

# Platform Based Design of Embedded Systems

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- ✧ **What is a “Platform”**
- ✧ **Advantages of Platform based design cycle**
- ✧ **Example of an Industry Project**

# What is a “Platform”

- ✧ A Platform is a **reusable** and **proven** hardware and/or software element.
  
- ✧ The Platform is adapted to the project requirements: custom specific form factor and features.
  
- ✧ **NetModule’s Platforms comprise**
  - 32-Bit Microcontrollers and CPUs
  - variety of IOs and Interfaces
  - several Operating System
  - Software Components

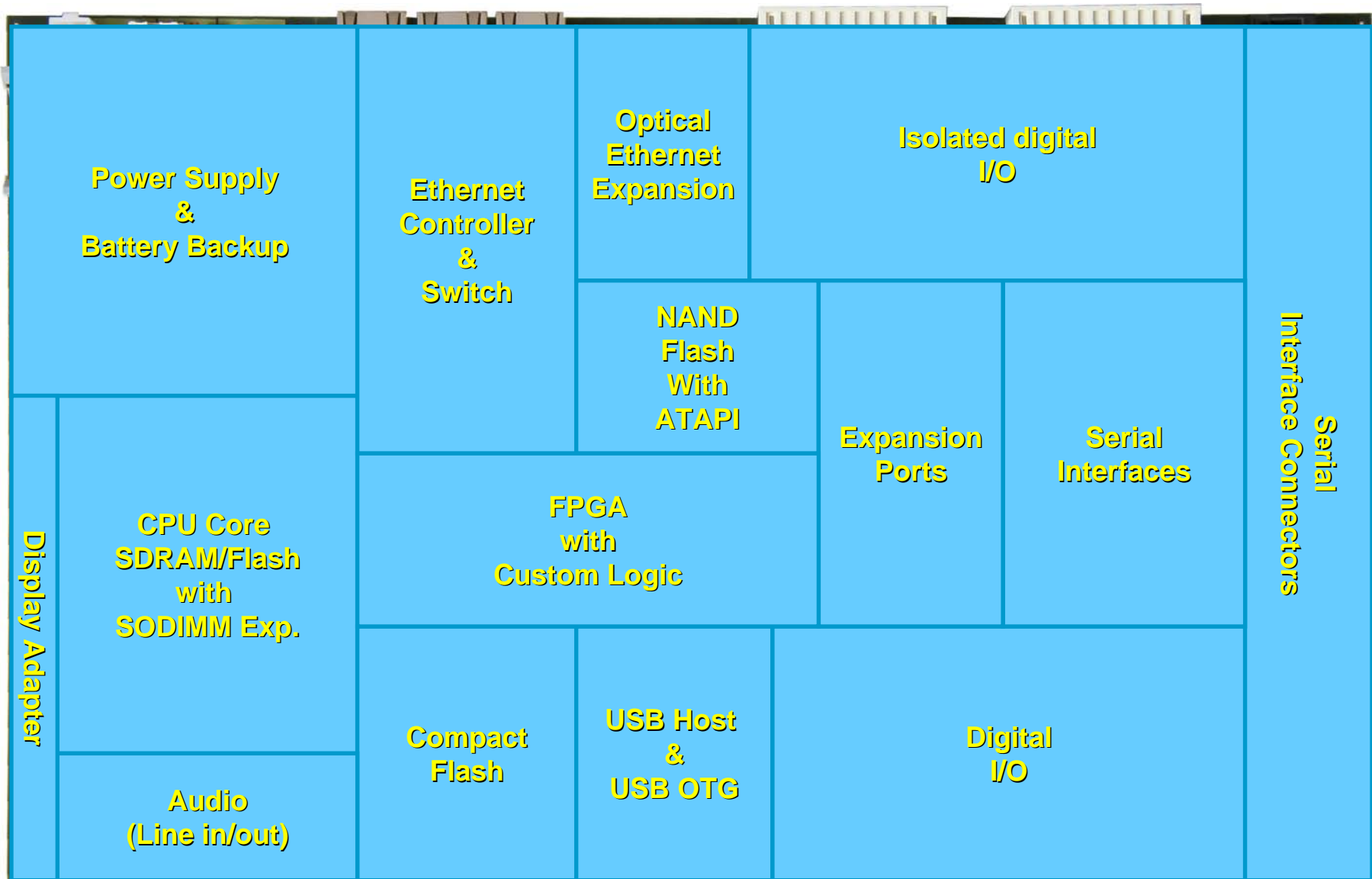
# Advantages of Platform based Design

- ✧ Starting point for a new development is a Platform.
- ✧ The Platform usually presents more than 50% of the target design (in terms of functionality and components).
- ✧ Through the use of a proven Platform as a design base,
  - the **design risks** are reduced,
  - the **quality** is improved
  - and the **time to market** is accelerated.
- ✧ As a consequence, the total cost are lower.

