Symphony: a digital home integrated platform

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Nextworks S.r.l.

- Established in 2002 in Pisa, Italy
- Main strengths
  - Know-how in a well focused set of ICT architectures and technologies
  - Skills in planning and executing projects, and in engineering integrated systems
  - Own R&D + co-funded projects (Regional, National, EC)
  - In the control & automation field: SOFIA EC Artemis project and DAGON regional project
- Divisions
  - Network Control & Management (research, consulting, 3rd-party developments)
  - Control & Automation Systems (products)
- Technology domains
  - control and automation
  - digital video coding & transport, VoIP
  - embedded systems
  - transport and access networks
Everything comes from R&D and became Best®

BENETTI’S EXCLUSIVE SEA TECHNOLOGY

Benetti’s Exclusive Sea Technology – BEST – is the new exclusive technological platform created by Benetti, that integrates all the on-board electrical systems.

In BEST all subsystems, although different in function and technology, can communicate with each other using a common language: television “talks” with lights and cameras “talk” with phones. This is possible because every function has an open interface that enables communication with the rest of the system.

BEST is made up of a single network infrastructure and middleware software that correlate all devices and different components through the exchange of signals and events. BEST is based on stable technological foundations constituted by a pervasive network of connections that reaches all the on-board systems.

The physical network act like the yacht’s nervous system because it conveys all the information to different devices through signals exchange.
Everything comes from R&D and became Best®
A core platform for digital home services

• A comprehensive solution
  • A service-oriented **middleware** integrating many subsystems into a unified and IP-based platform
  • Including tech **gateways** (e.g. communications, domotics) and **terminals** (video, VoIP, controllers)
  • Subsystems:
    • **Home Automation/Domotics** – lighting control, HVAC, RFID-based presence services, environment sensors, remote calls and scene management
    • **Security, Safety and Surveillance** – safety for people and things, indoor and outdoor video control and recording
    • **Communications** – voice, data and video communications based on different technologies (Wi-Fi, DECT, Dual Mode GSM/Wi-Fi) and integrated with entertainment, surveillance and other subsystems
    • **Entertainment** – pervasive distribution of movies, music, information and digital & visual art throughout the home

• A stable platform, with a naval application of the technology
  • Currently 20+ installations on mega-yachts (60mt) and mid-size yachts since 2006
  • [www.hellosymphony.it](http://www.hellosymphony.it)
Integrated home automation
Integration as a key enabler for EE

Unified Software Platform

- Power
- HVAC
- Automation
- Sensors

- Light
- Home Automation
- Home Entertainment
- Active Security Monitoring
- Audio/Video/Data Communication

Energy efficiency engines & tools
## Integration: advantages

<table>
<thead>
<tr>
<th></th>
<th>Integrated Systems</th>
<th>Stand alone Systems</th>
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<tbody>
<tr>
<td><strong>Cabling</strong></td>
<td>Only one cabling for different systems</td>
<td>Each system has its own cabling</td>
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<tr>
<td><strong>Configuration and Maintenance</strong></td>
<td>Unified services configuration. You will not have to program each single device or scenario, but you will manage them all together in one single way</td>
<td>Each system has its own configuration and programming approach and its diagnostic procedures</td>
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<tr>
<td><strong>User Interface</strong></td>
<td>You can access the system through many different devices with a single use and control approach</td>
<td>Need to manage several heterogeneous subsystems with different interfaces and control logics</td>
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<td><strong>Upgrade and system update</strong></td>
<td>Remote upgrade is cost effective, system ready to integrate flexibly current and future digital devices</td>
<td>The addition of new services may require high installation costs</td>
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<tr>
<td><strong>Energy saving</strong></td>
<td>[Co] Generation and loads control in order to get the best solution in terms of energy budget</td>
<td>Lack of integration in the technology present on the market, such as KNX, ModBus, LON, Vantage, Zumtobel...</td>
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### Middleware: unified software platform

#### Events
- Remote’s button
- Touch panel button
- Physical button
- DTMF on the phone
- Motion detection on camera
- Security Alarm
- Threshold for water/smoke/temp/hum/… sensors
- GPS Position
- RFID/Badge people recognition
- …

#### Actions
- A/V Client notification (popup)
- A/V Client function activation (ex. broadcast audio/video)
- Domotic scene activation
- Phone Call
- SMS/MMS
- Touch panel alarm
- Buzzer activation
- Camera positioning
- …
A snapshot insight of energy management in Symphony

- Zone fancoils
- Control actuators
- Thermostats (time-based)

Energy sources

Gateways for the integration of energy source controllers

AC plant (KNX based)
- Zone fancoils
- Control actuators
- Thermostats (time-based)

Symphony net
Luxmate bus
KNX bus

For lighting control
EE in Symphony; now...

