

Material and some slide content from:

- Emerson Murphy-Hill, Reid Holmes
- Software Architecture: Foundations, Theory, and Practice
- Essential Software Architecture



Architectural Style Intro

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Attribute Driven Design

- ▶ Choose module to decompose
 - ▶ Initially whole system is one module
- ▶ Refine the module
 - ▶ Choose arch drivers from NFR and FR
 - ▶ Choose arch style that satisfies them
 - ▶ Create modules based on style
 - ▶ Allocate functionality to each module
 - ▶ Define interfaces for modules
 - ▶ Verify and evaluate against NFR and FR
- ▶ Repeat until you cannot decompose

Architectural styles

- ▶ Some design choices are better than others
 - ▶ Experience can guide us towards beneficial sets of choices (patterns) that have positive properties
- ▶ An architectural style is a named collection of architectural design decisions that:
 - ▶ Are applicable to a given context
 - ▶ Constrain design decisions
 - ▶ Elicit beneficial qualities in resulting systems

Architectural styles

A set of architectural design decisions that are applicable to a recurring design problem, and parameterized to account for different software development contexts in which that problem appears.

e.g., Three-tier architectural pattern:



Architectural styles

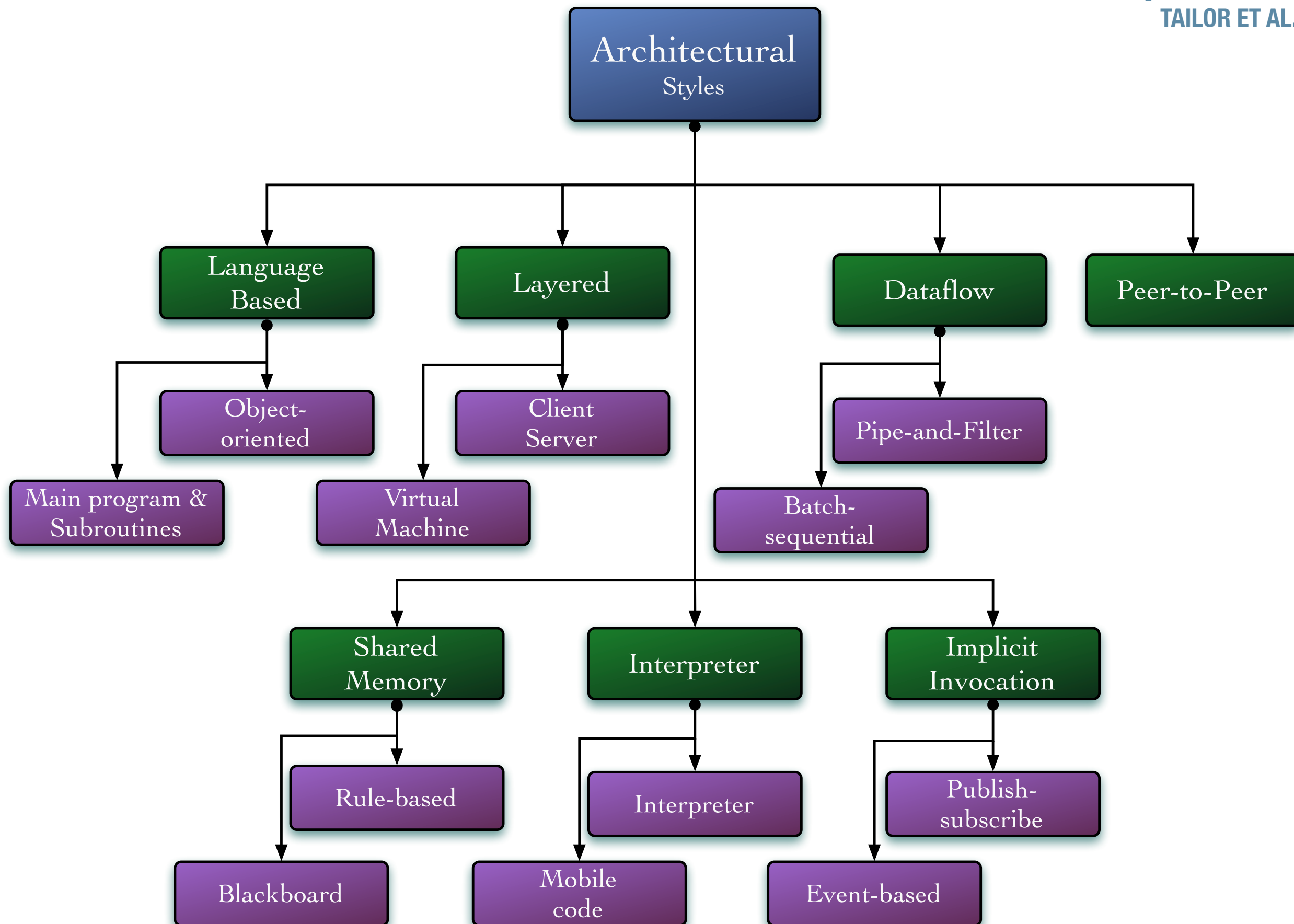
- ▶ Defines a family of architectures that are constrained by:
 - ▶ Component/connector vocabulary
 - ▶ Topology
 - ▶ Semantic constraints
- ▶ When describing styles diagrammatically:
 - ▶ Nodes == components (e.g., procedures, modules, processes, databases, ...)
 - ▶ Edges == connectors (e.g., procedure calls, events, db queries, pipes, ...)

Good properties of an architecture

- ▶ Result in a consistent set of principled techniques
- ▶ Resilient in the face of (inevitable) changes
- ▶ Source of guidance through product lifetime
- ▶ Reuse of established engineering knowledge

“Pure” architectural styles

- ▶ Pure architectural styles are rarely used in practice
- ▶ Systems in practice:
 - ▶ Regularly deviate from pure styles.
 - ▶ Typically feature many architectural styles.
- ▶ Architects must understand the “pure” styles to understand the strength and weaknesses of the style as well as the consequences of deviating from the style.



Arch Activity

Presentation

- ▶ 20 minute maximum
- ▶ Two primary components:
 - ▶ Description of how the style / pattern is useful over time
 - ▶ Comprehensive example / tutorial that demonstrates the dynamic nature of the style / pattern
- ▶ No slides; be creative. Make it memorable.

Arch Style - D2 Document

- ▶ Have its own vocabulary for its components and connectors? (define)
- ▶ Impose specific topological constraints?
- ▶ Most applicable to specific kinds of problems?
- ▶ What specific positive behaviours does it engender?
- ▶ Have any specific negative behaviours?
- ▶ Support/inhibit specific NFPs?