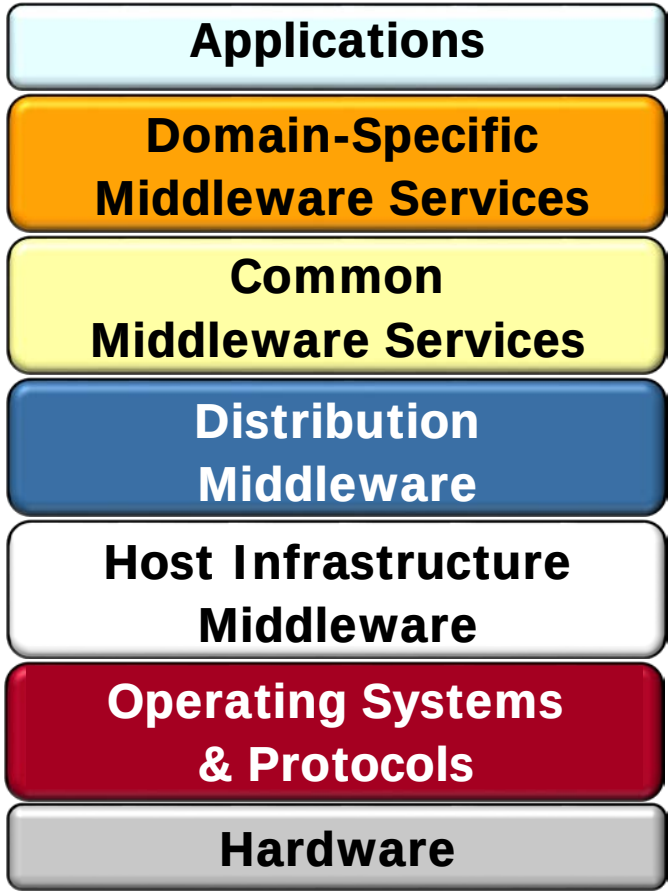
Infrastructure Middleware (Part 0): An Introduction to Key Concepts

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

Institute for Software Integrated Systems
Vanderbilt University
Nashville, Tennessee, USA

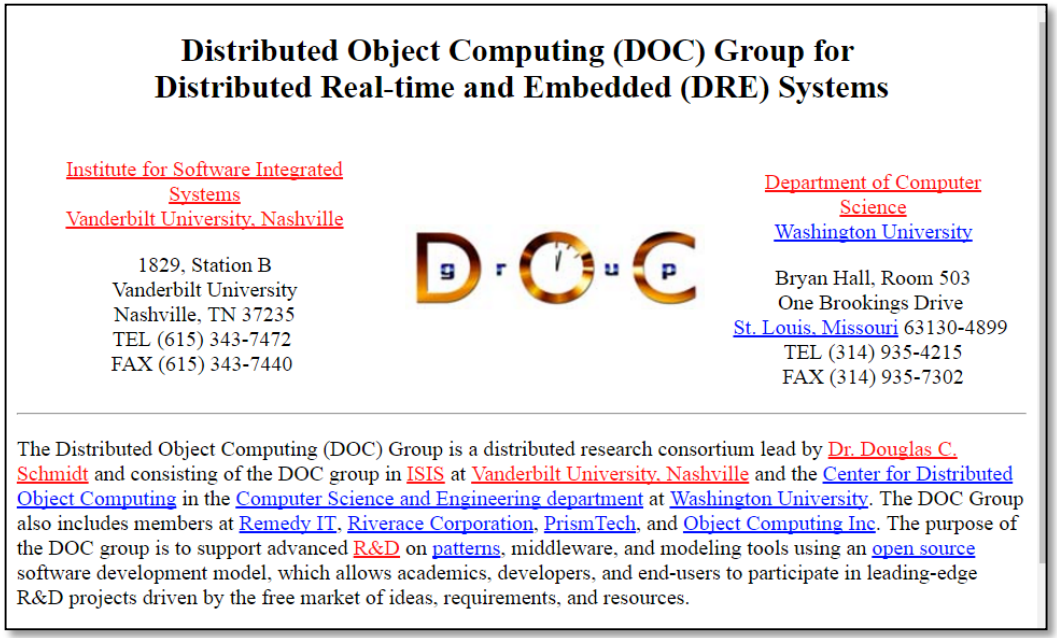
Learning Objectives in this Part of the Lesson

- Understand key capabilities & benefits of middleware & middleware infrastructure



Learning Objectives in this Part of the Lesson

- Understand key capabilities & benefits of middleware & middleware infrastructure
  - Much more info on my website



Distributed Object Computing (DOC) Group for Distributed Real-time and Embedded (DRE) Systems

