Introduction:
MOOC Organization & Topics

Douglas C. Schmidt
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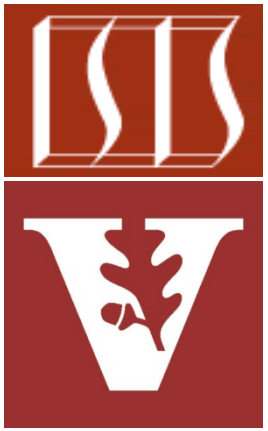
www.dre.vanderbilt.edu/~schmidt



Professor of Computer Science

Institute for Software
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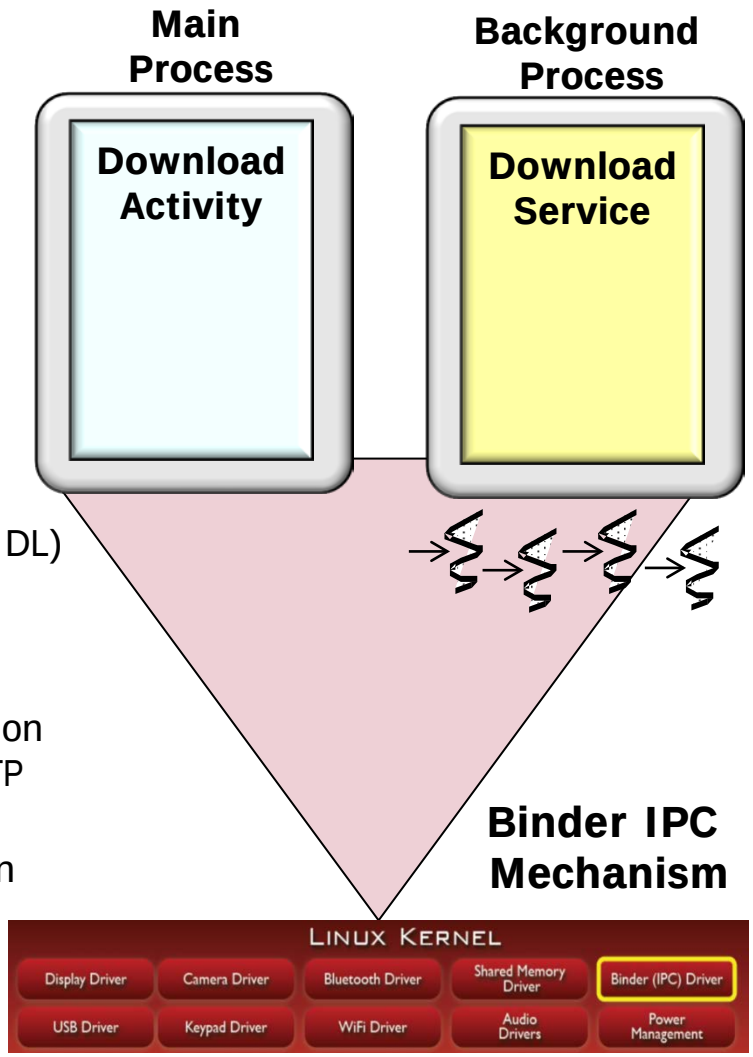

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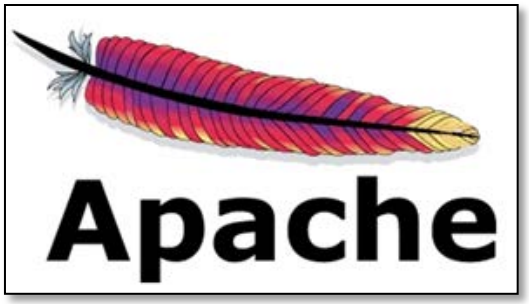

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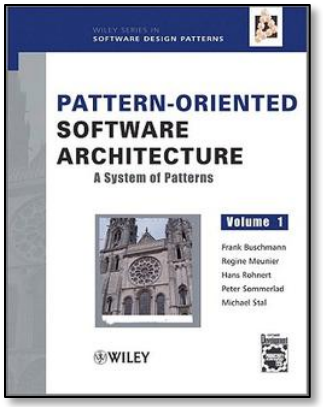

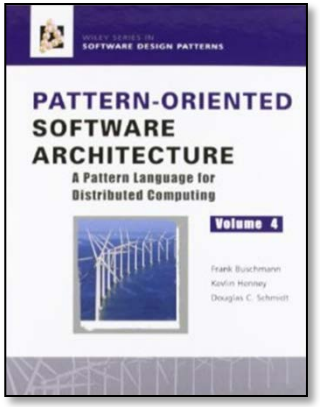

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See github.com/douglascraigschmidt/POSA-15/wiki/POSA-15-FAQ item #26

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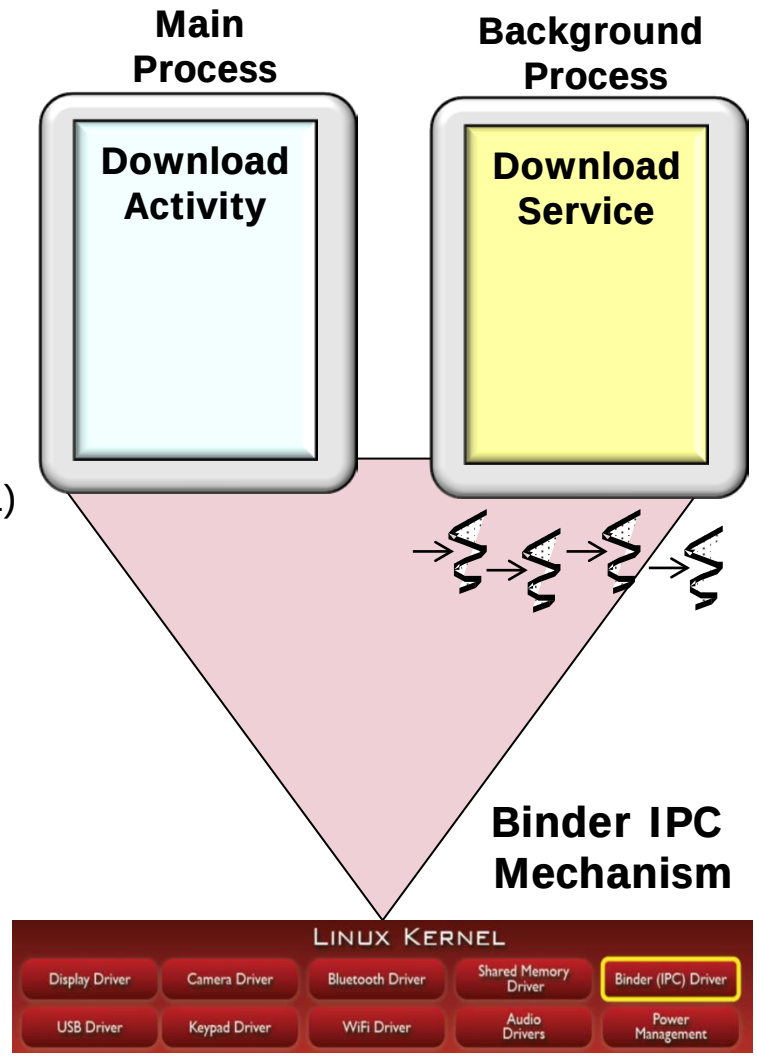

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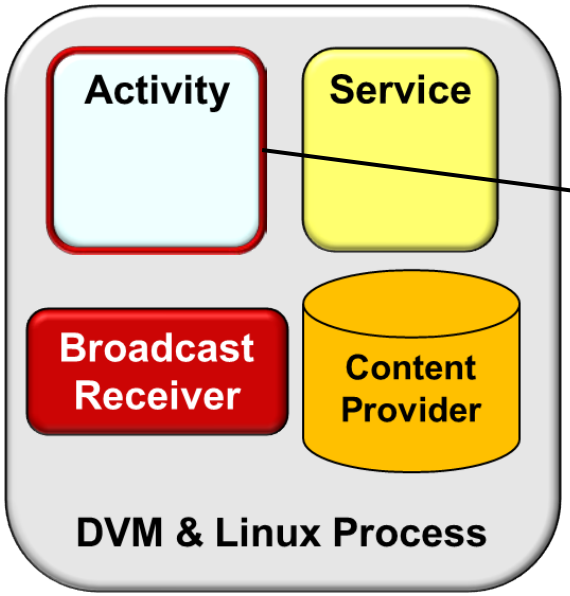
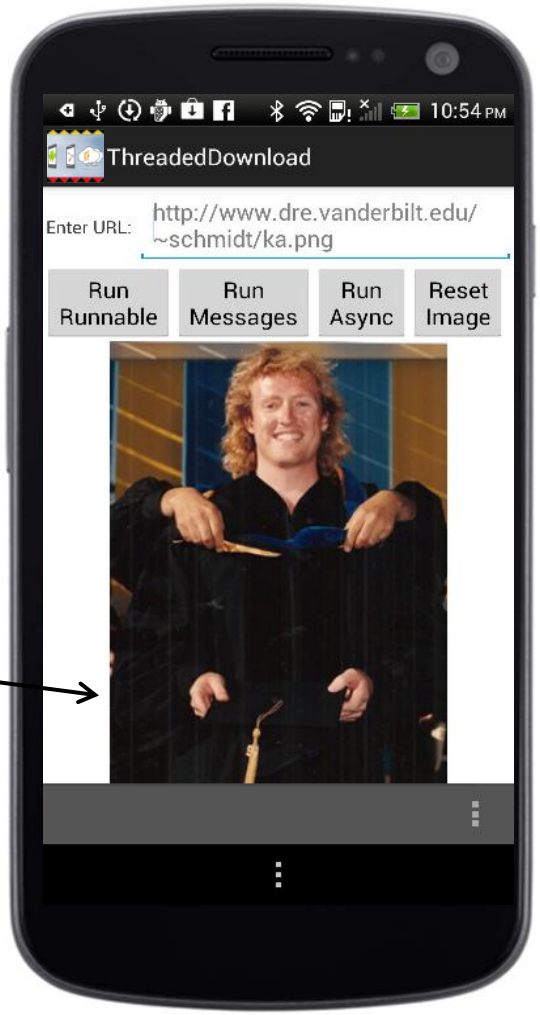
- **Section 1 – Android Services & Local IPC**
  - Android Services & Communication Frameworks





