

IoT Development Tools Run on the Cloud

Development tools are no longer rooted on your PC. Today, IoT development often means using the cloud to access your IDE.

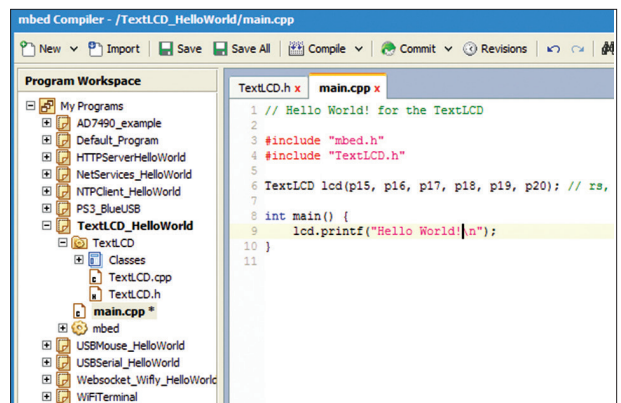
Running conventional development tools on the cloud is easy using virtual machines, but creating web-based tools becomes a major undertaking. They usually take the form of Infrastructure as a Service (IaaS) or Platform as a Service (PaaS). On the other hand, vendors see significant advantages to providing tools in the cloud. It also minimizes setup and configuration time for new users. Furthermore, developers can access the latest versions and possibly companion products.

For developers, a cloud-based solution allows the cloud to do the (often considerable) heavy lifting for large applications—especially for tasks like unit or regression testing. Development platforms can be lightweight hardware, such as Chromebooks.

Of course, there are potential downsides: Fast, reliable Internet connections are a must. Security is also a major issue, and some environments may not allow code to be located offsite. Customization and updates can be problematic as well. For example, a production environment may require a fixed version of the IDE and toolset. Many systems do automatic updates, and setting up multiple users on the same version—if it is not the latest one—can be a challenge.

Cloud-based development has been common for apps that target smartphones, but more platforms targeting embedded solutions have appeared. ARM mbed includes a cloud-based IDE (see the figure), although that's just one aspect of the mbed environment. The mbed environment includes an IoT framework and its own operating system, mbed OS. It targets ARM platforms and supports partners like IBM that provide IoT services.

The mbed targets embedded applications that run on ARM Cortex-M microcontrollers, so it is a more focused development environment. It can be used for standalone applications running on devices without communication links, as well as connected IoT applications. ARM has announced the mbed Client, a set of libraries allowing mbed OS programs to be ported to Cortex-A platforms running Linux. IoT communication support includes standard protocols like MQTT, CoAP, and LWM2M. These run on top of interfaces like Bluetooth, 6LoWPAN, IPv4, and IPv6.



The mbed IDE runs on the cloud. It can download applications to local hardware for debugging.

Wind River's Helix is another portfolio of software and services similar to mbed, but targeting a wider range of devices (including x86 architectures). The Helix Device Cloud is the cloud-based portion of Wind River's IoT support providing device management. Wind River was showing new additions to Helix at the 2015 Intel Developers Forum, including a cloud-based IDE integrated with remote hardware and debug tools.

Cloud-based collaboration using existing desktop IDEs is another way to take advantage of the cloud. A number of platforms use this approach, such as Microsoft's Visual Studio Online. Of course, this works with Microsoft's Visual Studio, but it's a team project system that works with projects written in any language using any IDE. For example, Visual Studio Online also supports Eclipse, a popular open-source IDE.

Visual Studio Online provides everything except the IDE from version control to agile development collaboration support. It's extensible using REST APIs and OAuth 2.0. Visual Studio Online also provides services like load testing. This feature can help make sure an application scales properly.

Desktop IDEs are not going away, but they are no longer the only alternative—even for embedded development. 