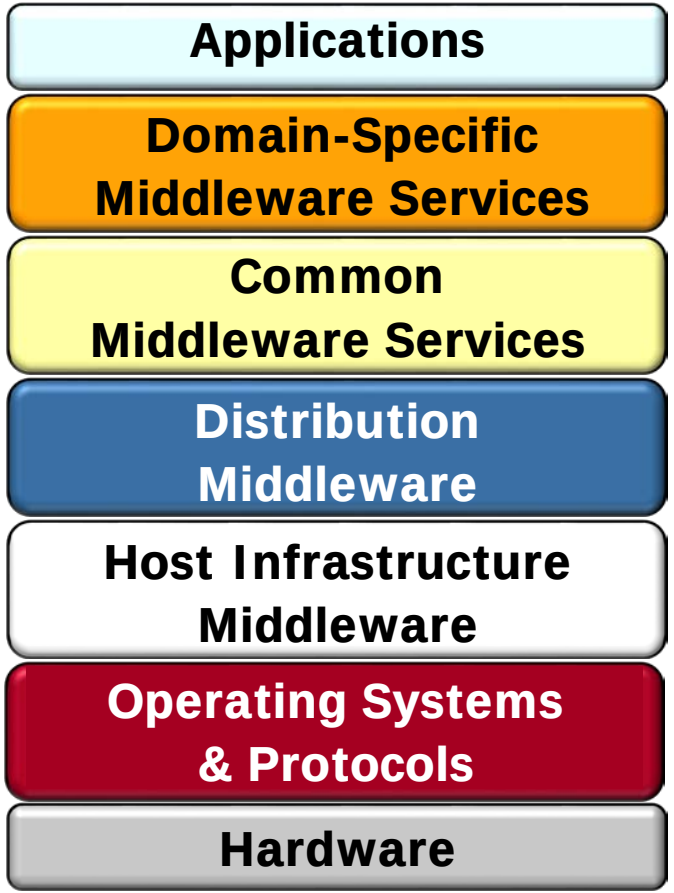
Institute for Software Integrated Systems
Vanderbilt University, Nashville

1829, Station B
Vanderbilt University
Nashville, TN 37235
TEL (615) 343-7472
FAX (615) 343-7440

Department of Computer Science
Washington University

Bryan Hall, Room 503
One Brookings Drive
St. Louis, Missouri 63130-4899
TEL (314) 935-4215
FAX (314) 935-7302

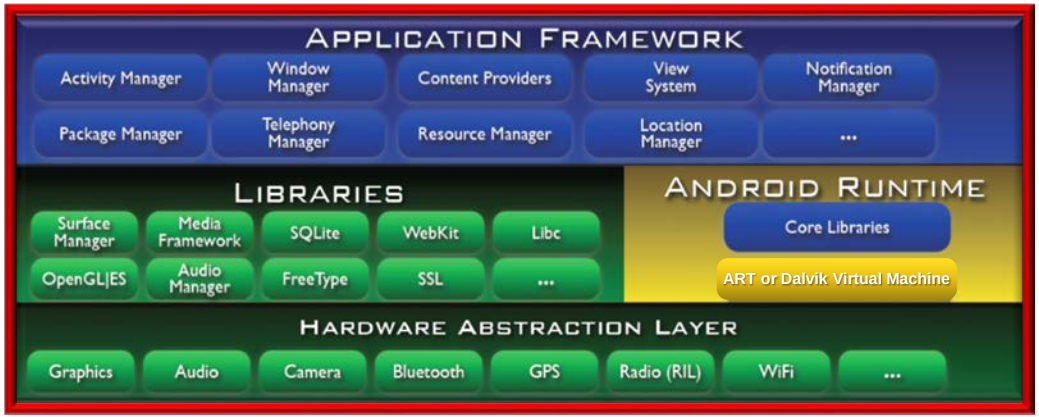
The Distributed Object Computing (DOC) Group is a distributed research consortium lead by Dr. Douglas C. Schmidt and consisting of the DOC group in ISIS at Vanderbilt University, Nashville and the Center for Distributed Object Computing in the Computer Science and Engineering department at Washington University. The DOC Group also includes members at Remedy IT, Riverace Corporation, PrismTech, and Object Computing Inc. The purpose of the DOC group is to support advanced R&D on patterns, middleware, and modeling tools using an open source software development model, which allows academics, developers, and end-users to participate in leading-edge R&D projects driven by the free market of ideas, requirements, and resources.