Activities handle user-facing operations

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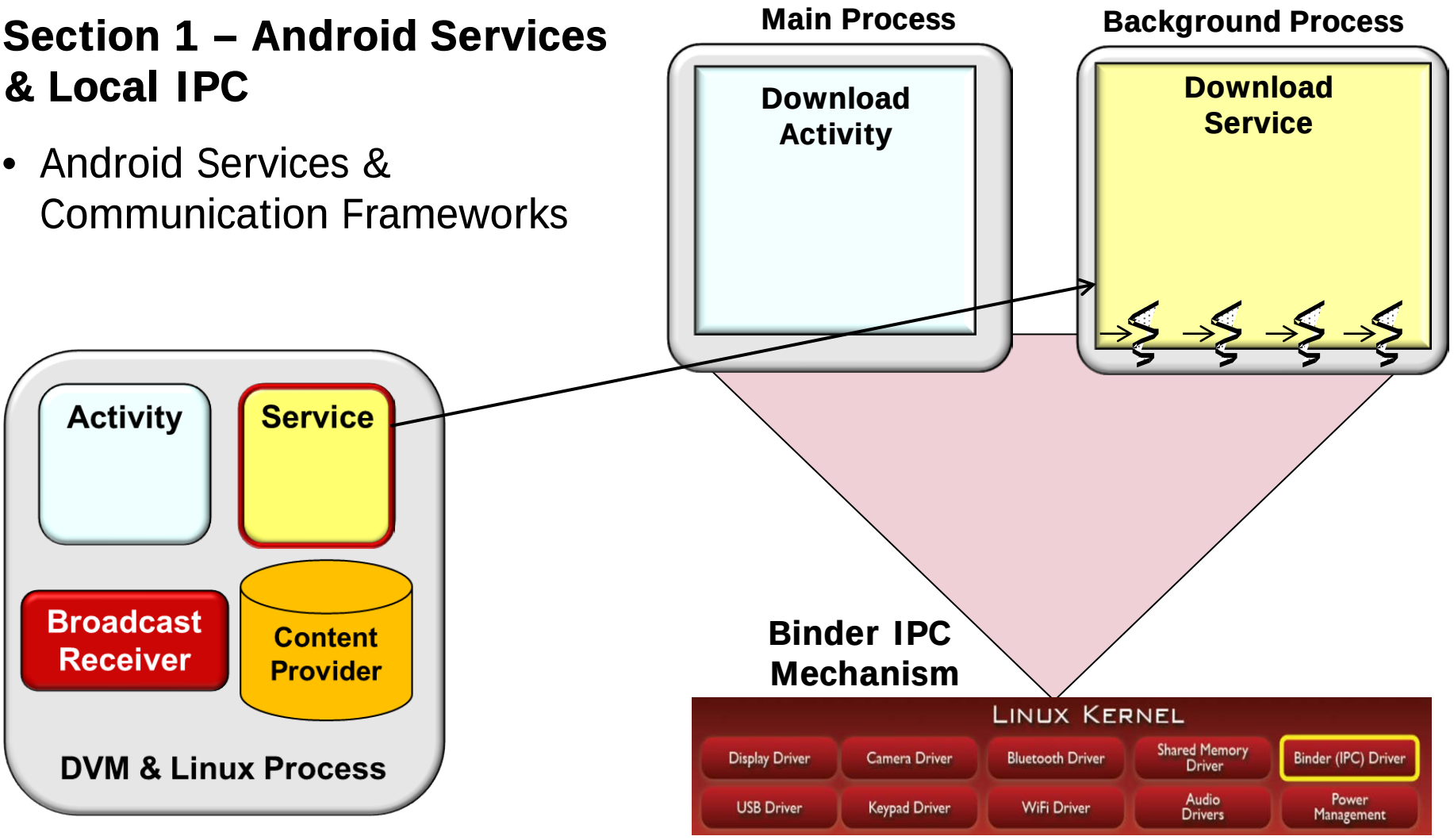

Services can handle long-duration operations that don't interact with the user directly

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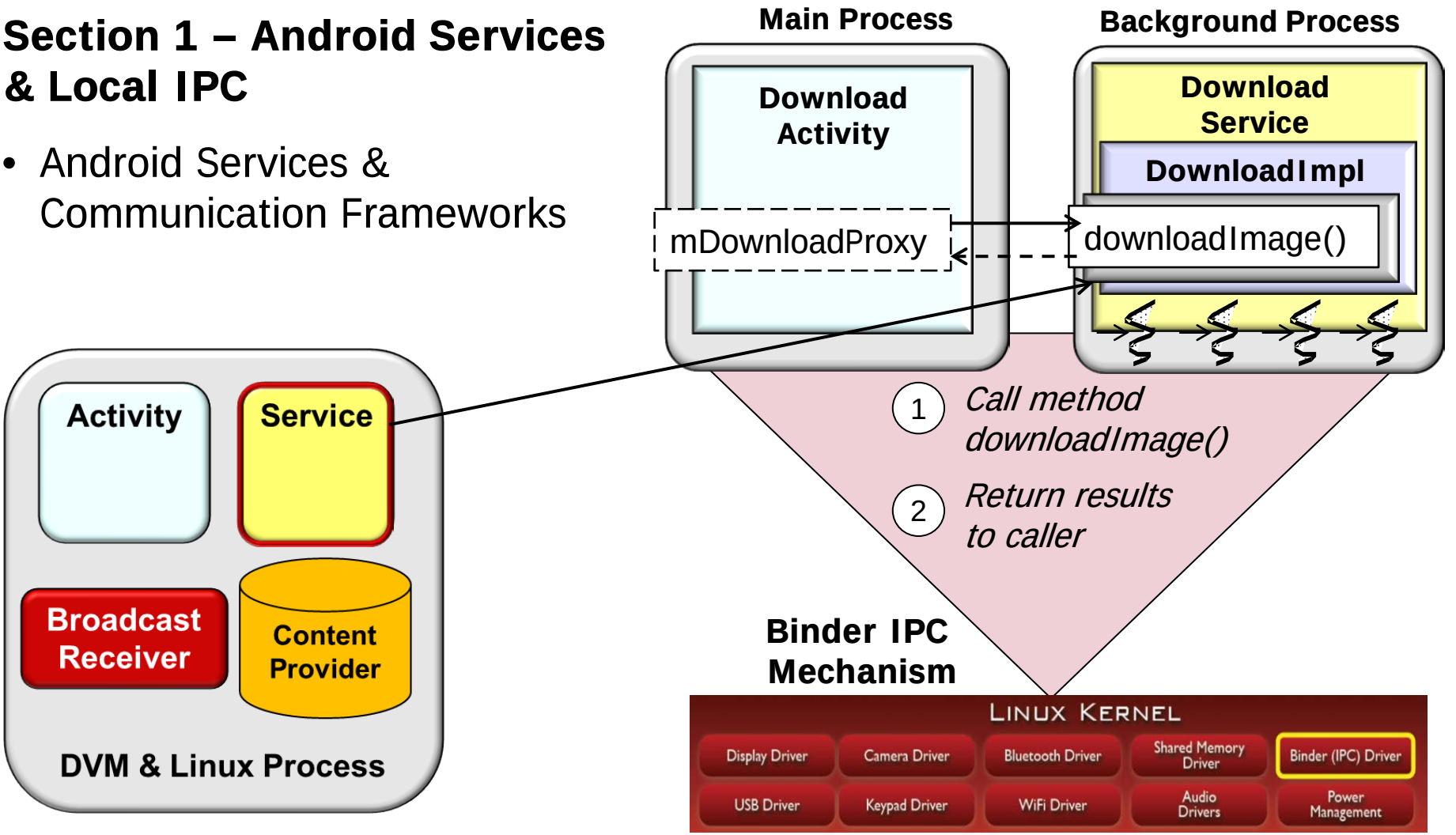

IPC mechanisms are used to facilitate Activity & Service communication

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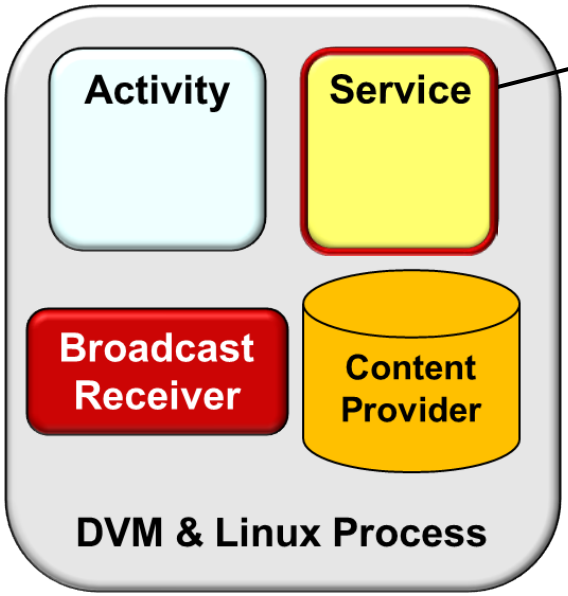

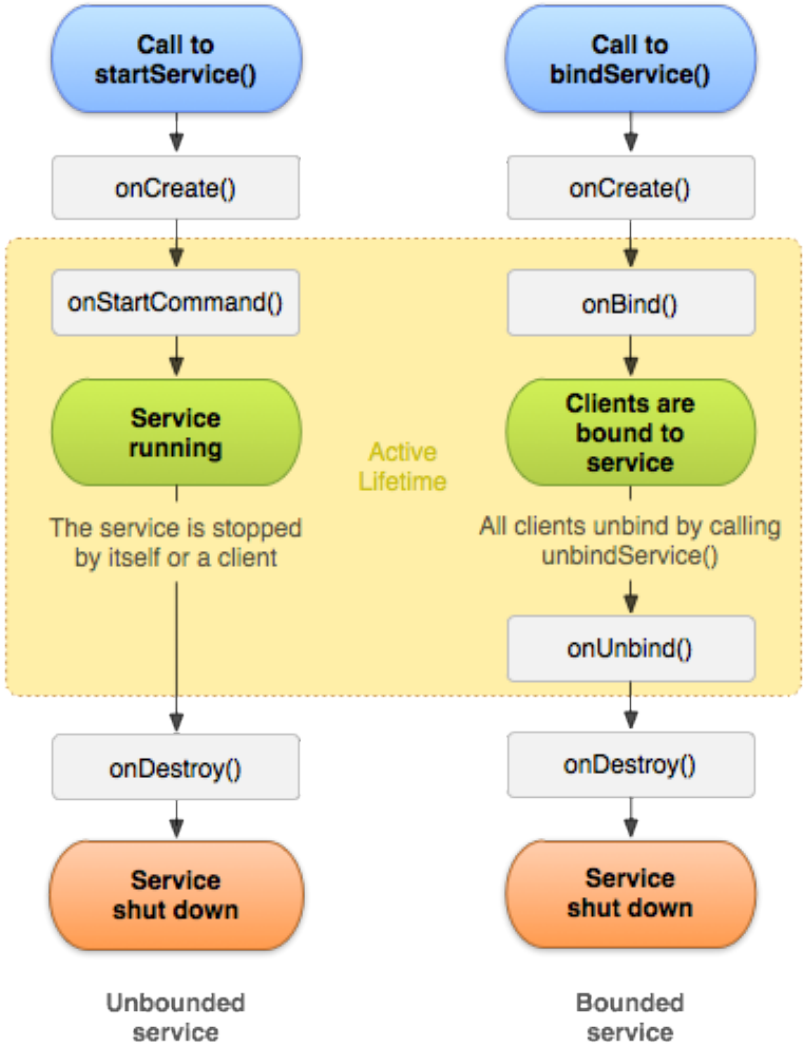

There are two types of Services

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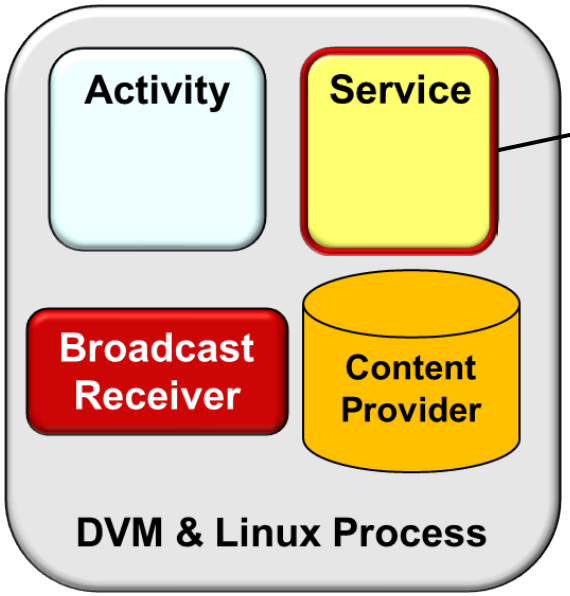

