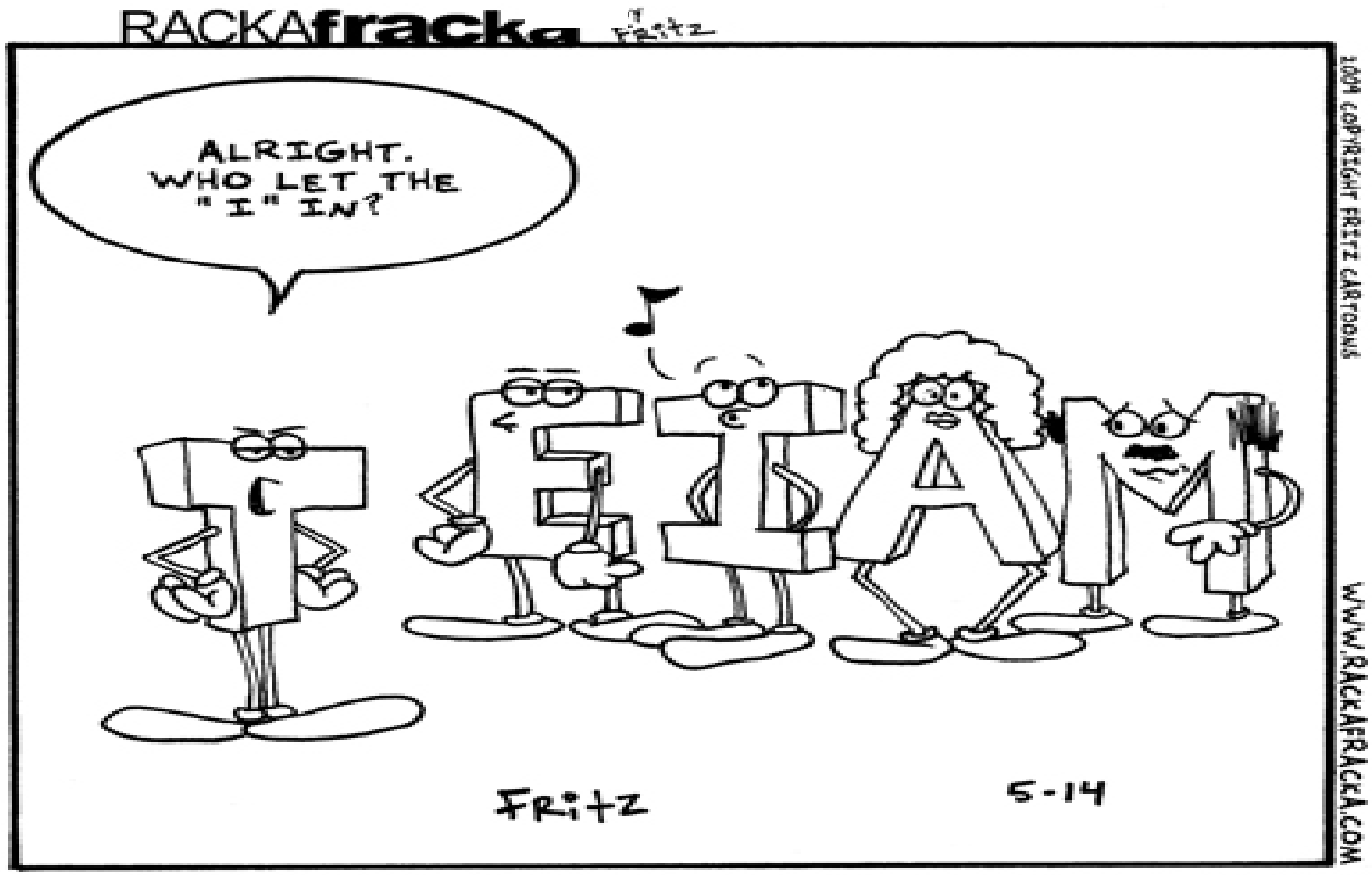
- Improve medical science are remote monitoring of patient, biometric data of wireless network, and dispensers applications

- Monitoring levels of glucose wirelessly , pressure, checking blood flow rate, dissolve of oxygen, hovering residue, checking of acidity for various purpose and surety or presence of living organisms etc.


Infra-Structure
Mobile or Unwired Person
Network Gateway/ Modem
Sensium™
Network(s)
Data Store/ Server
Services
Decision Engine
Monitoring/ Clinical Data/ Alarms
sensium
PDA
Call Centres
SmartPhone
sensium
Added Value Data/ Information
SMS/Email
Bedside Unit/ Room Modem etc.
Service Provider
Infra-Structure Providers
Payments
Health Care Provider - Service Purchaser
Services

Conclusion

What we learnt as a team ?



Team Work

PROFESSIONALISM

SHARING IDEAS

TIME MANAGEMENT

TECHNICAL WRITING SKILLS

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As individuals ?

Let's get creative.

Acknowledgments

- We would like to offer our sincere thanks to Professor Marcin . M, Dr. Andrew for technical guidance.

Time for

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