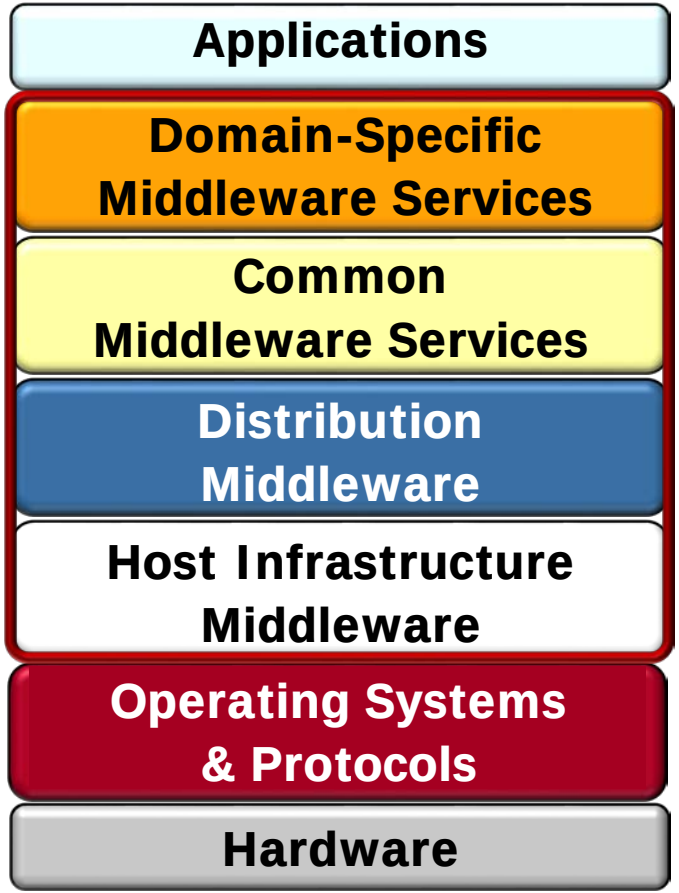


See www.dre.vanderbilt.edu

Learning Objectives in this Part of the Lesson

- Understand key capabilities & benefits of middleware & middleware infrastructure
- Recognize how Android supports key layers of middleware & middleware infrastructure





Overview of Middleware & Middleware Infrastructure

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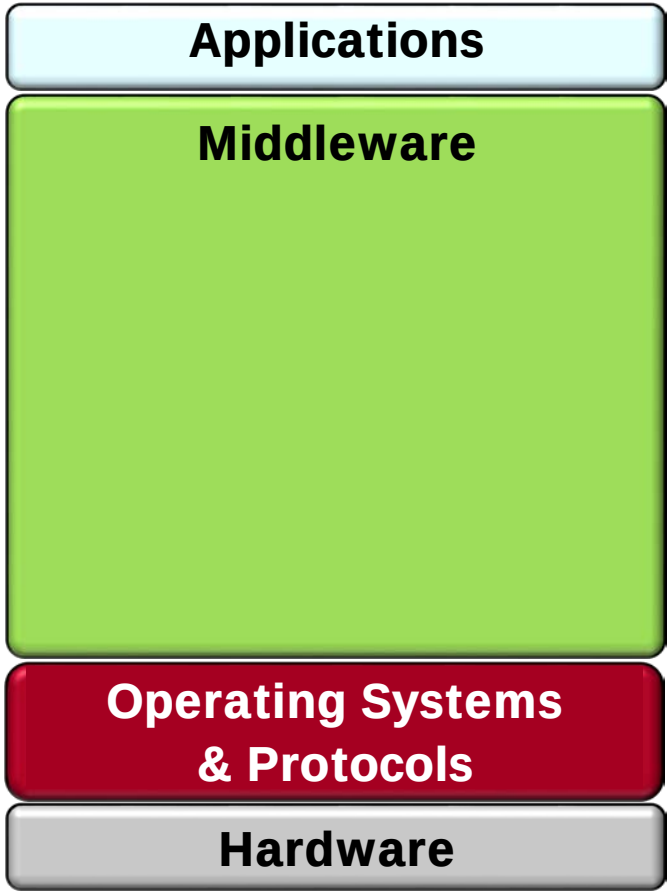
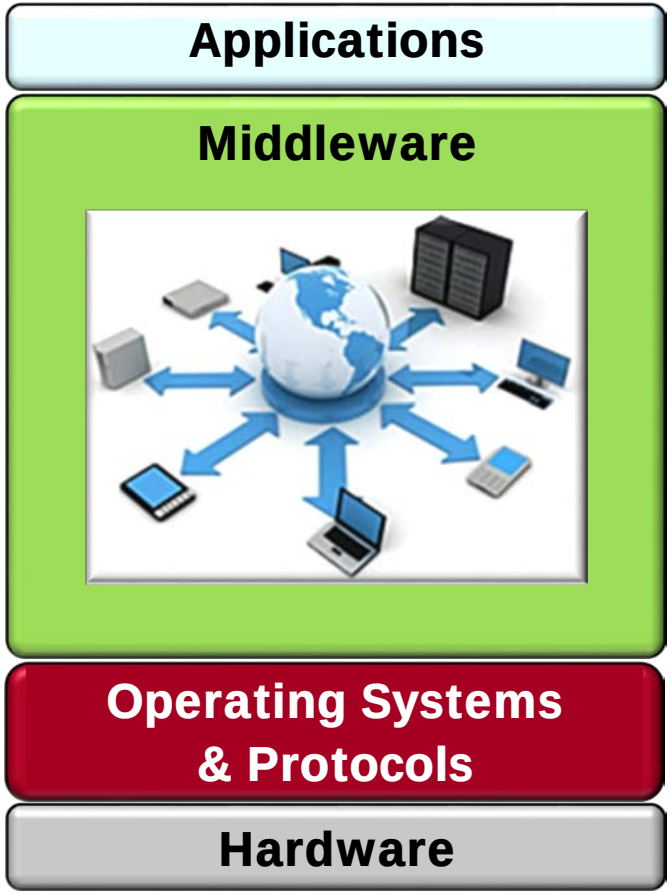
- *Middleware* is software residing atop the OS —but below apps—that provides benefits