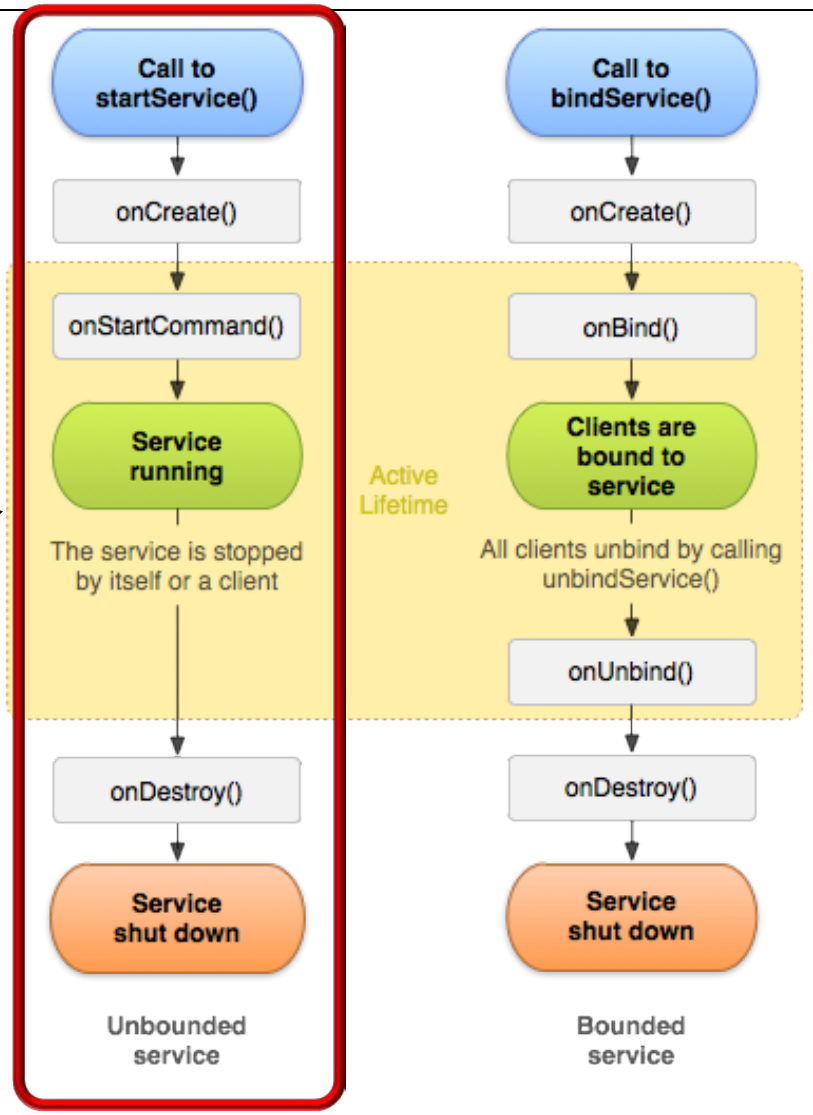

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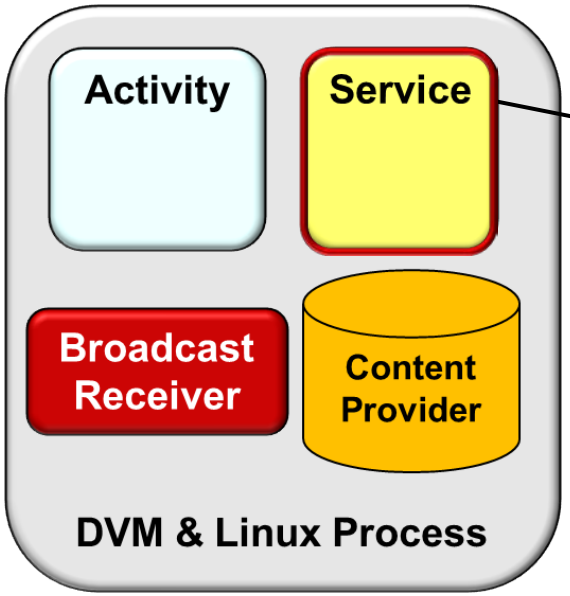

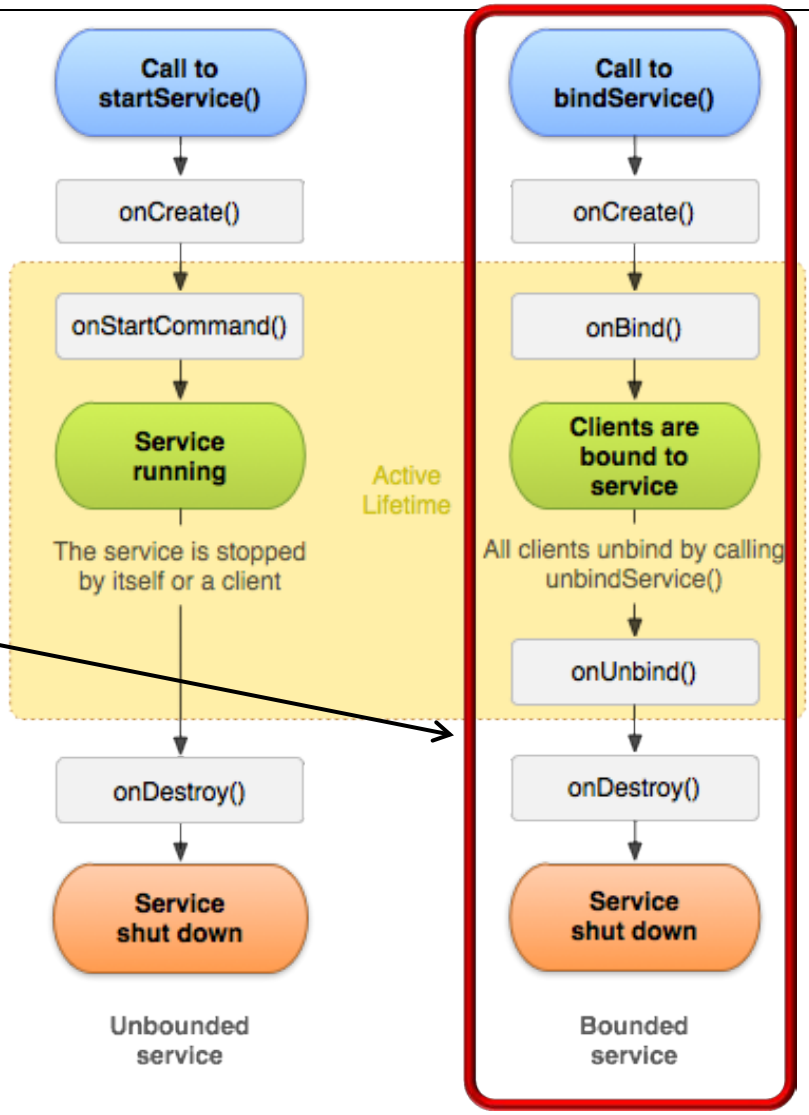

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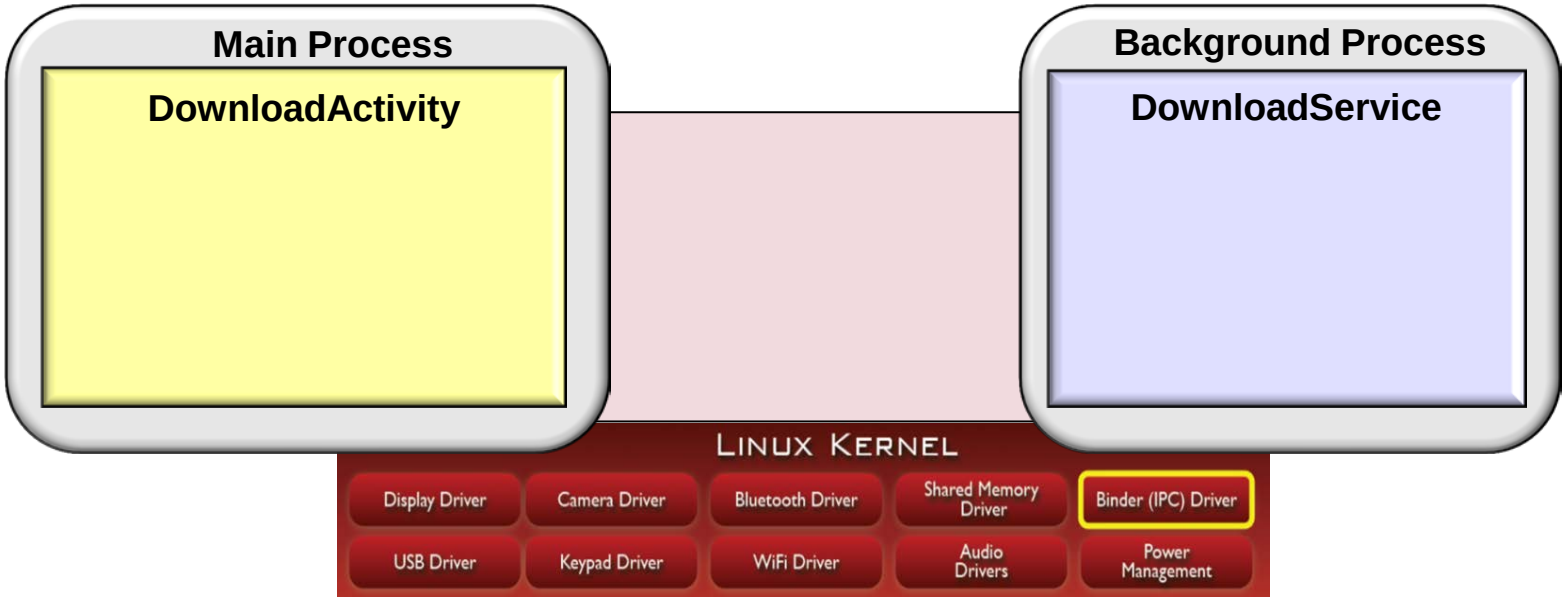

Android Linux provides mechanisms that are optimized for inter-process communication

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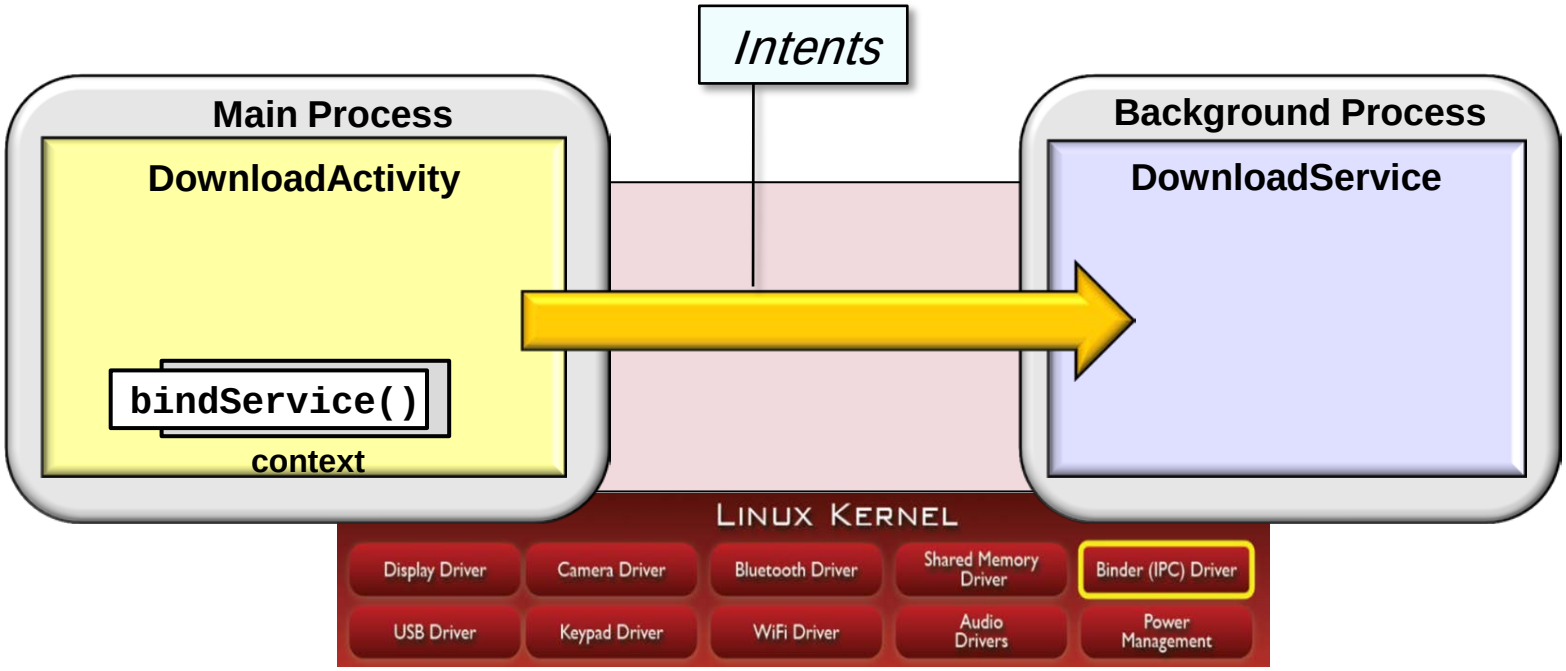