- Wide range of domotics technologies supported
  - KNX, LON, VANTAGE, LUTRON, MODBUS, CONDARIA, YACHTICA..
- Applying principles of CEN/UNI EN 15232 ("Energy performance of buildings – Impact of Building Automation, Controls and Building Management")
- Control of energy co-generation systems
- Time-based charge management of electrical loads
- Zone-based temperature tuning
- Indoor climate adaptation to external conditions
- Automated controls of curtains/blinds, coordinated with climate control
- Management of artificial lighting based on natural lighting and presence control
...and in the future

- Easy integration/evolution of energy management functions
- Dynamic adaptation of the building to the “context” in terms of
  - User profiles
    - Preferences (static info)
    - Adaptation to users’ behaviours (dynamic info)
    - Detection and re-adaptation in case of deviations from the basic profile
    - Human-Device Interface (HID) issues for the usage of this functions
  - Environmental conditions
    - Automatic planning of activities based on outdoor conditions (current and future)
    - Advanced algorithms for the comprehensive coordination of building global resources to optimize its energy budget
- Integration of new devices and services
  - New mechanisms and interoperability platforms
  - Context-awareness mechanisms
  - Automated service-discovery
  - Distributed and highly fine-grained control (up to each single device – light, actuator, sensor, etc.)
Case study: a green country guesthouse in the green in Tuscany

- The user interface is intuitive, in order for new guests to use the system effectively with a quick learning curve
- Appliances and devices are discreet, in order to preserve aesthetics and interior design
- Avoid wall buttons and switches, hide devices in a dedicated technical space, use wireless controls.
- Integrated a specific lighting system, based on a proprietary technology
- Entertainment and communications services with accounting
- Complete control over comfort and automation on wireless touch panels
- Video surveillance and environment sensors for wine cellar, etc.
Symphony at work
Thank you! See you in our “symphonized” demo...

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Summary

- Who is Nextworks
- Symphony *Unified Software Platform* overview
- [maybe 1]: Best™, Benetti Exclusive Sea Technology
- [maybe 2]: a case study - country guesthouse in Tuscany
Centralized supervision and control system
Our innovation: the middleware

Graphics User Interface (and configuration)

HOME AUTOMATION
ENTERTAINMENT
VOICE COMM.
SURVEILLANCE
SENSORS AND HOME DEVICES
DATA COMMUNICATION

... 

MIDDLEWARE (Operation, Maintenance, Service)

NETWORK INFRASTRUCTURE
Symphony architectural diagram: building deployment
Symphony the evolution: smart city
BEST® – Benetti Exclusive Sea Technology
Case study: Benetti’s Exclusive Sea Technology [1/4]

• Issues to be addressed
  • Simplify *cabling* infrastructure (each service has its own cabling)
  • Avoid *configuration* and *maintenance* nightmares (each service has its own installer, procedures, diagnostics, ...)
  • Provide users with an *easy to use* and *consistent* interface (each service has its own graphics, icons, layout, ...)
  • Allow for *easy* system *modifications* and *upgrades* (the ship must be dismantled to add new services, e.g. surveillance)
  • Guarantee *scalable* reliability
  • Create a standard, yet allowing *highly customized* realizations
  • Unify user interface look ‘n feel to reinforce brand
Case study: *Benetti’s Exclusive Sea Technology [2/4]*

- Nextworks proposal
  - Migrate every service to an *IP based infrastructure*, and deploy cat. 5e cabling
  - Develop a *custom middleware* to provide protocol translation for services
  - Adopt *industry standards* whenever possible, avoiding proprietary solutions
  - Software based approach
  - Keep an open-ended approach, to accommodate any possible service and device
  - Deploy a *scalable, open* and *future-proof* system
The final solution: BEST – a Benetti exclusive product for luxury yachting

- Infrastructure: redundancy
- User devices: A/V clients, remotes, touch panels
- Server room: from one simple server to 20 rack units
- User services
  - Entertainment
  - Comfort and Automation
  - Communications and networking
  - Navigation and monitoring
- Remote diagnostic and assistance

**Service benefits for the yacht owner**
- Complete range of services
- Personalized solutions
- Remote assistance and upgrades
- Optimized infrastructure

**Service benefits for the shipyard**
- 40% less cabling, saving materials and weight
- 50% reduction for on board assistance
- New revenue streams from customizations and services
- Seamless system modifications
- Cutting edge technology
There are currently ca. 20 BEST installations on 50-65 mt long yachts. Typical systems are composed of:

- 10-15 high definition A/V stations
- More than 50 devices, including wireless touch panels, VoIP phones, video cameras, etc.
- Over 150 automation control points managed by the system
- Over 400 sqm surface (across 5 bridges) covered by WiFi
Case study: a green country guesthouse in the green in Tuscany

Requirements for the integrated building automation system

- **Entertainment and communications services with accounting**
  Symphony provided Video on Demand service and Communications server for phone and Internet access.

- **Complete control over comfort and automation on wireless touch panels**
  Philips Pronto remotes have been selected to match the customer’s tastes.

- **Video surveillance and environment sensors for wine cellar, etc.**
  Symphony’s surveillance and monitoring modules are adopted.
Integrating lighting controls

**Symphony network for:**
- Automation control (lighting and HVAC)
- Home Entertainment control
- Audio/Video distribution
- Data and voice communications
- Events and alarms notifications
- Video surveillance and anti-intrusion

**LUXMATE bus for lighting control**

- Symphony net
- LUXMATE bus
Wall plates are directly connected to the LUXMATE bus.

Touch panels are connected to the Symphony network.

Surveillance is connected to the Symphony network.
Evoluzione del sistema

Impianto fotovoltaico (sistema proprietario)

Estensione rete Symphony per integrazione centralina di controllo impianto fotovoltaico

Impianto di condizionamento su BUS KONNEX:
- Fancoil di zona
- Attuatori di controllo (solo nel locale tecnico)
- Cronotermostato di zona
Evoluzione del sistema

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Estensione rete Symphony per integrazione centralina di controllo impianto fotovoltaico
Smart city: infotainment service

- Community announcements are visualized on TV screens and touch panels
- Users and administrators publish announcements through a simple web interface
- Interactive announcements can include confirm/reservation options and polls
- Online ordering is also supported
- A very effective way to spread the word about community services