See en.wikipedia.org/wiki/Middleware

Overview of Middleware & Middleware Infrastructure

- *Middleware* is software residing atop the OS —but below apps—that provides benefits, e.g.
  - Leverage advances in hardware & software technologies
    - e.g., enable apps to transparently take advantage of improvements in multi-core CPUs, networks, storage, power, etc.



See www.dre.vanderbilt.edu/~schmidt/PDF/middleware-encyclopedia.pdf

Overview of Middleware & Middleware Infrastructure

- *Middleware* is software residing atop the OS —but below apps—that provides benefits, e.g.
  - Leverage advances in hardware & software technologies
  - Simplify the evolution of apps to meet new requirements & environments, e.g.
    - New form factors
      - Such as wearables
    - New missions
      - Such as providing reliable comms to first responders after natural disasters

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Overview of Middleware & Middleware Infrastructure

- *Middleware* is software residing atop the OS —but below apps—that provides benefits, e.g.
  - Leverage advances in hardware & software technologies
  - Simplify the evolution of apps to meet new requirements & environments
  - Increase developer productivity via reusable app-oriented common services
    - e.g., caching, geo-location, transparent load-balancing, federated single-sign-on, etc.

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Overview of Middleware & Middleware Infrastructure

- *Middleware* is software residing atop the OS —but below apps—that provides benefits, e.g.
  - Leverage advances in hardware & software technologies
  - Simplify the evolution of apps to meet new requirements & environments
  - Increase developer productivity via reusable app-oriented services
  - Enhance performance & end-to-end quality -of-service (QoS)
    - e.g., fine-grained specification & control of latency, throughput, & replication

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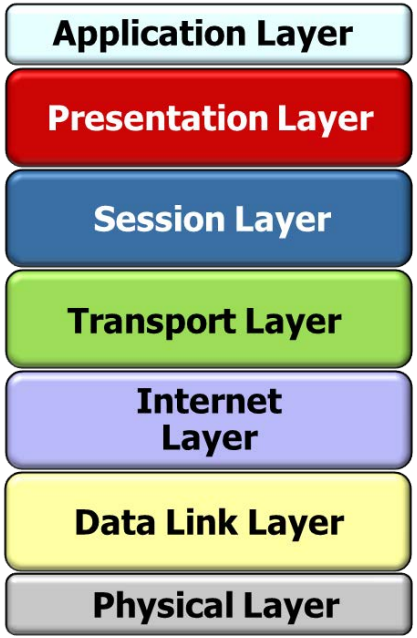
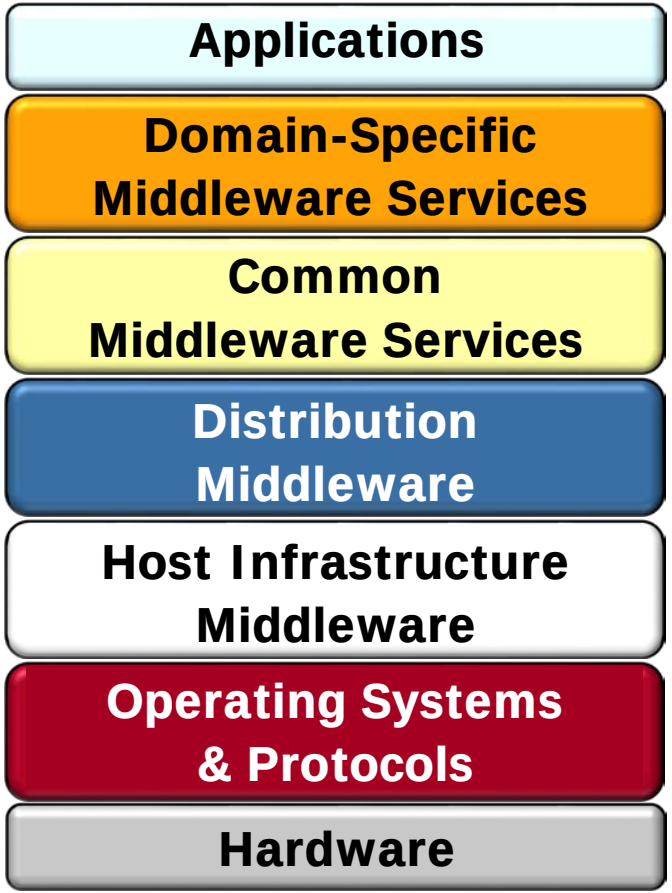
Overview of Middleware & Middleware Infrastructure

