scaffold

Scaffold is a toolbox (language and framework) designed to ease the programming of IoT applications, by abstracting away from the hardware details of the sensor network infrastructure. It has 3 main components: a programming language, a compiler (scale) and a runtime environment (scanner).

The runtime

The runtime environment ensures the deployment and execution of applications on top of the network infrastructure. It introduces a component called scanner, which is similar to a registry that keeps track of available sensors, actuators and processing components in the network.

It's second role is to deploy (allocate) the images generated by the compiler onto nodes that can accomplish the required application tasks. For example, if there is an image which ensures sensing data - it will be allocated to the node instrumented with the required sensor.

Advantages

Multi-tenancy: The ability for multiple stakeholders to share resources on a node without needing to know the underlying hardware.
Minimising communication across the network when reconfiguring resource constrained edge devices.

The language

Scaffold introduces a language which allows developers to concentrate on expressing the high level requirements of the application, rather than having to deal with the specific hardware that will be used or having to address the complexities of the network.

The compiler

To facilitate the programming of city-wide systems, Scaffold provides a compiler that hides the heterogeneity of sensor nodes and the complexity of the network from programmers.
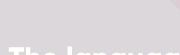Specifically, the compiler:
- generates images for high-level application tasks, such as sensing, actuating and computations;

- produces a set of requirements necessary for determining how images are to be deployed over the network.

The compiler also provides guarantees, such as that data produced with one sensor will never be misinterpreted as data produced by some other sensor, and that conversions occur as needed.