CrossMount

MediaTek White Paper

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Introducing CrossMount

CrossMount™ is a new MediaTek technology that simplifies hardware and software resource sharing between different consumer devices. Designed to be a new standard in cross-device convergence, the CrossMount framework ensures any compatible device can seamlessly use and share hardware or software resources authorized by the user. CrossMount, an open and simple-to-implement technology for the wide ecosystem of MediaTek customers and partners, opens the possibilities for multiple devices to effectively work as one or share applications and hardware resources.

With CrossMount-enabled devices viewers can, for example, easily pair their TV audio to their smartphone earphones or use their smartphone microphone as a voice controller to search content on their smart TV. This is a breakthrough in user experience as the CrossMount standard means several devices can act as one together, rather than simply share content.

The CrossMount Flow

Typically a CrossMount-enabled device requires three steps to complete sharing, as shown in Figure 1. In step one, CrossMount devices discover others automatically by Multicast DNS (mDNS) protocol. Then those CrossMount devices automatically broadcast their capabilities and services, all CrossMount devices keep a copy of all services list for utilization. In the last step, user borrows capabilities from other devices; those capabilities act just like native ones, applications don't modify codes, and therefore there is no learning pain for user.

Figure 1. The CrossMount Flow

Device Discovery

The CrossMount service mounting standard is based on mdns (multicast domain name system) protocol, and can be implemented in Android, Linux, and other platforms. CrossMount works through simple discovery, pairing, authorization, and use between devices of both hardware and software resources across smartphones, tablets and smart TVs. Communication between devices is achieved directly between devices via home gateways (Wireless LAN) or peer-to-peer (Wi-Fi Direct). Discovery and sharing are granted through an easy software implementation that allows all Wi-Fi capable devices to share resources without the need for cloud servers.

Services Notification

Once the CrossMount Device finds other, it begins broadcasting its capabilities using JSON (JaveScript Object Notation) format. The broadcast content includes the capabilities, descriptions, icons, uris, and other necessary information for devices or users.

CrossMount devices keep and manage that Broadcast content into a Services List (such as camera, microphone, sensor). With CrossMount devices joining and leaving, these services list will be maintained in the most effective way. The figure below shows a service list example. If service is available when paring, the service can be borrowed at that moment.

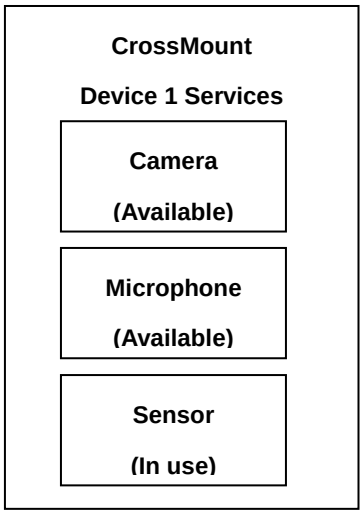

Figure 2. Example of Service Lis

The diagram below shows how CrossMount devices broadcast their capabilities.