Intents are used to launch Services (& Activities) & can also contain data

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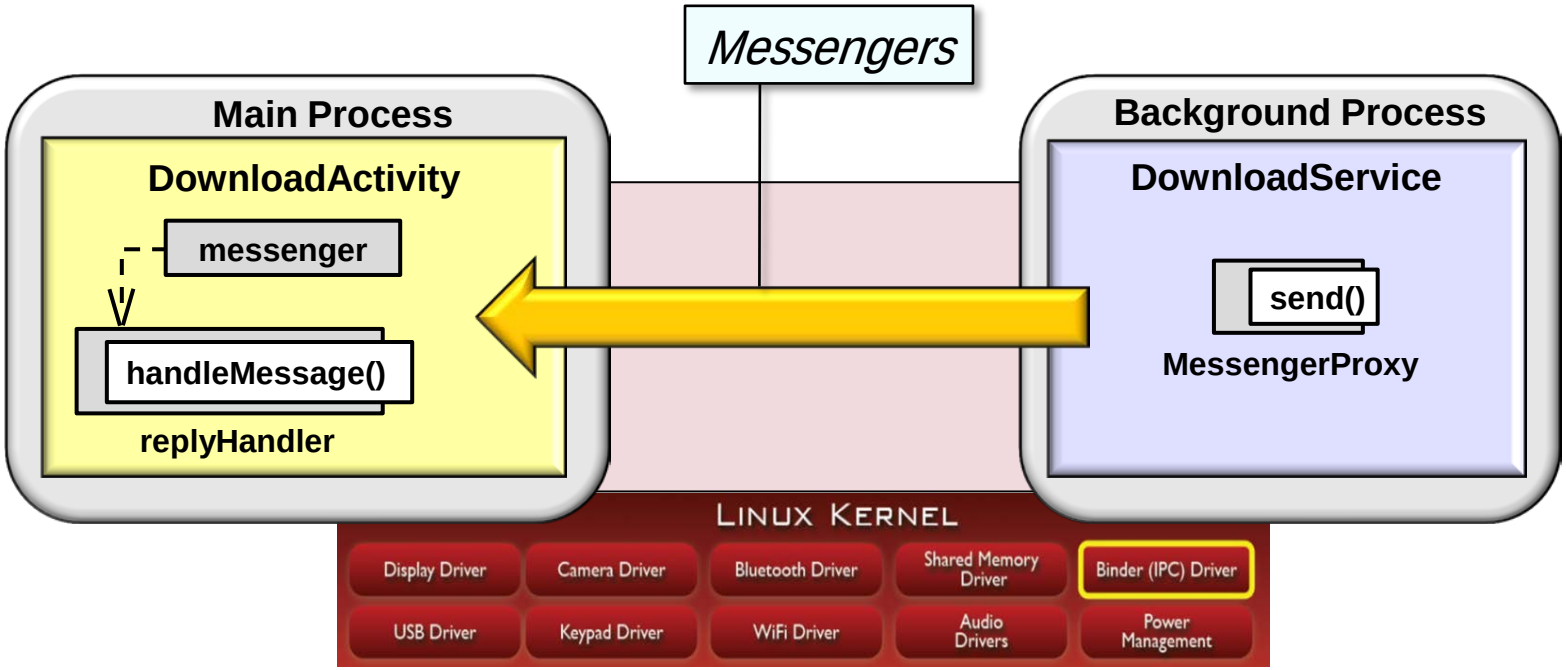

Messengers can be used to pass messages between processes

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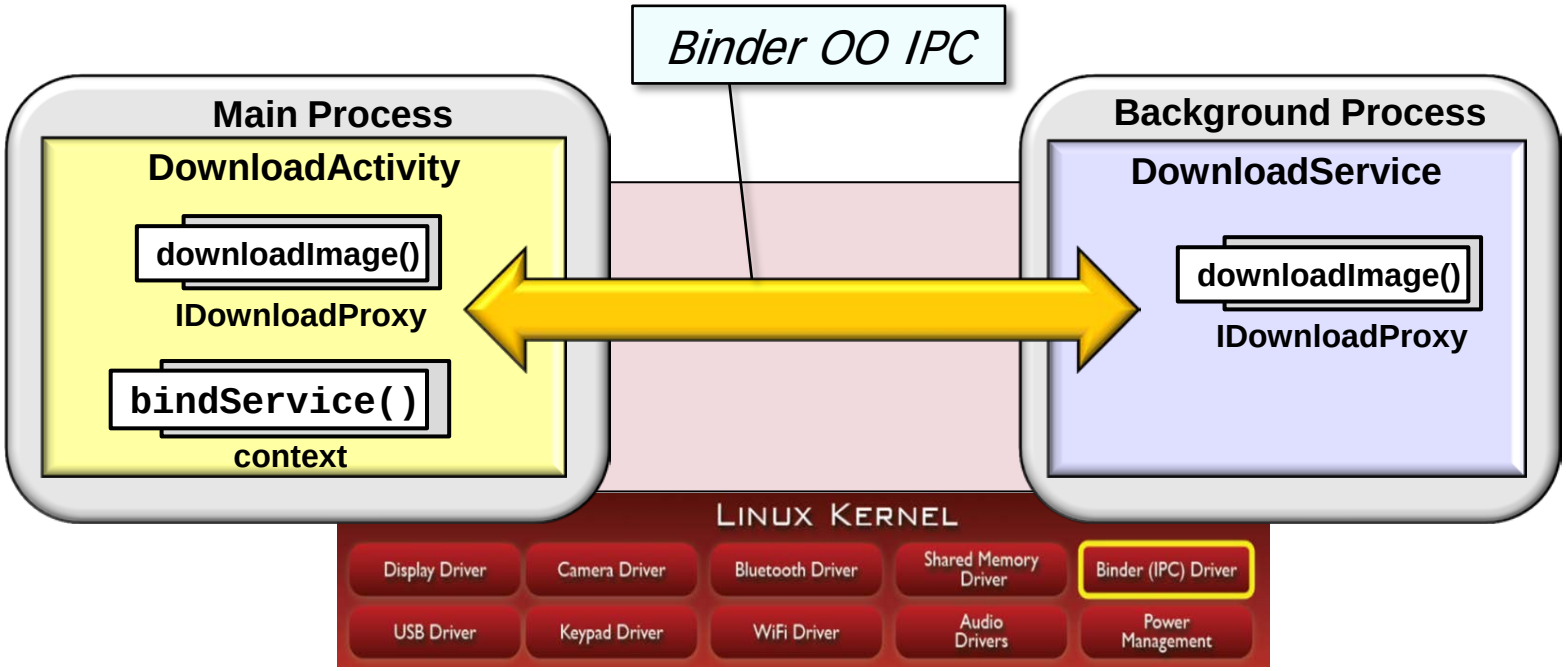

The Binder also provides an object-oriented IPC mechanism that can invoke methods on objects in other processes

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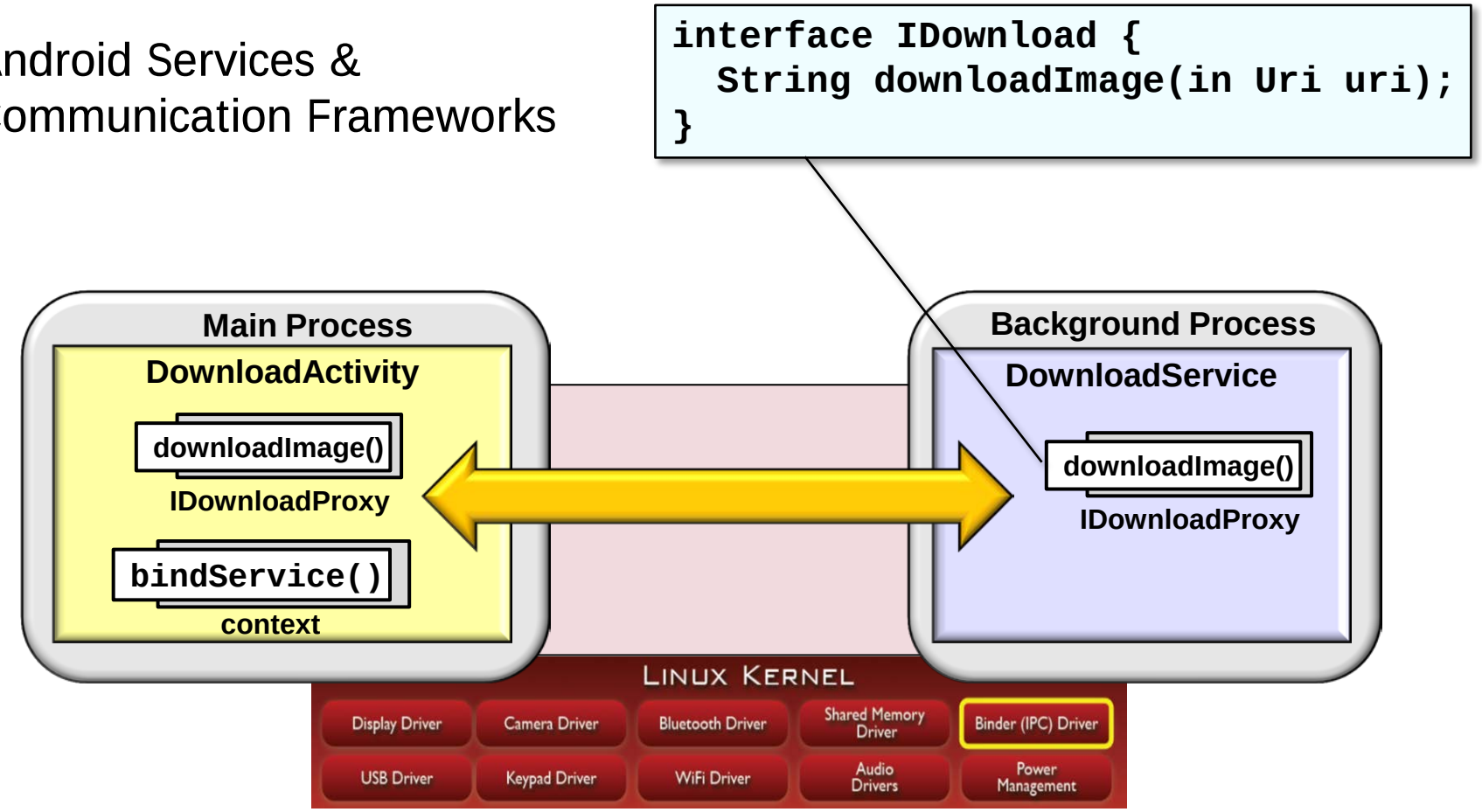

