

HealthOS: A Platform for Integrating and Developing Pervasive Healthcare Applications

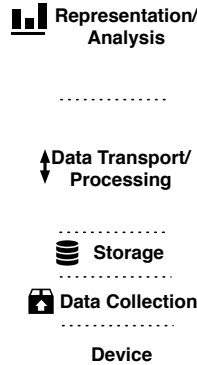
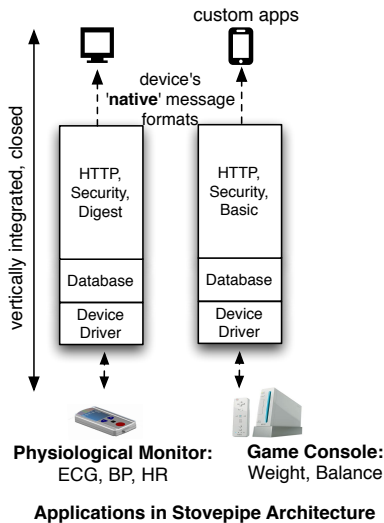
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Context

- Pervasive wellness devices are being introduced to the **home** environment
- Pervasive health applications (on PCs or mobile phones) compose information streams (collected from devices or the cloud) to infer people's health and encourage lifestyle changes

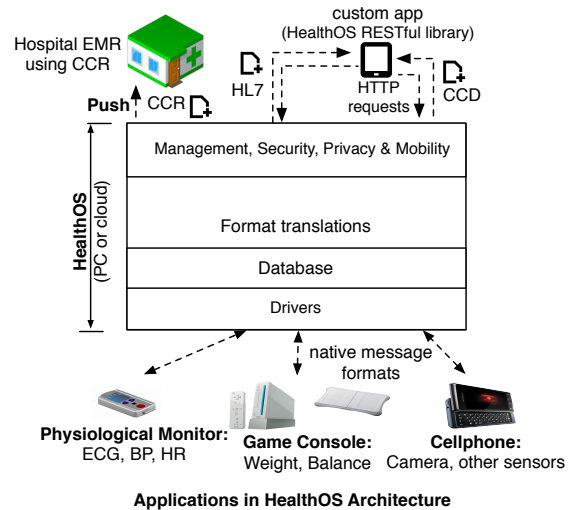
Problems in Current Architectures

- **Stovepipe architecture** [1]
 - **Vertically-integrated** and **closed** (from devices to applications)
 - Hinders *composability, unified-management, and integration* with other systems.



Our Architecture

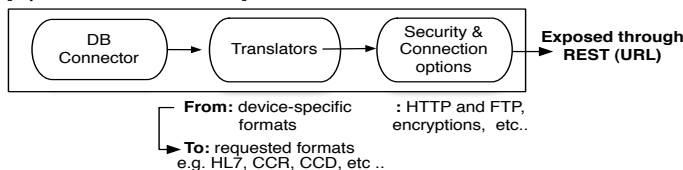
- **HealthOS**: Unified data collection and development platform
- 1) expose stored data through REST and 2) translate native data formats for developers' convenience and integration with other systems.
- **Q**: modular and scalable design?



Pipelines and Drivers

- **Pipelines**
 - Interconnected sub-modules to **translate** devices' native data formats and **access** the storage system
 - Users can setup pipelines for devices of interest
 - For **modularity**, we developed pipelines based on a component-based software architecture
- **Drivers**
 - Interpret devices' input based on their formats
 - Push data to external or internal services

[Pipeline for device's sensor]



Security and Management

- **Unified Management Console**
 - All devices and users are managed through a **single** HealthOS Web interface.
- **Security**
 - **CP-ABE** (Ciphertext Policy Attribute Based Encryption): Data encrypted with keys customized to users' access policies [2]

References

- [1] Deborah Estrin and Ida Sim. Open mHealth Architecture: An Engine for Health Care Innovation. Science, 2010
- [2] J. Bethencourt, A. Sahai and B. Waters. Ciphertext-policy attribute-based encryption. IEEE Symposium on Security and Privacy, 2007.