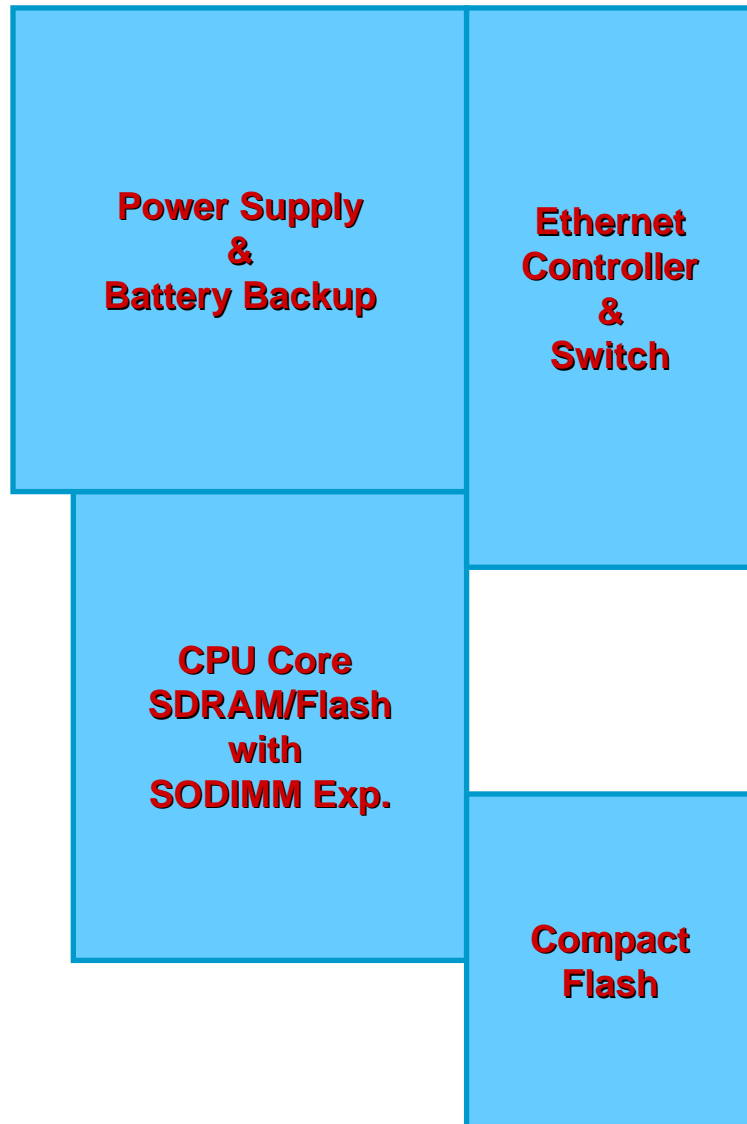
# Comparison to other Design Flows

|   | Strenghts  | Weaknesses  |
|---|--|---|
| <b>Design from scratch</b>                      | <ul style="list-style-type: none"> <li>✧ Maximum flexibility</li> <li>✧ Low manufacturing cost at high volumes</li> </ul>  | <ul style="list-style-type: none"> <li>▪ High engineering effort</li> <li>▪ High risk</li> <li>▪ High effort for OS and driver integration</li> </ul>   |
| <b>Platform based design</b>                    | <ul style="list-style-type: none"> <li>✧ Flexibility where required</li> <li>✧ Cost efficient</li> <li>✧ Reduced design risks</li> <li>✧ Improved quality</li> <li>✧ Reduced Time to market</li> </ul> |   |
| <b>Integration of embedded processor module</b> | <ul style="list-style-type: none"> <li>✧ No-risk solution for processor module</li> <li>✧ Reduced part inventory</li> </ul>  | <ul style="list-style-type: none"> <li>▪ Two-board solution (cost, reliability)</li> <li>▪ Engineering effort required for motherboard design</li> <li>▪ Restricted access to OS and driver software</li> </ul> |

# Platform Hardware Components



# Example Hardware



- ✧ The hardware is designed such that individual interfaces and components can be easily added or removed from a design.
- ✧ A hardware design typically consists of up to 90% of existing components. All these components are already qualified and are working in similar configurations in real products.

# Platform Software

**Major Platform Software Components are:**

- ✧ **Bootloader**
- ✧ **Operating System**
- ✧ **Drivers**
- ✧ **Middleware Components**



# Bootloader

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- ✧ **Small software that is present always (in NOR-Flash).**
- ✧ **Self-test of hardware on boot.**
- ✧ **Starts software that is stored on on-board flash or on compact flash card.**
- ✧ **Allows to upgrade software over USB, Ethernet or Serial Interfaces.**

# Platform Operating System

- ✧ VxWorks
- ✧ Embedded Linux
- ✧ Windows CE
- ✧ eCOS



**Use whichever is suited best for the application!**

- ✧ Development Environment
- ✧ Features
- ✧ Support
- ✧ Commercial Conditions

# Platform Drivers

**Drivers are critical!**

**→ They form the foundation of the system.**

**✧ Proven drivers are a big advantage:**

- Sometimes, faults in drivers are found long after they passed “testing”.
- Certifications for USB (Microsoft Certificate)

