

Smart Control Template Server

EU Celtic Pluss proposal:
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Touching

- Smart Controller in Health and Caretake
(as the video have already shown you)
- Smart Controls in Gyms
- Smart Controls in Greenhouses
- Gains using smart server and off-the-shelf bus technology
- Gains using free and open source
- Most important open standards

About Knut Yrvin

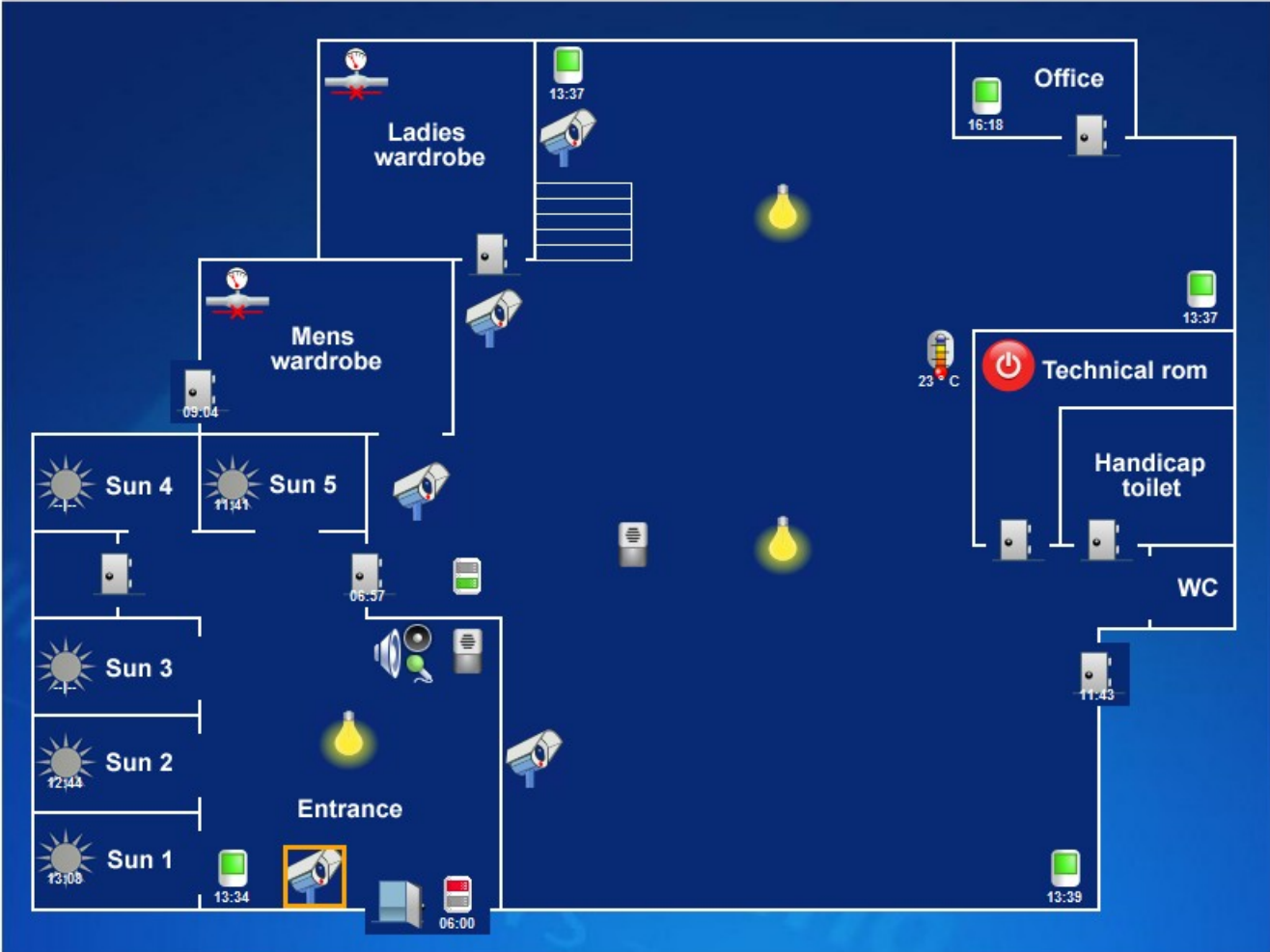
- Telenor in 1986 – technical assistant
- Engineer in electronics – 1992
- Telenor – planning engineer – 1993
- Master in system development – 2000
- Consultant for three years. Norwegian Central Securities Depository, different banks and other industries
- Co-founded the award winning free software distribution Skolelinux and Debian Edu in 2001
- The Qt Development Framework at Trolltech, Nokia and later Digia – 2006-2013
- Skolelinux + ITI - 2013 - present

