Digital Infrastructure Creation with Tactical Cloudlets

Today's edge users are increasingly equipped with mobile computing and communications technology that enables them to share data and access complex applications such as facial recognition and language translation. Since computational power and battery power are limited, these mobile devices typically reach back to external resources such as cloud resources or data centers to support the needed capabilities. But in an austere environment such as the aftermath of a tsunami, or a hostile environment such as the center of an insurrection, access to these remote resources may be compromised, degraded, or disabled, severely limiting access to the needed capabilities.

The deployment of a local cloudlet solves this problem. A cloudlet is a discoverable mobile cloud resource that supports edge-user mobile devices.
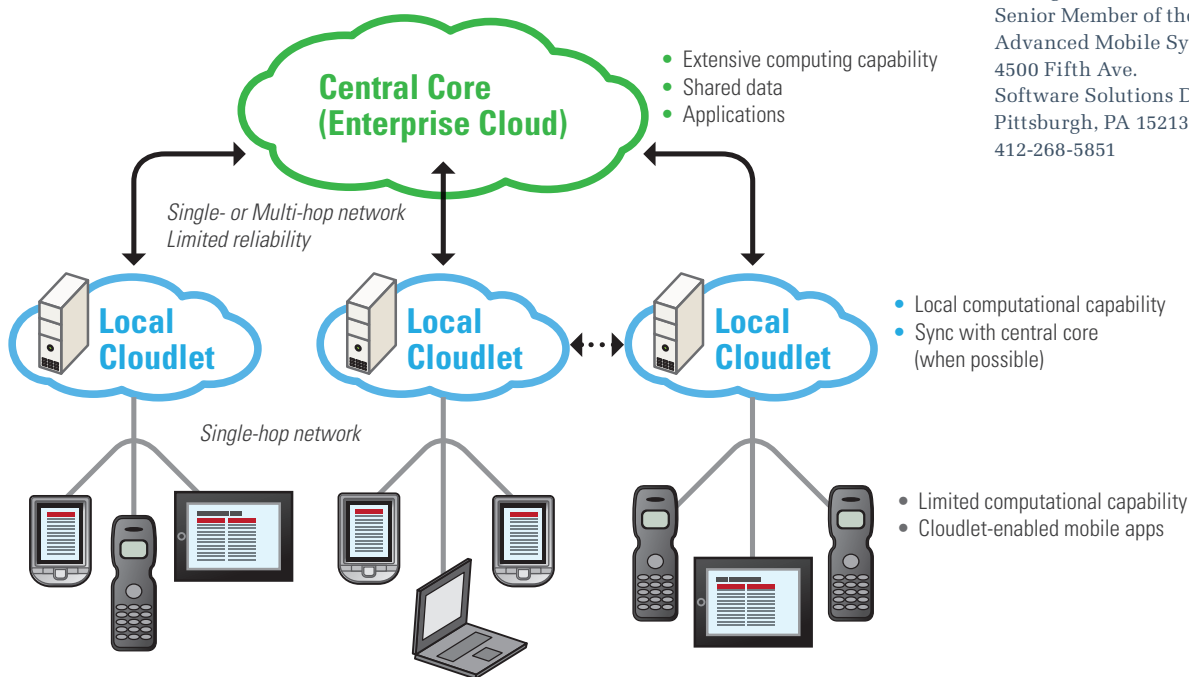
The mobile devices are just one network hop from the cloudlet; hence they have adequate connectivity to enable devices to offload computational tasks to the cloudlet and share data and applications.

The cloudlets are pre-loaded with the applications and data likely to be needed by the edge users. If an edge user wants to access an application or a data source not pre-loaded on the cloudlet, it attempts to acquire the needed resource from the enterprise cloud or the mobile device itself. The cloudlets attempt to maintain communication with the central core to ensure that needed data and applications are current. However, when that connectivity is lost or degraded, the cloudlet still supports the mobile devices using the most current information available. The cloudlets use virtualization technology to execute legacy applications in their native environments, providing access to them via mobile apps without having to port them to the mobile devices.

Cloudlets can also communicate with each other, providing redundancy and continuity of operations for edge users in hostile and otherwise constrained environments.

Forward-deployed, discoverable, virtual-machine-based cloudlets can be hosted on vehicles or other platforms to provide
- infrastructure to offload computation
- forward data-staging for a mission
- data filtering to remove unnecessary data from streams intended for dismounted users
- collection points for data heading for enterprise repositories

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Central Core (Enterprise Cloud)
- Extensive computing capability
- Shared data
- Applications

Single- or Multi-hop network
Limited reliability

Local Cloudlet

Local Cloudlet

Local Cloudlet
- Local computational capability
- Sync with central core (when possible)

Single-hop network
- Limited computational capability
- Cloudlet-enabled mobile apps

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