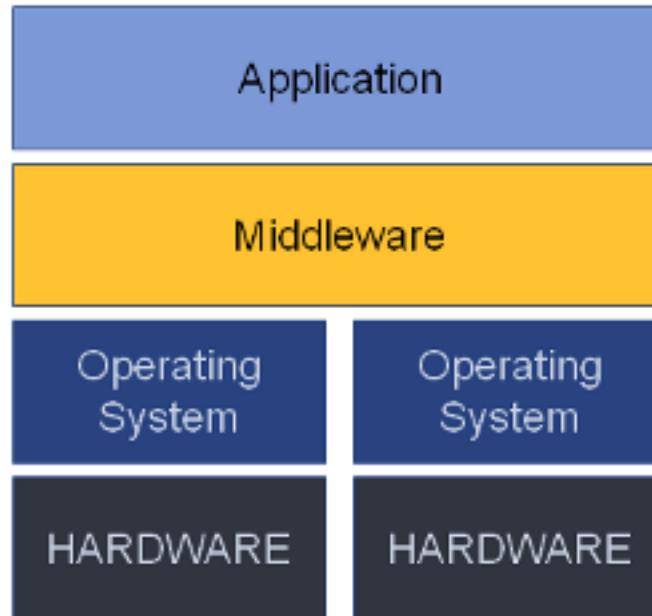


Introduction to Middleware

General Concept

- A class of standalone system-level software and service procedures, working on top of OS
- Managing computational resources and network communications for supporting distributed applications in sharing resources among various technologies



Major Functionalities

- Addressing issues related to inter-connectivity and inter-operability in heterogeneous network environments
 - Providing standardized interfaces and protocols
 - Hiding implementation details
 - Increasing the portability of applications
- Middleware is placed on top of OS and DBMS
 - Providing environments for the execution and development of higher-level applications
 - Assisting software engineers in flexibly and efficiently developing and integrating complex distributed software

Major Factors Driving the Emergence and Evolvment of Middleware Technologies

- Hiding the heterogeneity
 - Hardware heterogeneity, OS heterogeneity, database heterogeneity, etc.
- Supporting inter-operability
 - Among different platforms, network protocols and communication mechanisms
- Promoting software reuse
 - For improving efficiency and quality of software development

Major Categories

- Remote procedure call (RPC) middleware
- Object request brokers (ORB) middleware
- Message-oriented middleware (MOM)
- Database access middleware
- Transaction processing middleware
- ...