The Android Interface Definition Language (AIDL) provides the means to enable strongly typed IPC across processes

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java.net

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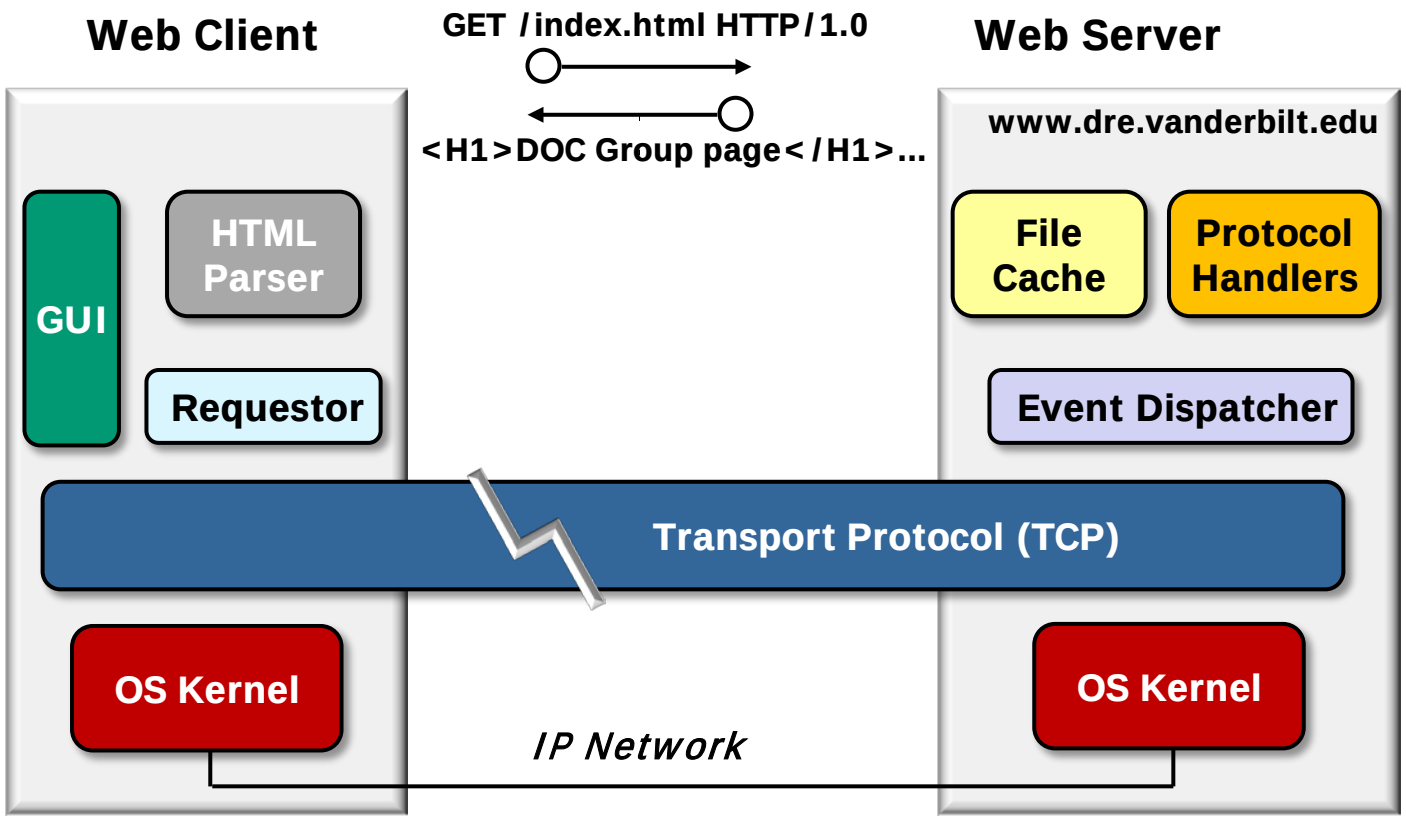
- **Section 2 – Android Remote IPC**
  - Overview of HTTP



See en.wikipedia.org/wiki/Hypertext_Transfer_Protocol

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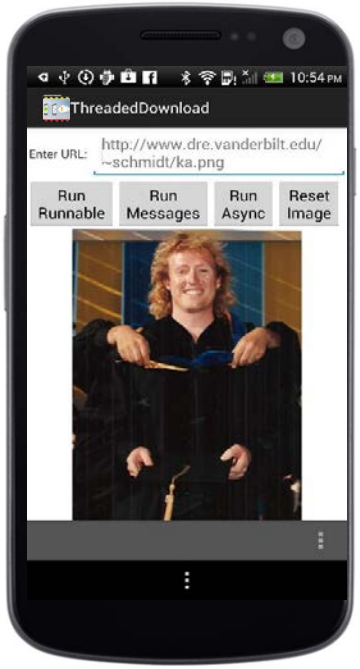
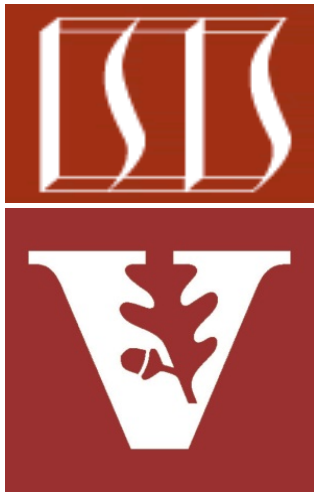
- **Section 2 – Android Remote IPC**
  - Overview of HTTP
  - Writing clients that access web services via HTTP & JSon





Apache

Java java.net

See android-developers.blogspot.com/2011/09/androids-http-clients.html

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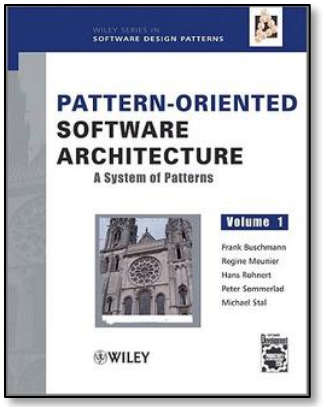

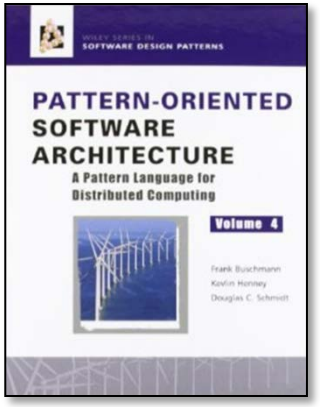

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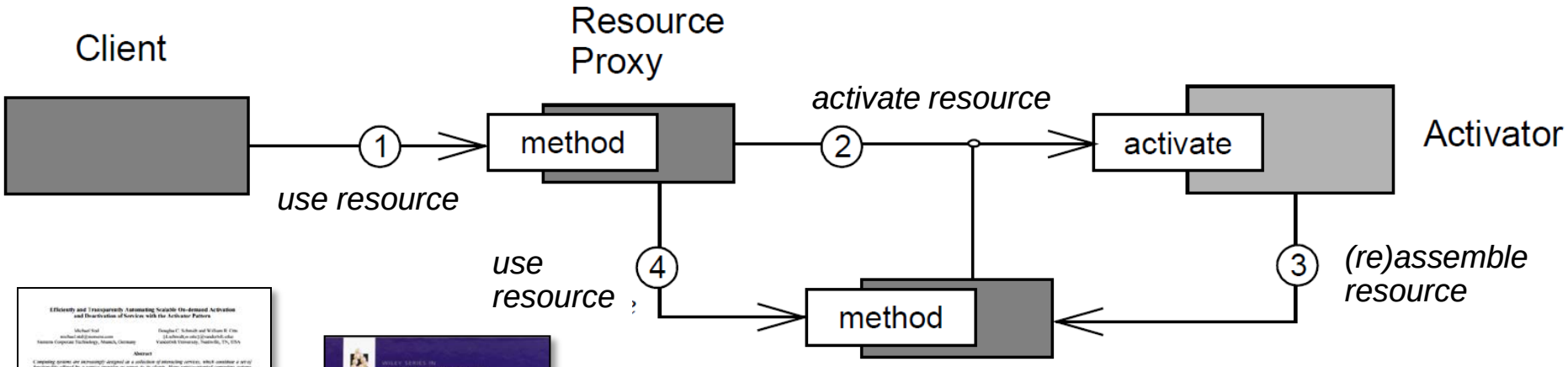
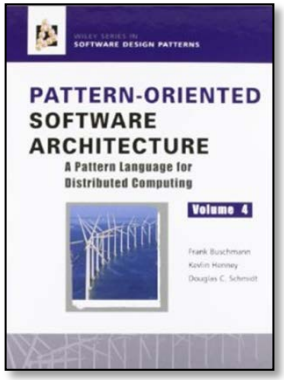
  - *Activator*
    - Automates scalable on-demand activation & deactivation of service execution contexts to run services accessed by many clients without consuming excessive resources





See www.dre.vanderbilt.edu/~schmidt/PDF/Activator.pdf

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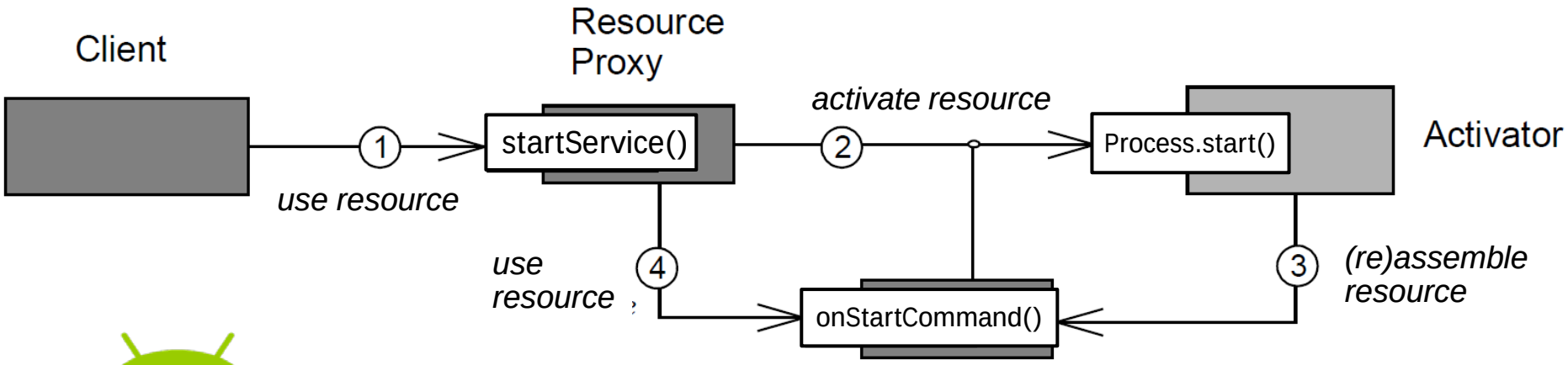

Android's Activity Manager Service applies *Activator* to launch Services (& Activities) on-demand