- There are layers of middleware, just like there are layers of networking protocols



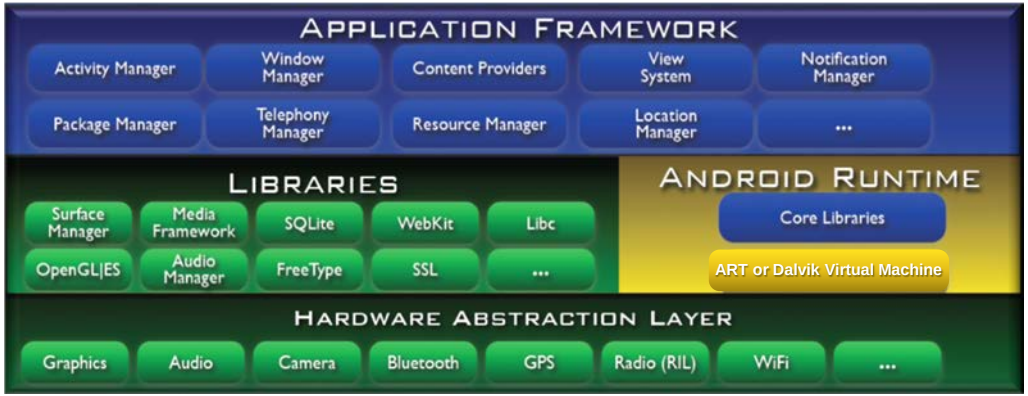


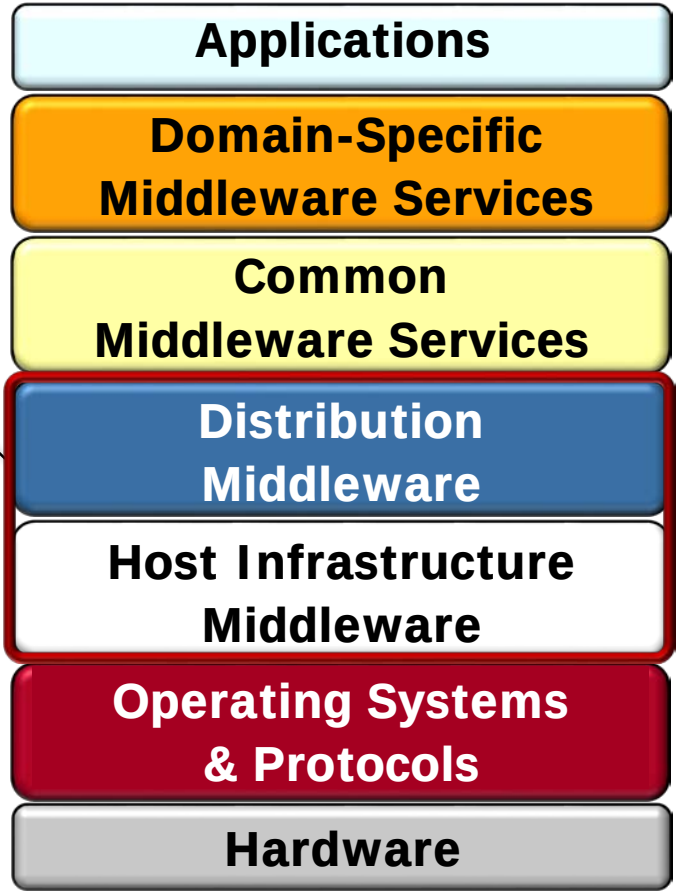
See earlier lesson on an “Overview of Layered Architectures”

Overview of Middleware & Middleware Infrastructure

- There are layers of middleware, just like there are layers of networking protocols

Android's middleware infrastructure layers provide reusable capabilities that extend Android Linux kernel mechanisms