Smart Control Server

Navigation menu with icons and labels:

- << Control 1 Control 2 Settings Cam 1 Cam 2 Cam 3 >>

gymtech™ logo and Logout button



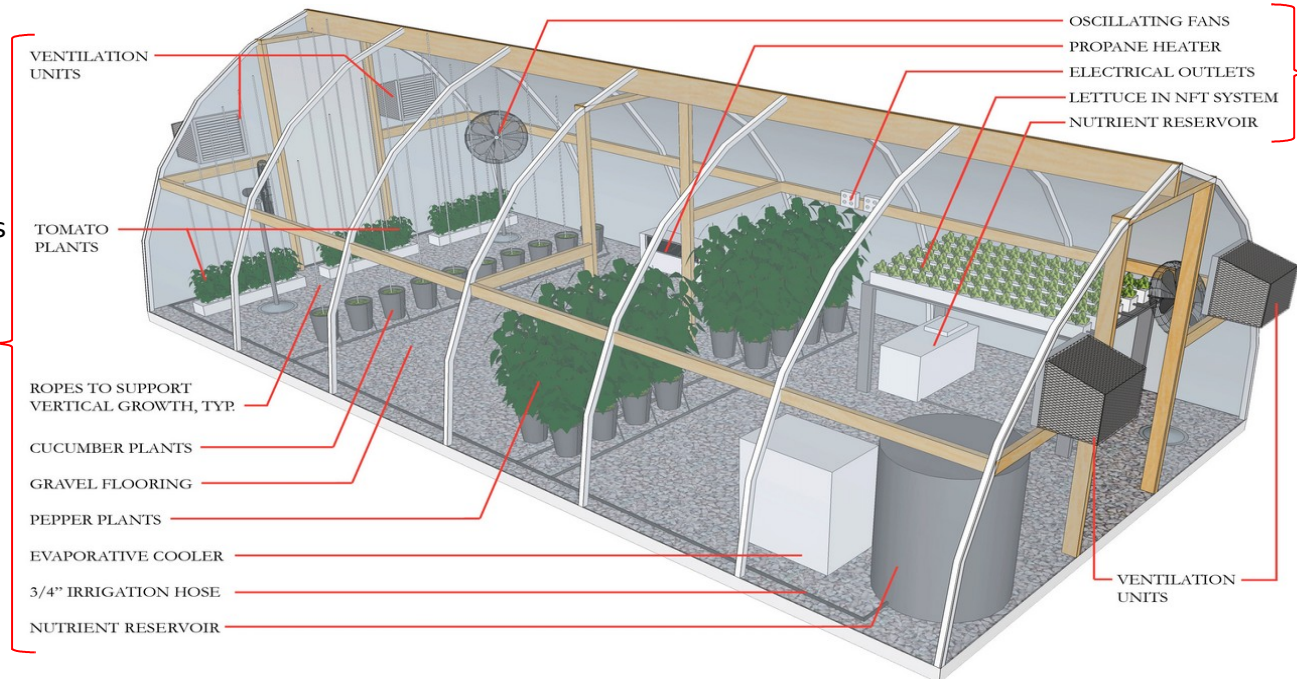
Smart Hydroponic Greenhouse

Source: Urban Garden Magazine (Educational purposes)