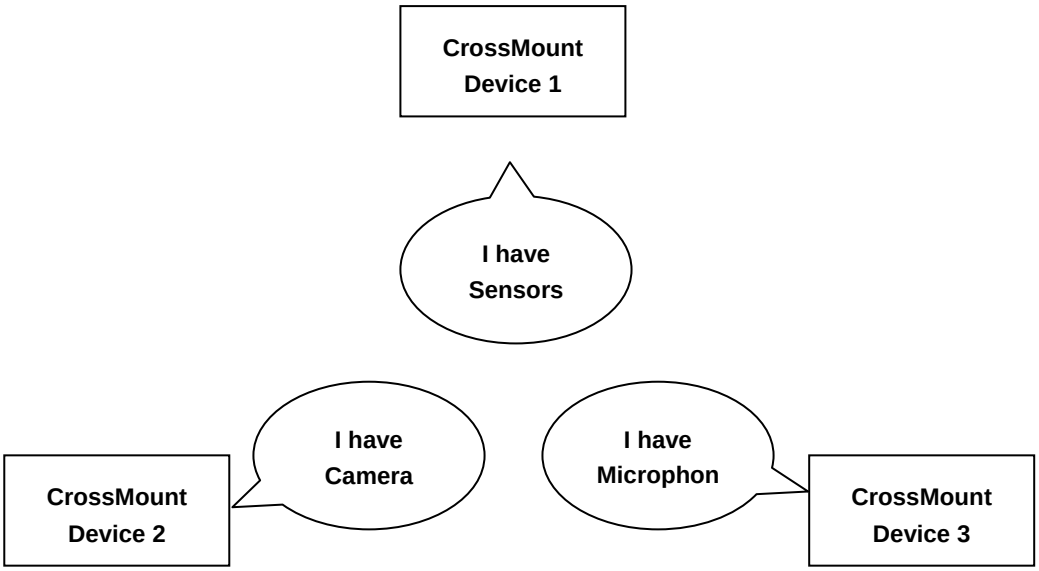

Figure 3. Services Notification Flow

Sharing

Once CrossMount devices have a services list, the user can borrow capabilities from others by CrossMount GUI or a CrossMount pop-up.

CrossMount sharing is shown in Figure 4 below. In this case, CrossMount Device 1 borrows hardware from CrossMount Device 2. By means of CrossMount framework technology, the Device 1 utilizes the borrowed hardware like a local hardware; we call it a Virtual Hardware. The characteristics of Virtual Hardware are transparent to the application layer; all applications can use that Virtual Hardware without requiring any modification.

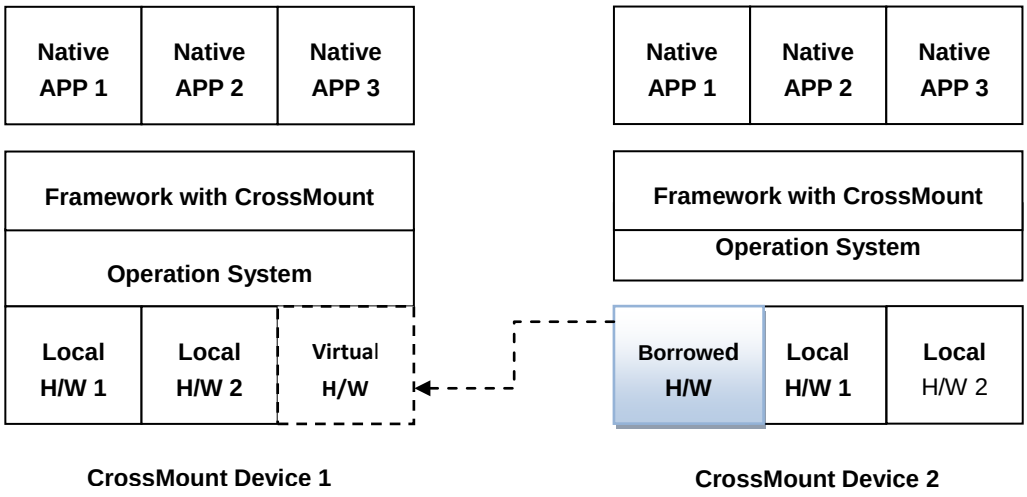

Figure 4. Virtual Hardware Flow

For a 1-to-1 connection, one device borrows service from one device as shown in Figure 5. In addition, one device is allowed to borrow different services from different devices if these services are different. Figure 6 demonstrates another case of 1-to-1 connection.

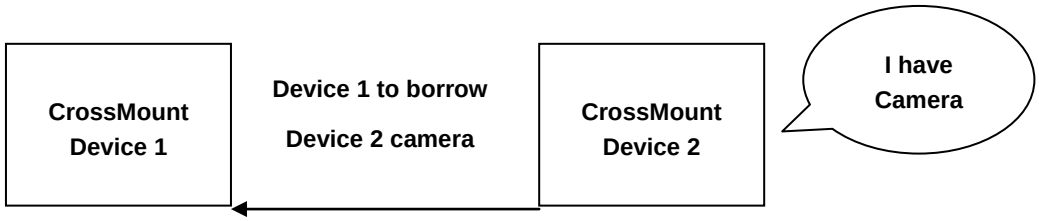

Figure 5. 1-to-1 Connection (Case 1)