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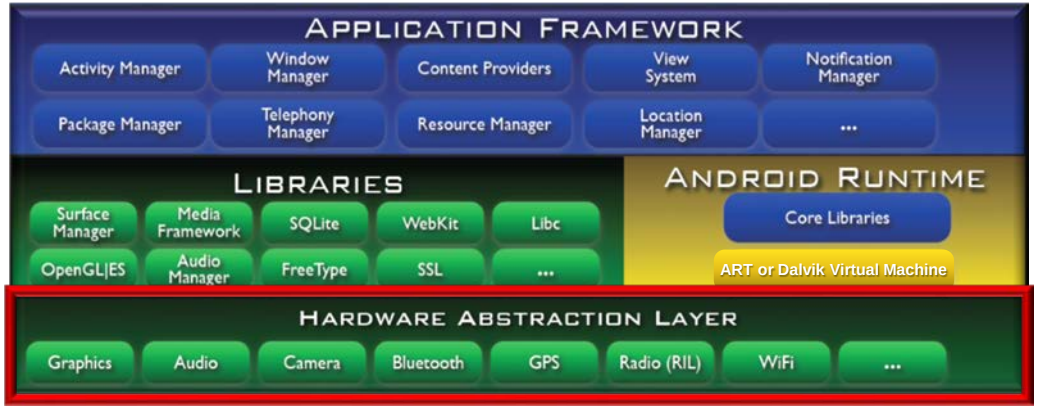

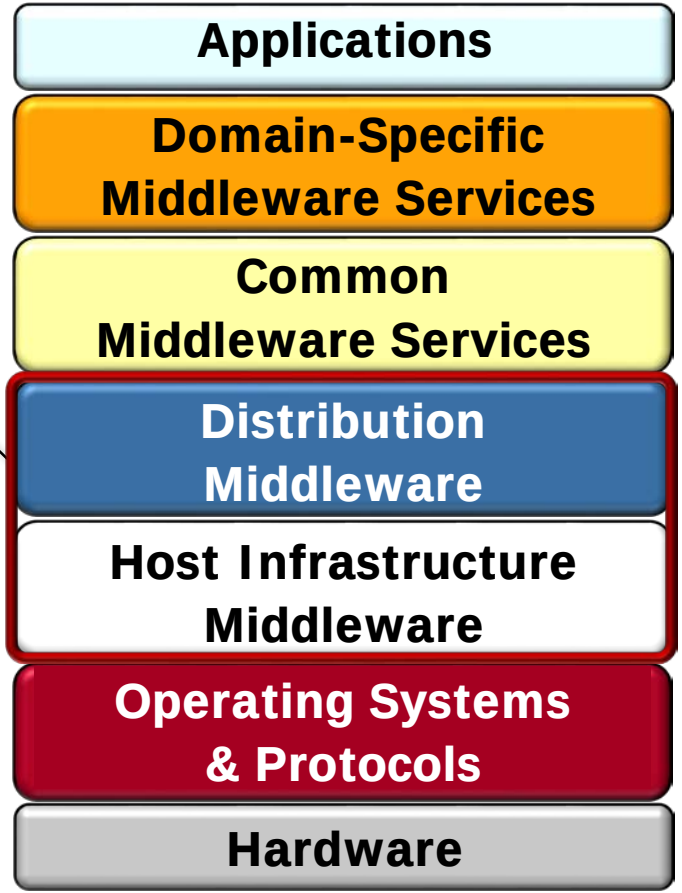

See Part 1 of this lesson on an "Android Hardware Abstraction Layer (HAL)"

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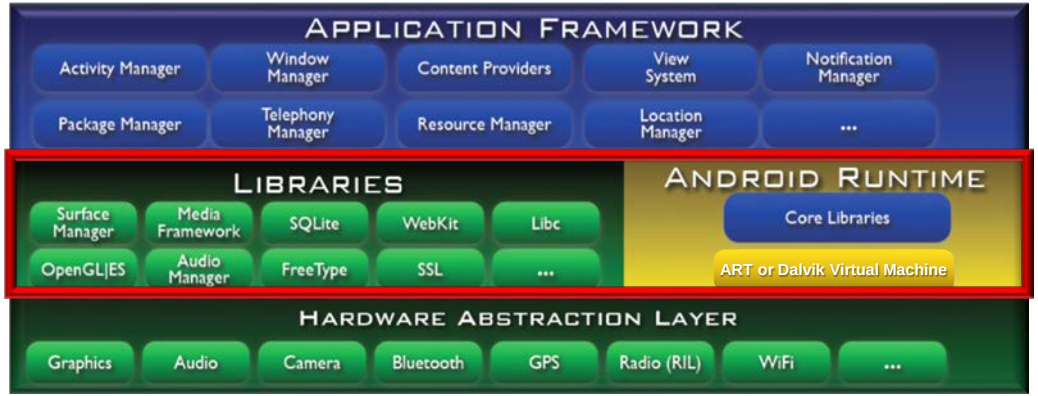

