

Application Development

Network integration of embedded products as well as new operation concepts have become important design parameters in the development of applications in an industrial environment.

The devices at field level are rarely stand-alone solutions, but are directed by a process-control computer, which itself can be integrated into a local or company-wide network as well as the related business processes. A kind of middle-ware is established between the field and business levels.

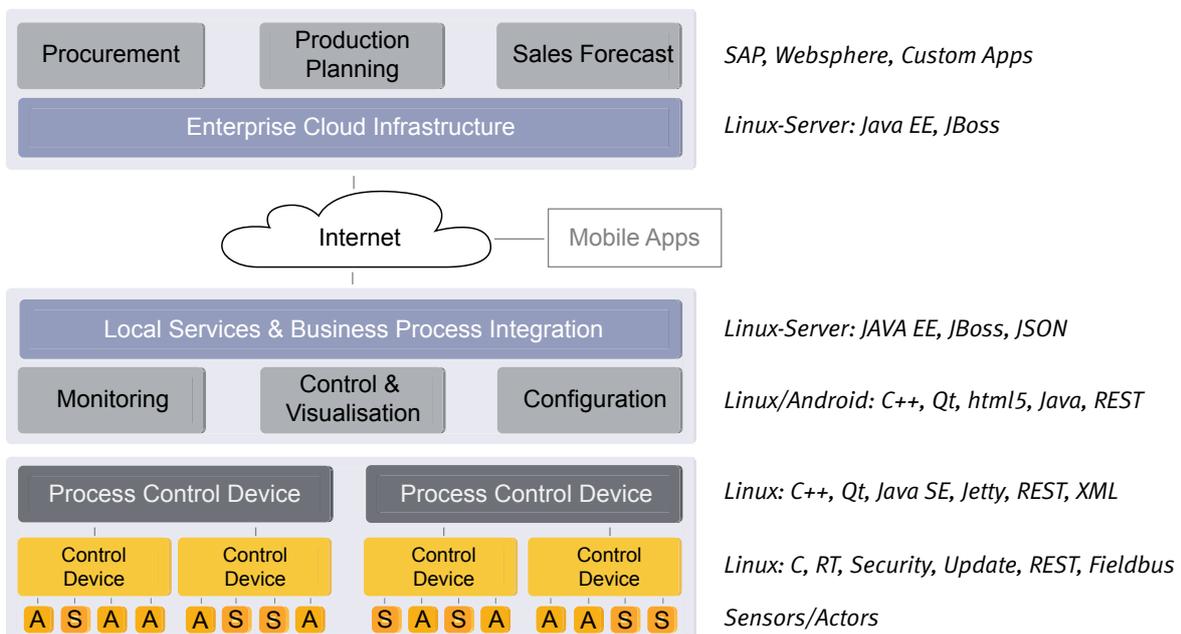
Generally, C/C++ is used, often as a Qt-based solution or Java. For the communication between the levels, among others, TRestful web services are utilized. Which components are used is largely dependent on the application and integration context. Equally of course, the performance capabilities of the hardware and the necessary performance of the processes play a role.

Whereas at the field level the processes are often real-time-critical, this is not necessary on the business level. If the two levels communicate with each other, this must be

Technologies and Frameworks

The context in which the application will be used is decisive for the selection of the programming language and further tooling. The technical requirements and the architectures of networked devices are of fundamental importance. For application development in embedded projects, emlix uses, among others, the following programming languages, frameworks and technologies:

- C/C++, Qt, Java, LUA, Python
- nano-X, GTK+, SDL
- JSON, XML
- jsonRPC, D-Bus
- html5, JavaScript, REST
- HTTP, FTP, SMTP, TCP/IP, UDP
- authentication, encryption
- certificates, signatures
- SSL, TLS



taken into account during the planning of the architecture. The same goes for the separation of open source and proprietary software.

Operation concepts in industry are changing, partly due to the high availability and the ease of use of mobile devices. The comfort expectations of the user are increasing. Operation takes place remotely via mobile devices.

In parallel with this, the technologies used have continued to develop. Qt offers web-based solutions as well as diverse Javascript/html5 frameworks. Another aspect is that backend and frontend solutions – the control computer and the user interface – do not necessarily need to use the same technology.

Android can be a useful alternative for industrial applications, as long as certain conditions are met.

Security for remote HMI

In the planning of such devices and multi-level architectures and operating concepts it is clear that security requirements must play a significantly greater role than with stand-alone concepts. emlix supports its customers in the planning of suitable system and software architecture, in the implementation and integration of the solution as well as with life cycle support and maintenance.



The control and operation unit for liquid-transporting tanker trucks must be easy to use and must also be able to cope with rough conditions.

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Application Tests

In order to test applications extensively and efficiently, emlix uses various test procedures:

- Static test procedures (e.g. code reviews, walk-throughs)
- Dynamic test procedures (e.g. functional tests)
- White-box tests (e.g. code coverage, API, unit testing)

Furthermore, tools such as Valgrind, strace, ltrace, Cppcheck and OProfile are regularly used.

Agile Development

Innovation, complexity and tight time frames mean that development projects for our customers cannot be „completely“ specified. The solution is often collaborative development with an agile approach and close, regular contact between our customer and us. The more exact specification of the individual steps takes place during the project. Disturbances, problems and risks are communicated to the customer by emlix immediately, and are discussed so that if necessary a change of plan can be agreed.