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  - *Command Processor*
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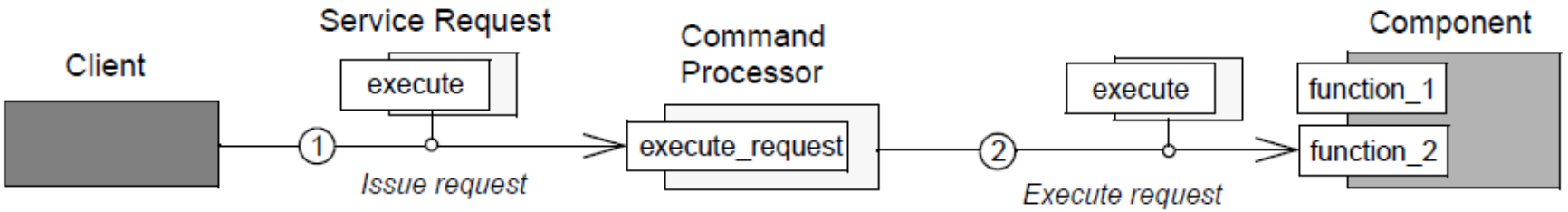

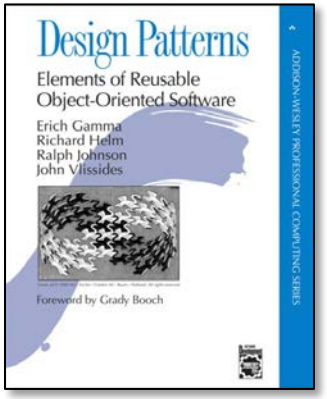

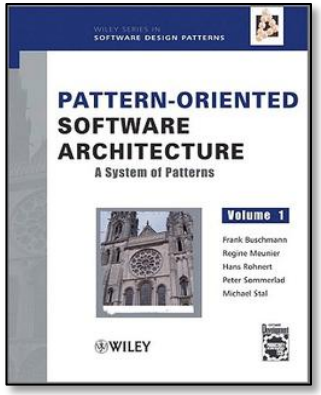

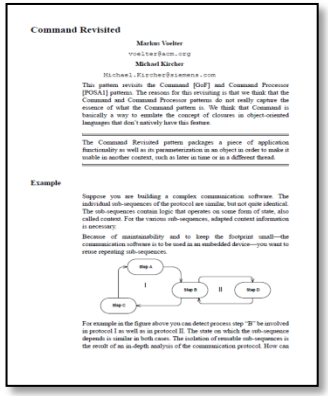

See www.dre.vanderbilt.edu/~schmidt/PDF/CommandRevisited.pdf

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  - *Command Processor*
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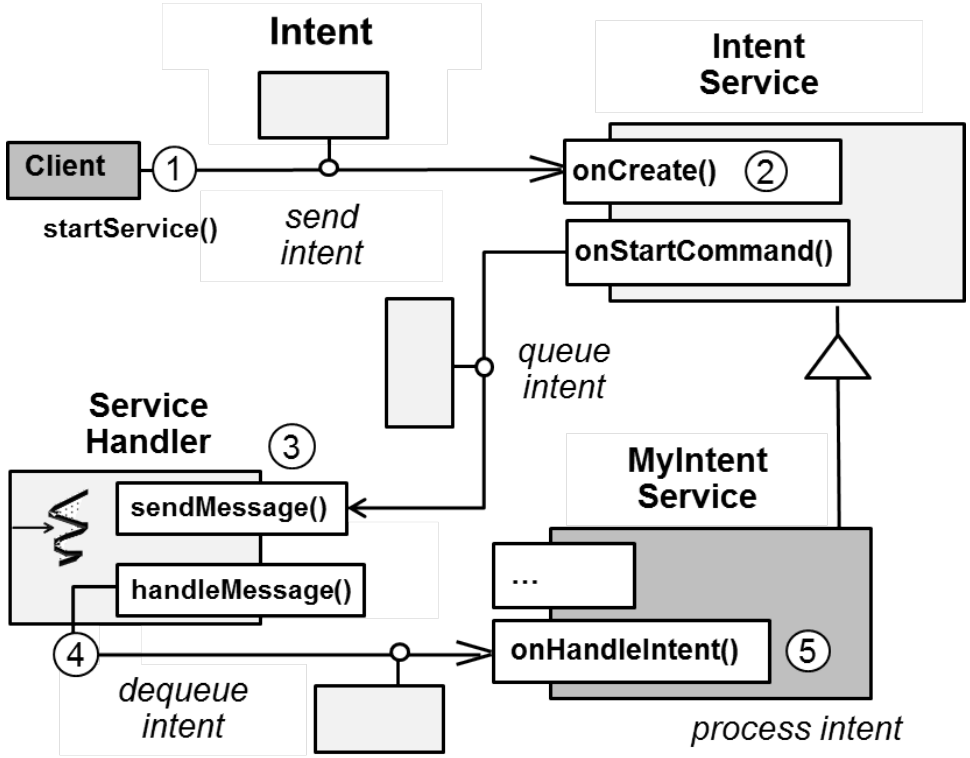
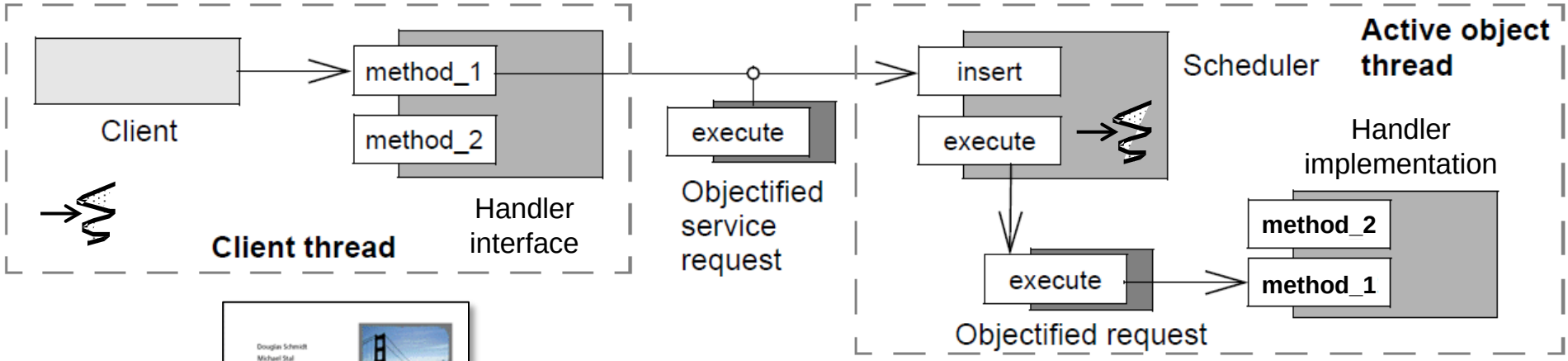


Android's Activity Manager Service applies *Command Processor* to pass commands to Services

Overview of Topics Covered in Section 3

- **Section 3 – Communication Patterns Applied in Android**
  - *Active Object*
    - Define service requests on components as the unit of concurrency & run service requests on a component in different thread(s) from the requesting client thread



See en.wikipedia.org/wiki/Active_object

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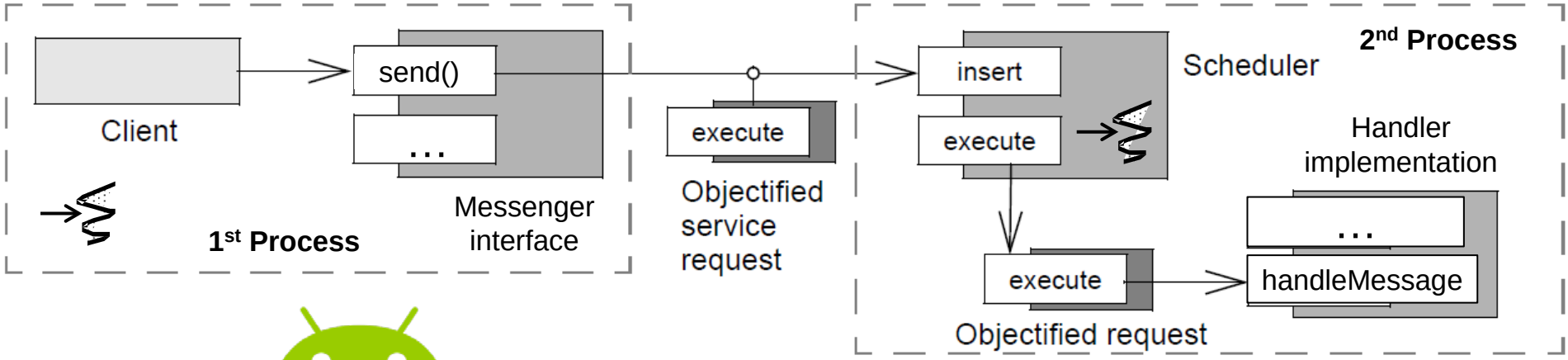

Android's Messenger IPC mechanism applies *Active Object* to send messages across processes

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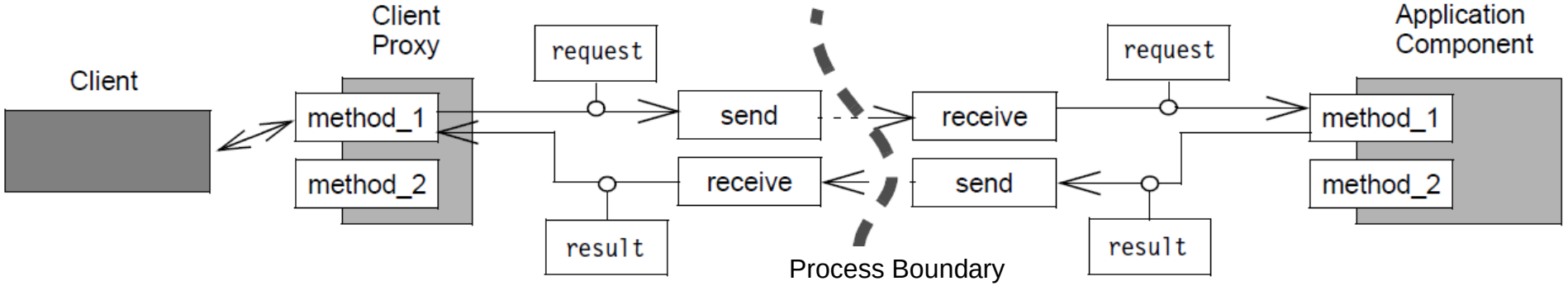
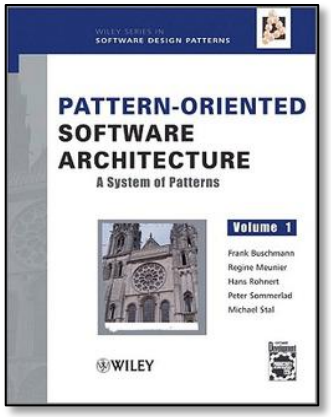
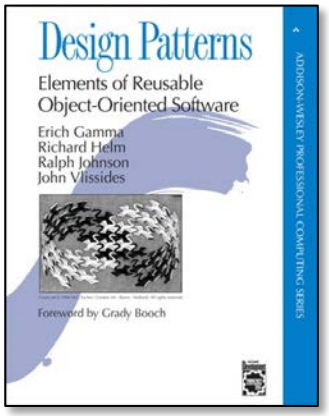
  - *Proxy*
    - Provide a surrogate or placeholder for another object to control access to it