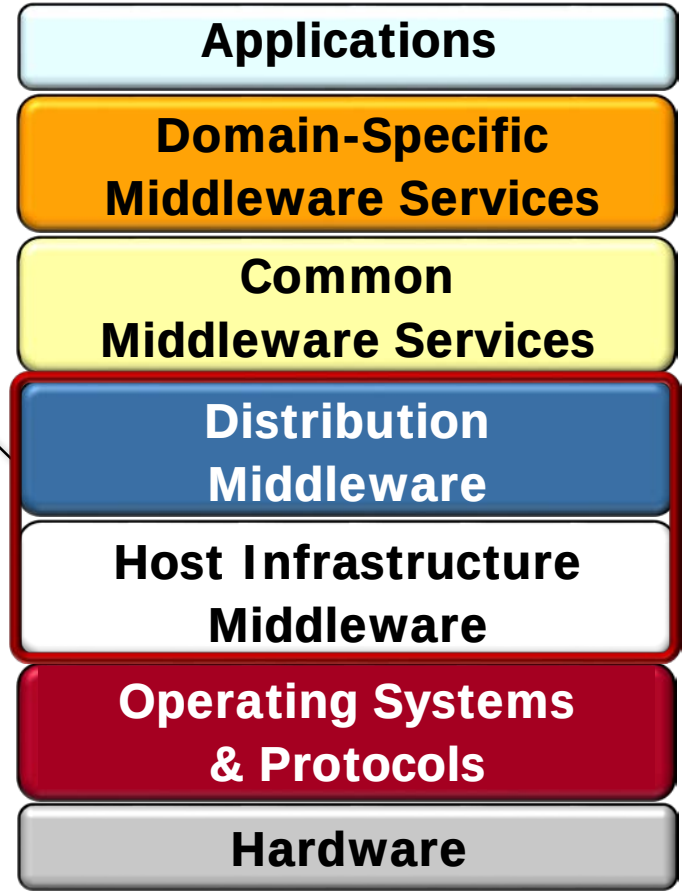

See Part 2 of this lesson on an "Android Runtime Execution Environment"

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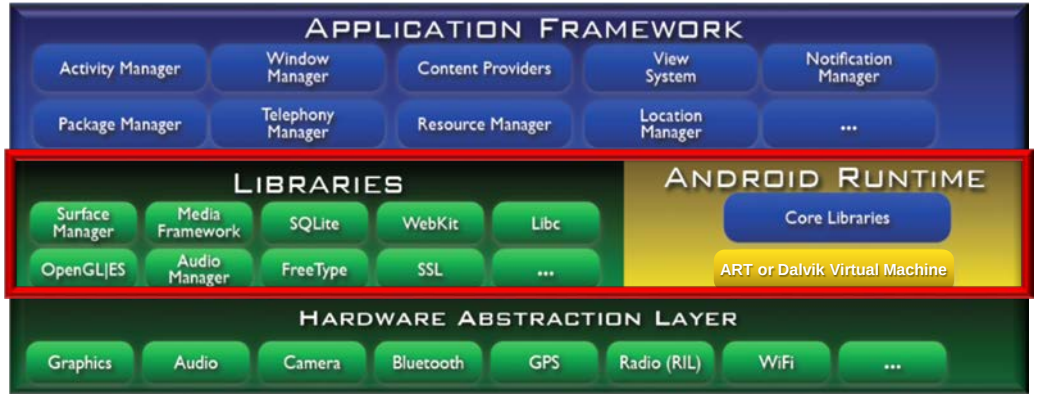

