Binder

Binder is a remote procedure call mechanism that allows a client process to remotely invoke a function on a server process.

Pros:
- Binder requires only one data copy plus a temporal memory mapping to transmit data from one process to another.

Cons:
- Binder requires predefined interfaces between the processes, which limits the communication flexibility.
- Binder causes higher kernel overhead.

Intent

Intent is a message forwarding system, where a system service forwards a message to its proper receivers based on intent-filtering policies.

Pros:
- The intent-filtering policies enable more flexible interaction between processors.
- Message broadcasting is supported.

Cons:
- Two-fold transmission is required, resulting in longer transmission latency and higher resource usage.

Content Provider

Content provider is a data storehouse mechanism that provides SQL-like APIs and enables the data sharing among processes.

Pros:
- It adopts shared memory technique to transmit query results and has the lowest data transmission overhead.

Cons:
- Content provider only favors large transfer size due to the high shared memory allocation overhead.

Performance Evaluation

Evaluation methodology: Two processes communicated every one second via different IPC mechanisms, while the packet sizes ranged from 4B to 256KB to simulate different continuous sensing IPC needs. Each data point is an average of 100 transactions, and the error bars represent 95% confidential intervals.

Latency: Content provider performs the best for larger packet sizes, but is outperformed by Binder for smaller packet sizes.

Memory Usage: Intent uses two times more memory than other mechanisms due to its two-fold transmission design.

CPU Usage: Content provider shows the lowest CPU usage for larger packet sizes, while Binder performs the best for the smaller packet sizes.