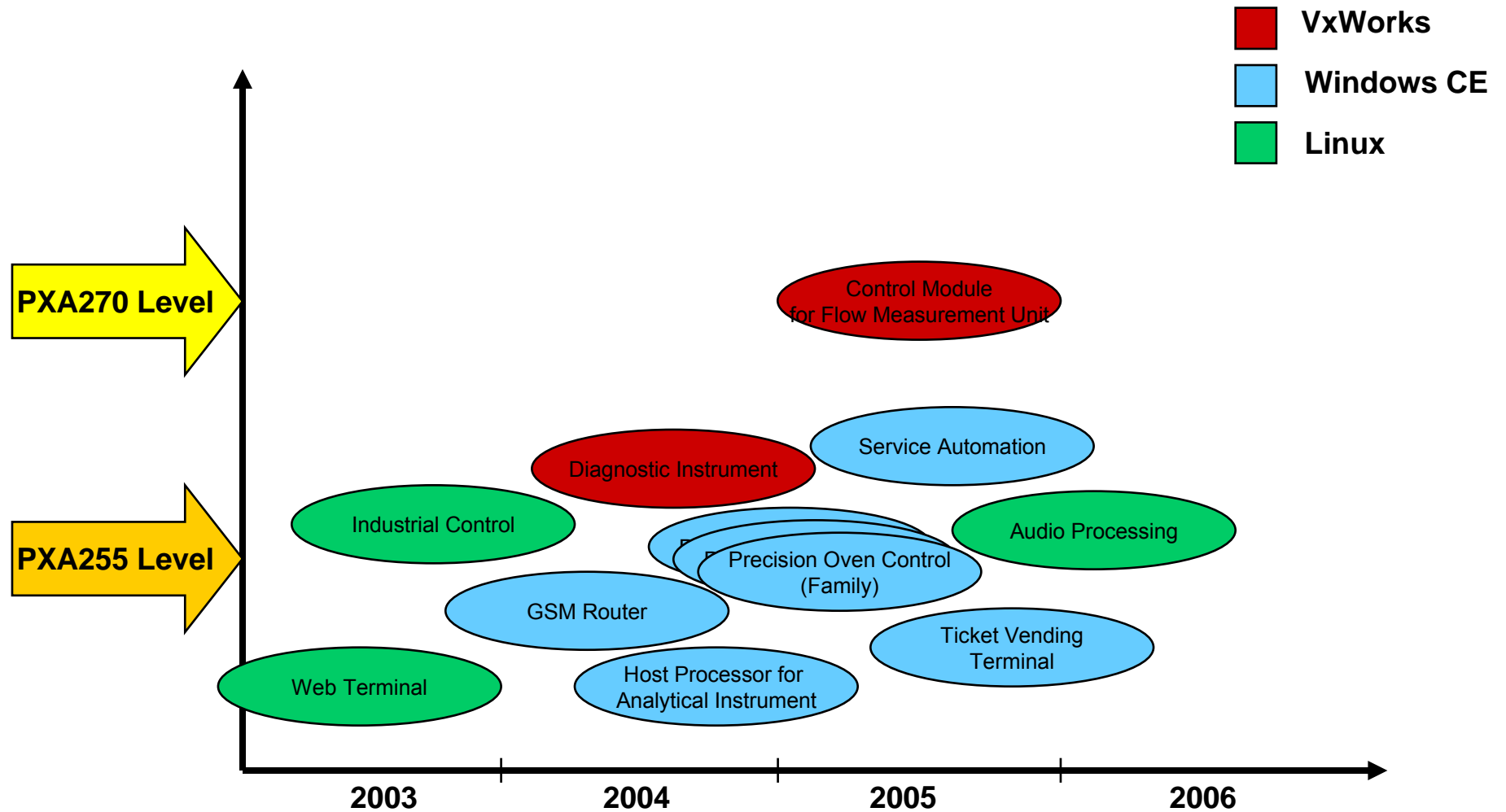
# Software Middleware Components

**There is a set of middleware components that is required in any system:**

- ✧ **System Supervision**
  - Tasks, memory, other resources
- ✧ **Watchdog**
- ✧ **System Log**
  - System Events, debug log, crash log
- ✧ **Remote Management**
  - Web Interface, Telnet, SNMP, ...
- ✧ ...

**Together with the functionality of the Operating System, they form a sound foundation for the application.**

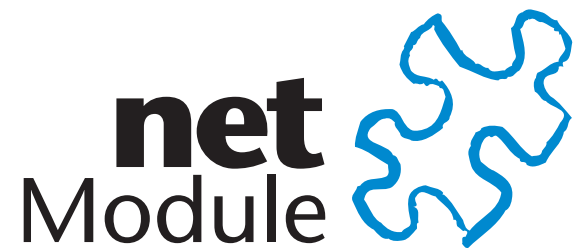
# Track Record: PXA Platform Designs





# Summary

- ✧ **A platform based design cycle offers advantages in terms of**
  - risks,
  - cost,
  - time to market,
  - and quality.
  
- ✧ **The combination of **hardware** and **software** components that seamlessly fit together is a precondition for a successful application of the platform design cycle.**



# Thank You

**Questions?**