See en.wikipedia.org/wiki/Proxy_pattern

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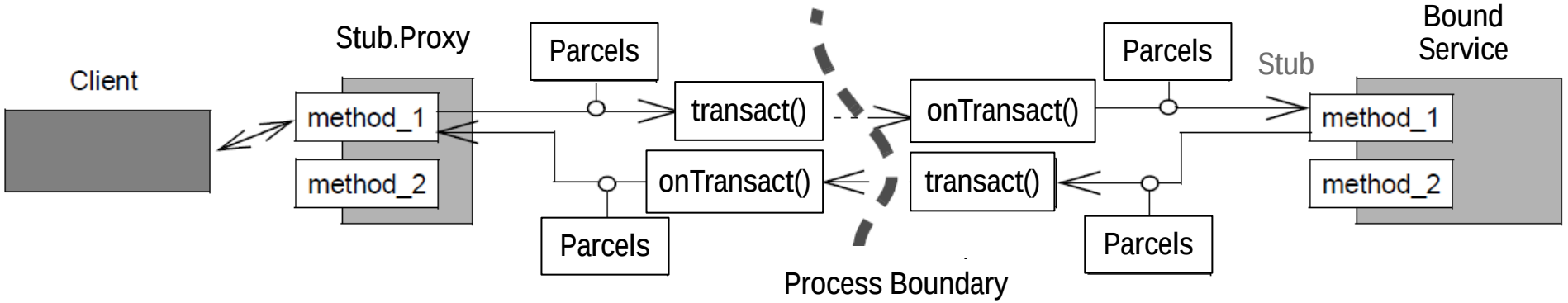
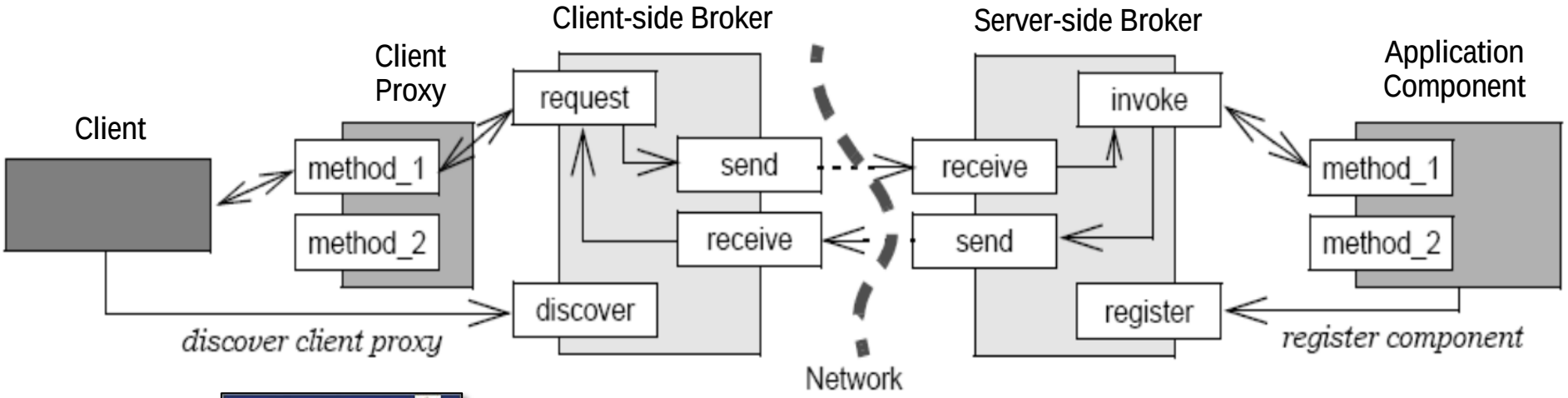
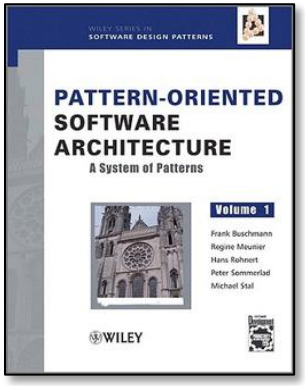


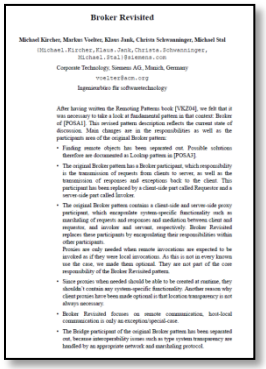
Android's Binder framework uses *Proxy* to support typed IPC

Overview of Topics Covered in Section 3

- **Section 3 – Communication Patterns Applied in Android**
  - *Broker*
    - Connect clients with remote objects by mediating invocations from clients to remote objects, while encapsulating details of local and/or remote IPC







See www.kircher-schwanninger.de/michael/publications/BrokerRevisited.pdf

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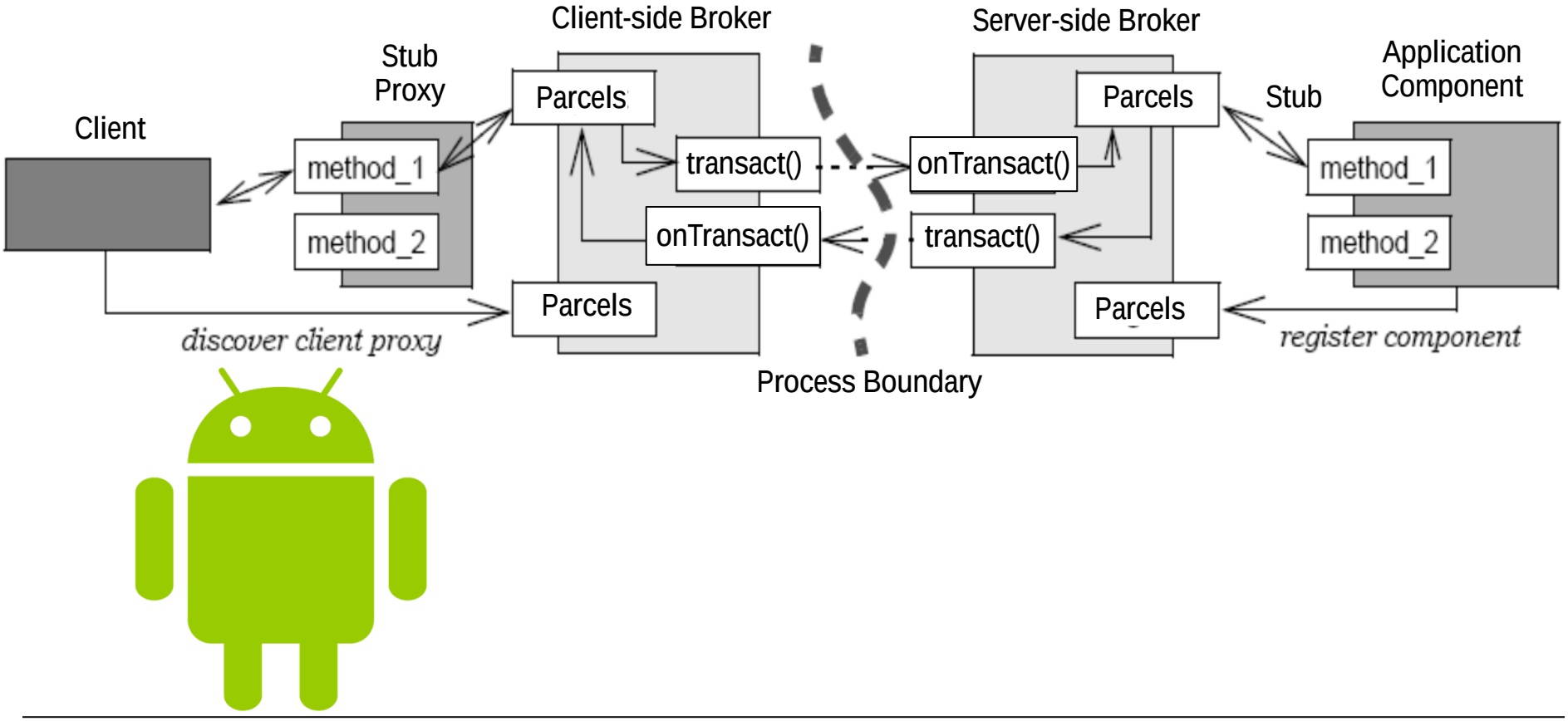

Android's Binder framework uses *Broker* to support object-oriented IPC

Overview of Topics Covered in Section 3

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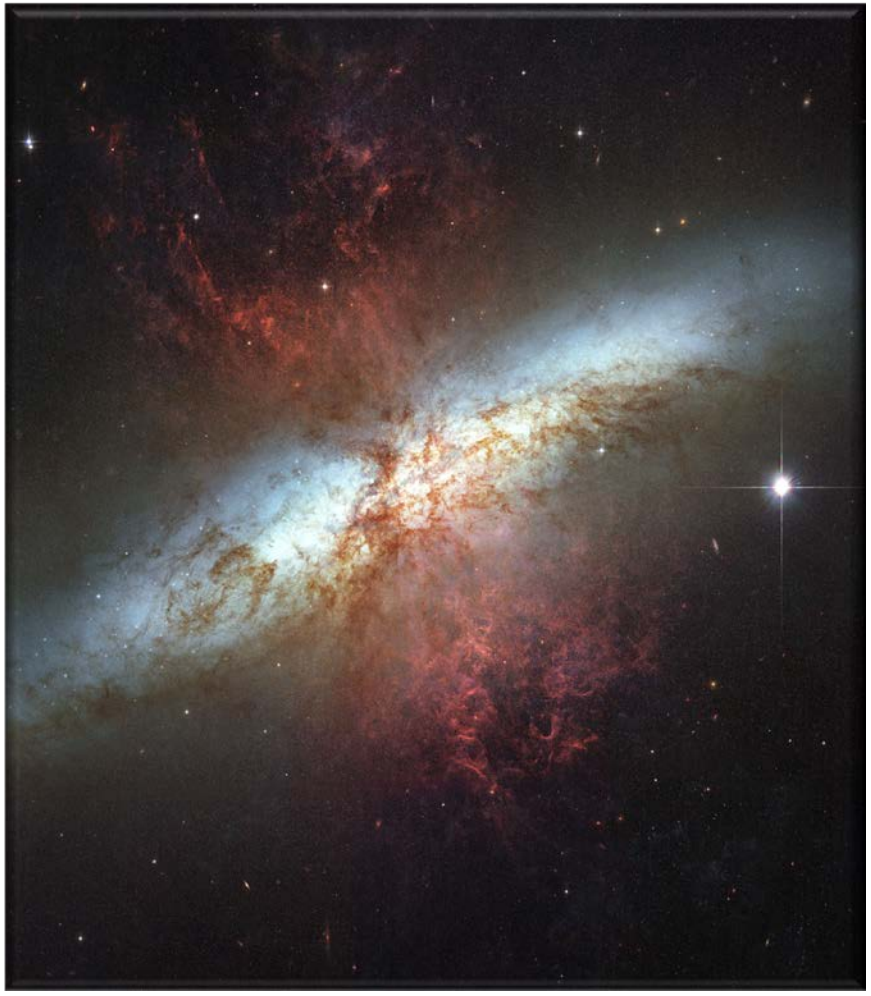