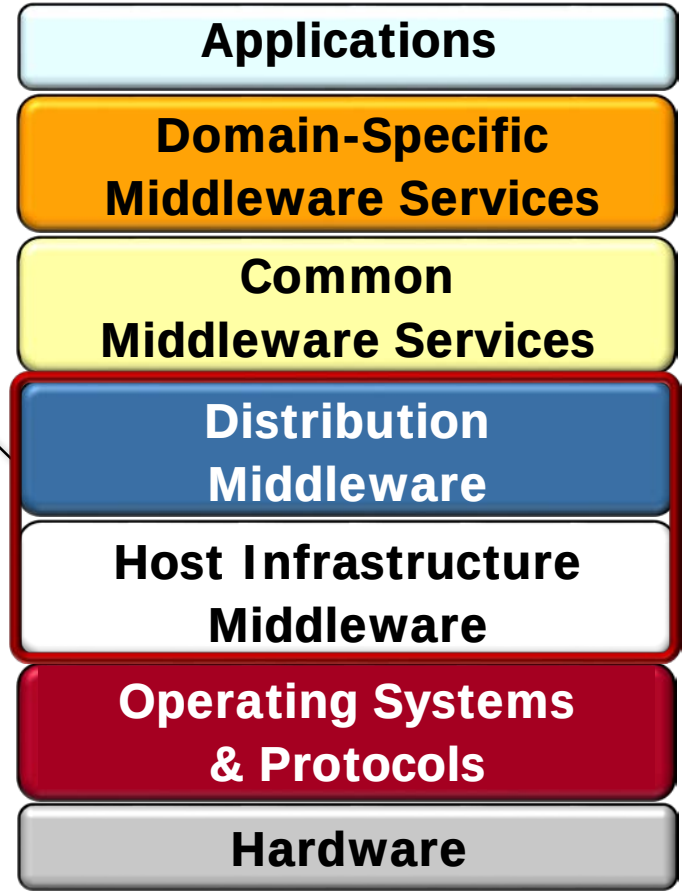

See Part 3 of this lesson on an "Android Runtime Core & Native Libraries"

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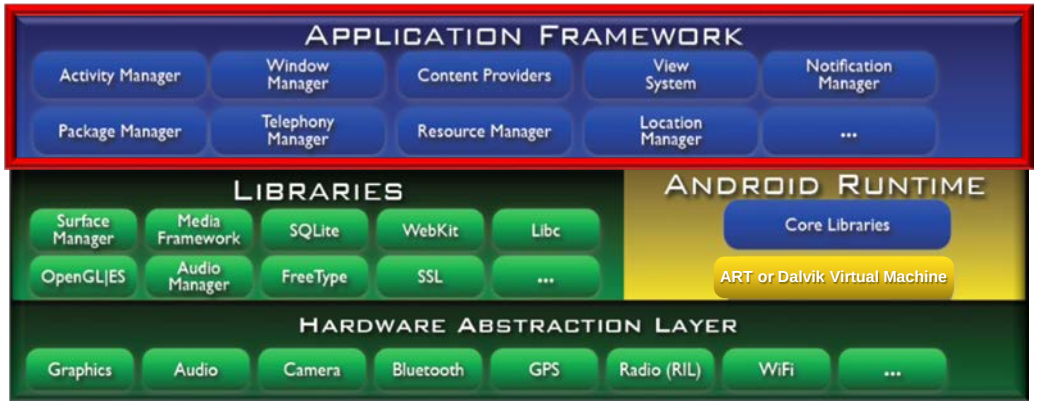
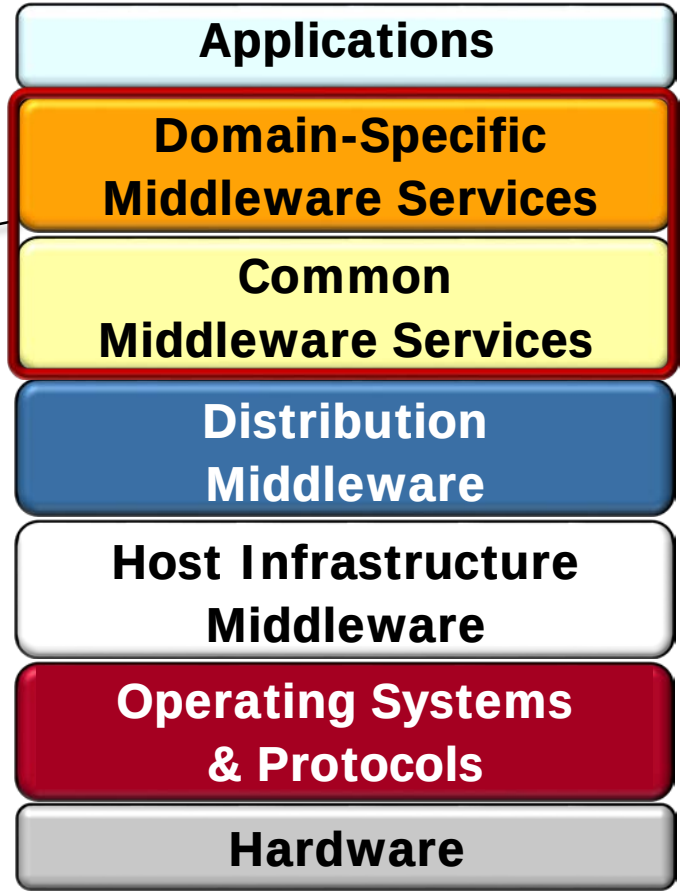
A higher layer of Android's middleware stack is covered later in this module





See upcoming lesson on an "Android Common Services & Apps"

End of Infrastructure Middleware (Part 0): An Introduction to Key Concepts