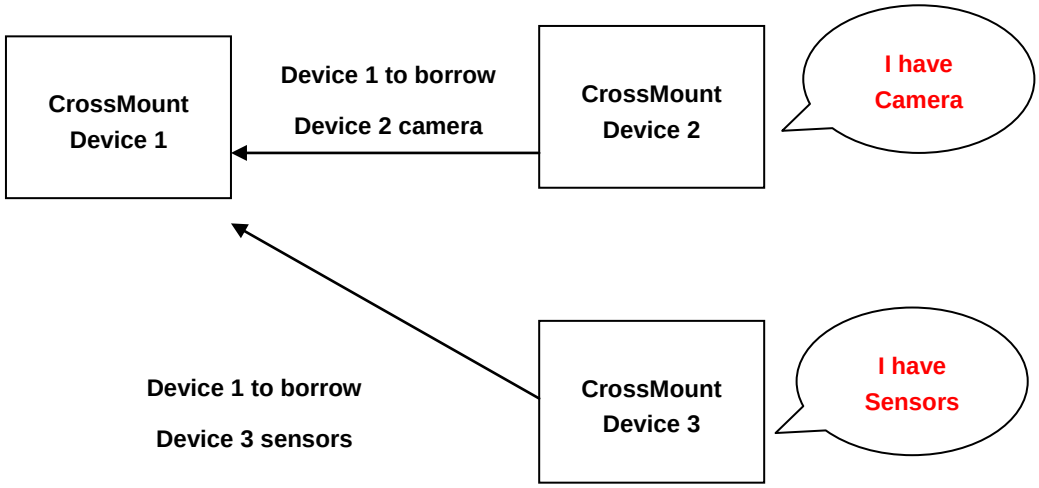

Figure 6. 1-to-1 Connection (Case 2)

The CrossMount technology is not limited to a 1-to-1 connection, but also N-to-1 connections. For N-to-1 connections, the borrowed services from different devices are shown below. For instance, a TV can turn into a game console by borrowing several mobile phones sensors at the same time. Mobile phones can act as game controllers!

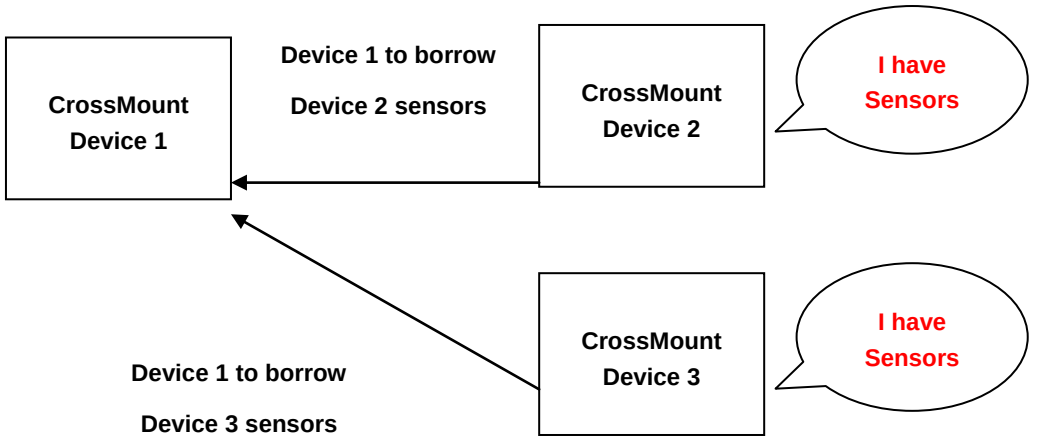

Figure 7. N-to-1 Connection

Conclusion

CrossMount unites your devices. It enables multiple devices to combine their functions to become a more capable one, and explores new possibilities to drive the technology forward.

CrossMount will be open for developers to further expand the ability for innovative and new applications to be created, potentially changing the way we use and share devices and content.