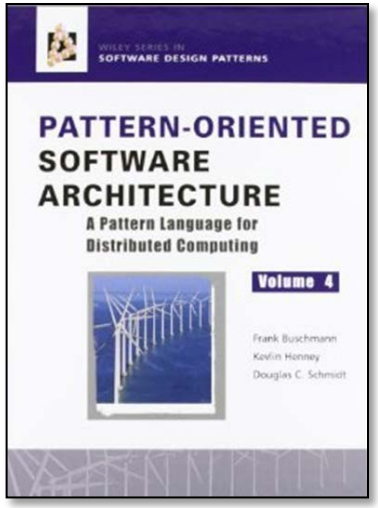

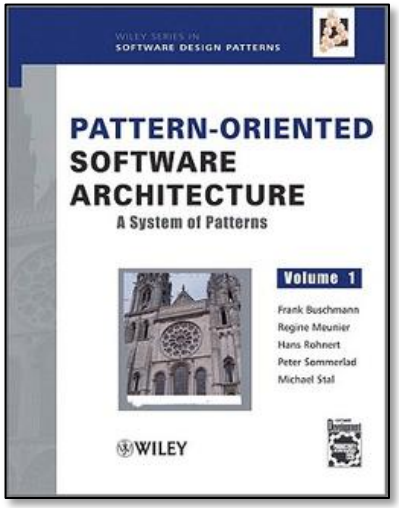

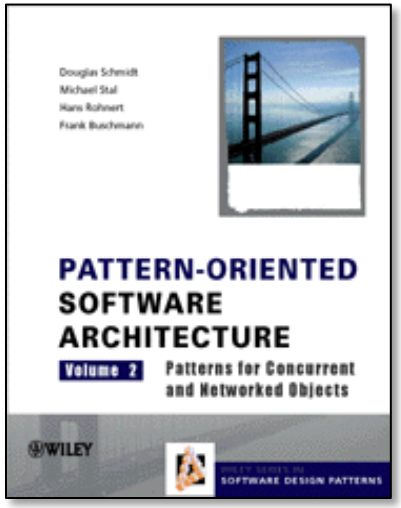

These patterns aren't limited to Android, Java, or mobile device programming

Summary

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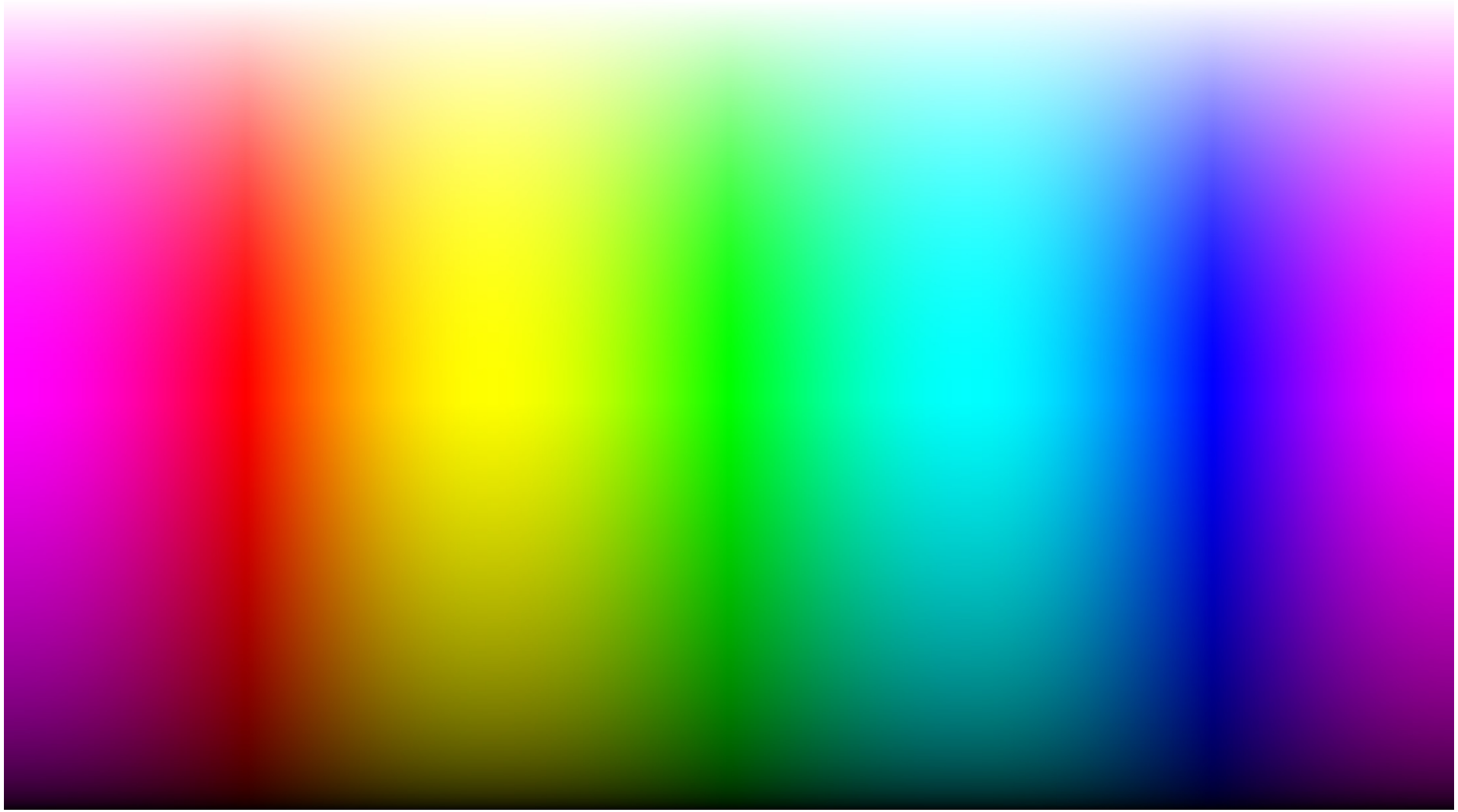
- This MOOC covers a spectrum of topics



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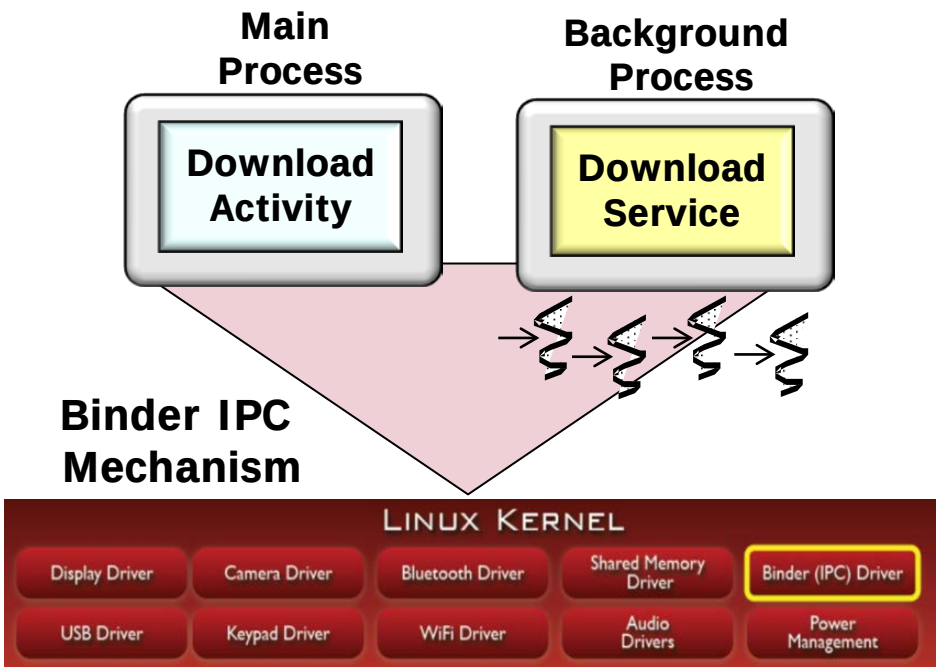

Summary

- This MOOC covers a spectrum of topics
- We analyze lots of Android software

See github.com/douglascraigschmidt/POSA-15/wiki/POSA-15-FAQ item #25

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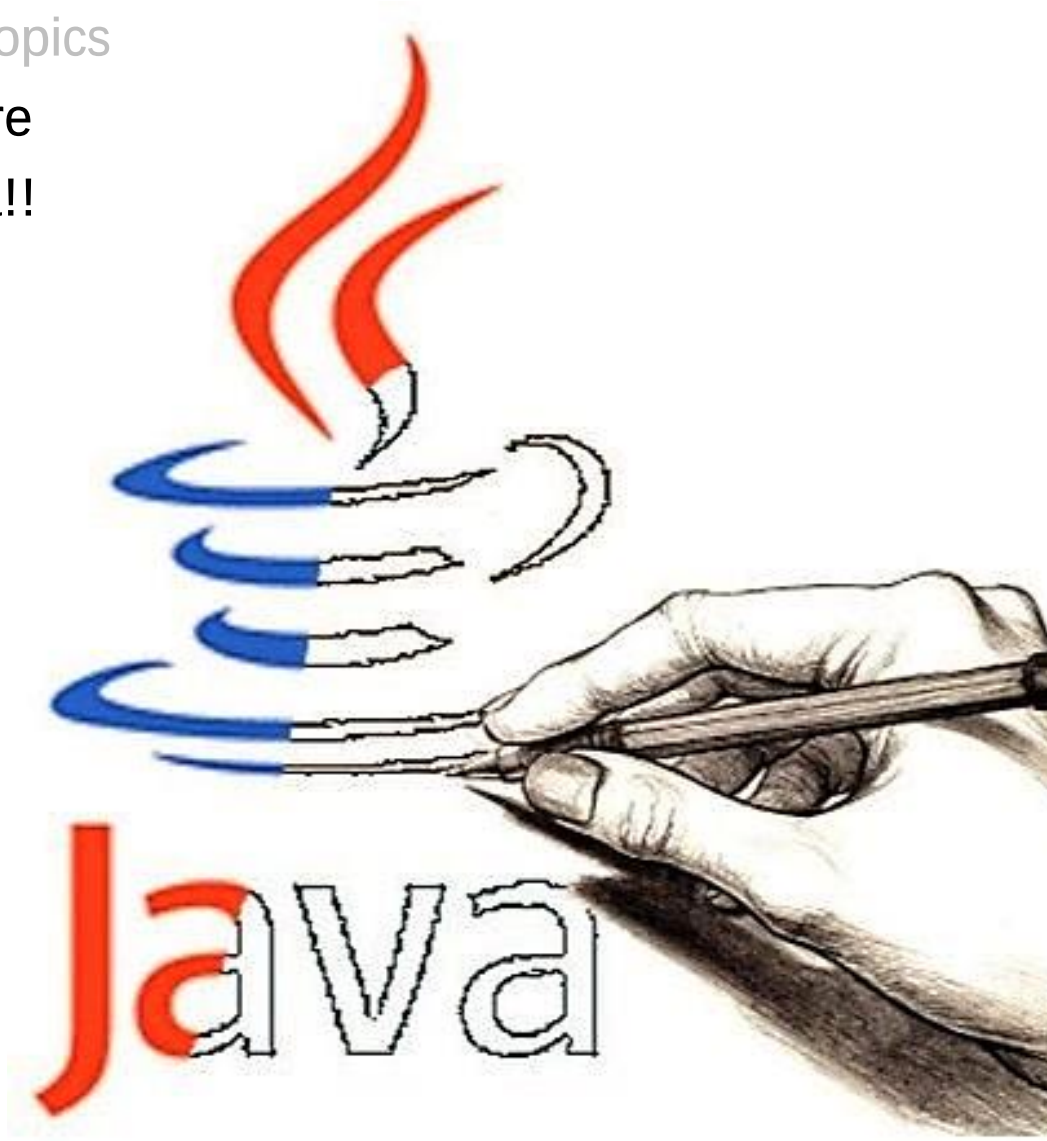

See github.com/douglascraigschmidt/POSA-15/wiki/POSA-15-FAQ item #7