SMART CABINET (Nodes+Server)



I/O Node-signals
from Smart
System



Smart server Environmental Control

Air:

Sensors	Actuators
Temperature	Heater
Humidity	Fan
CO2	CO2 generator
Atmosphere	

Light:

Sensors	Actuators
Light meter	Intensity
Spectrum	Photoperiod

Water:

Sensors	Actuators
Temperature	Mixer
pH-meter	
EC-meter	

Nutrient:

Sensors	Actuators
Temperature	Heater
Purity	Mixer
pH-meter	Composition
EC-meter	

Growth:

Sensors	Actuators
Air content	Fan
Moisture content	
Crop size	

Simple Dynamic Scenario Example

(Dynamic Forms/Template)

Photoperiod Template Scenario (Hours of light pr day)

Scenario inputs:

- Daytime temp: 24 °C
- Night-time temp: 14 °C
- Nutrient solution temp: 14 °C
- Air Humidity: 50 %RH



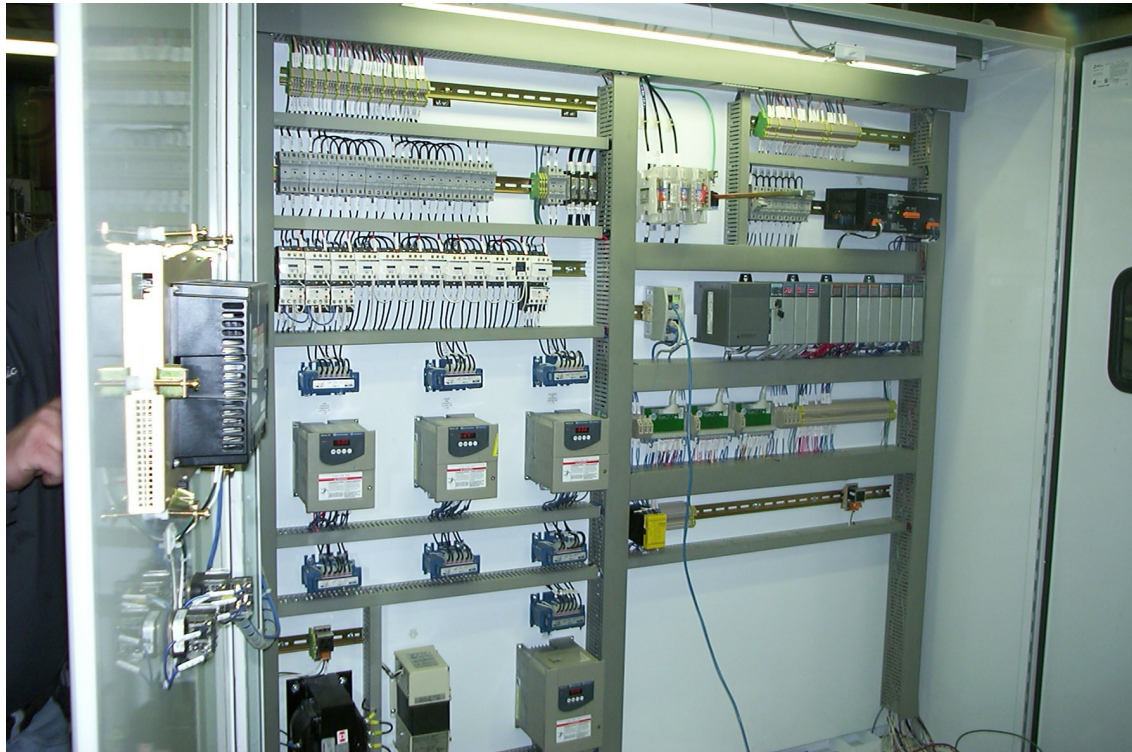
Real: (Outside)

9 °C	15 °C	23 °C	34 °C	8 °C
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Controlled:
(Greenhouse)

24 °C	24 °C	24 °C	24 °C	14 °C
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Programmable Logical Controls are replaced by Smart Control Server



Complex programming of each sub system -> Simplified Template Control Server

Smart control server overview

Resource Management Portal (1)

Cross Platform Clients (2) for control and monitoring

(OS independent Client User Interface – Web or Rich GUI)



Management Portal:

- (Services technology and thin client GUI)
- UDDI (XML Device and Scenario Catalogs)
- WSDL (Peer = XML Device/Scenario models)
- SOAP /XMMP (XML message protocols)

Centralised Logistic Server (Quality on logistics)

SOA* server running on Debian GNU/Linux
(UDDI, WSDL / TEMPLATE-models of eDevices and Scenarios)



Smart Control process server (3)

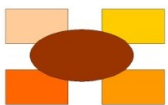


Smart nodes (4)



Smart nodes (4) in a bus** network

**other proprietary bus technologies can supported
(CAN bus = controller area network automotive bus)



Open Industry standards

© Copyright OASIS, 2013 SOA = Service Oriented Architecture

Free and Open Source Software (FOSS)

- Based on Debian Edu / Skolelinux
- The technology already got + 50 million users world wide through Debian and Ubuntu
- 10 people or less are running 70.000 computers at 200 schools in state of Extremadura in Spain
- Rock solid stability
- Market leading surveillance and upkeep (no-one does it more affordable)
- Whole municipalities, cities and national wide deployments

Gains on smart process server

- Installation: Disruptive effect using of affordable off-the-shelf bus-technology and computers – replacing PLC
- Running operation: Disruptive effect of using optimal multivariable control in software instead of PLC
- Increased growth with 10-15 percent according to research
- Reduced labor intensity: Due to simplified user-action with the systems because the complexity is “hidden” in smart templates. PLC is way more complex to program and maintain.
- Disruptive: Reuse of open standards and free and open source software will reduce R&D cost with 70-80 percent.
- Unique R&D knowledge in automation technology in Norway, including NTNU, BI and contacts to world leading research community in Romania and some other countries.

Why using standards?

- National Information Exchange Model (NIEM)

NIEM represents a collaborative partnership of agencies and organizations across all levels of government (federal, state, tribal, and local) and with private industry. The purpose of this partnership is to effectively and efficiently share critical information at key decision points throughout the whole of the justice, public safety, emergency and disaster management, intelligence, and homeland security enterprise.

NIEM Simplified (video):

<http://www.youtube.com/watch?v=BA1jY8LJ8tM>

Presentation of the cross platform smart control standards in government care-take for retired persons, changed Norwegian government policies, requiring care-take technology in municipalities by 2020



Minister of reform Rigmor Aasrud with Knut Yrvin at Nokia 09.04.2010. Photo: Kvandal, FAD

Use cases for the Internet of things, smart template server

- Caretake and health care
- Gyms and smart houses
- Greenhouses
- Alarm systems
- etc.

R&D on the smart template server
itself and some of the applications

What kind of partners do we look for?

- Companies which gains from using advance distributed control systems
 - Retirement homes and similar care taker providers
 - Industrial kitchen
 - Alarm companies
 - Internet and power
 - Energy companies
 - etc.

Partners today's

- **Gründergarage at Simula Research Center**
- **Buskerud University College**
- **Drammen Municipality – co-owned by Arena Helseinnovasjon**
- **Norwegian Computing Center**
- **Norwegian Business School (BI)**
- **Norwegian University of Science and Technology (NTNU)**
- **Petru Maiors University Romania**
- **EPR Forum / OASIS / CENELEC-Standardization**
- **Skolelinux Drift**
- **IT & Integration (ITI)**
- **Vitheia**
- **Bare Trening helsestudioer**
- **Fine Forest Food**
- **Aidon**
- **CollBizz**
- **Eaton**

Thank you!

Q & A?

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23-24. april - networking