

# Architectural Decision Records

*Software Architecture*

Richard Thomas & Guangdong Bai

March 3, 2025

# Developer Reaction to Reading Software Architecture Documentation



*Question*

How do you know why certain decisions were made in the architectural design?

*Question*


How do you know why certain decisions were made in the architectural design?

*Answer*

*Architectural Decision Records (ADRs)*

## Record Decisions that Influence

- *Structure* of the architecture
- Delivery of *quality attributes*
- *Dependencies* between important parts of the architecture
- *Interfaces* between important parts of the architecture
  - or external interfaces
- *Principles* about implementation techniques or platforms
- More "why certain decisions were made" than "what are in structure, interfaces, etc."



```
//  
// Dear maintainer:  
//  
// Once you are done trying to 'optimize' this routine,  
// and have realized what a terrible mistake that was,  
// please increment the following counter as a warning  
// to the next guy:  
//  
// total_hours_wasted_here = 42  
//
```

*Question*

Why ADRs?

*Question*

Why ADRs?

*Answer*

My code will defeat the architectural design,  
*if* I do not know why it was designed that way.



## Why ADRs

- *Team* alignment to ensure all stakeholders are on the same page regarding architectural choice
  - Onboarding team members sync up on past decisions.
- *Traceability* to allow the team to track how architecture evolves
- Decision *justification* to defend decisions when questioned later
- Preserve *knowledge* for future reference

*ADRs*

Record a *single* decision

*ADRs*

Are *never* deleted

Mark as *superseded* and link to new decision

*Question*

Where are ADRs documented?

*Question*

Where are ADRs documented?

*Answer*

Each decision is a separate file in the project repository<sup>1</sup>

---

<sup>1</sup>See the **adrs** directory in the [C4 Model](#) on the course website.

# ADR Management Tools

- Log4brains
  - Generates ADRs from Markdown files.
  - Provides a web-based UI for browsing ADRs.
- adr-tools
  - A light-weight command-line tool.
  - Generates ADR templates automatically.

# ADR Template *[Nygard, 2011]*

**Title** Short phrase describing the decision

**Date** When the decision was made

**Status** Current status of the decision

- proposed, accepted, deprecated, superseded, rejected

**Summary** Summarise the decision and its rationale

**Context** Describe the facts that influence the decision

**Decision** Explain how the decision will solve the problem

**Consequences** Impact of the decision

- what's easier to do
- what's harder to do

# ADR Example

## 1. Independent Business Logic

---

Date: 2022-01-06

### Status

---

Accepted

### Summary

---

*In the context of delivering an application with multiple platform interfaces, facing budget constraints on development costs, we decided to implement all business logic in an independent tier of the software architecture, to achieve consistent logical behaviour across platforms, accepting potential complexity of interfaces to different platforms.*

### Context

---

- The system is to have both mobile and web application frontends.
- Marketing department wants a similar user experience across platforms.
- Delivering functional requirements requires complex processing and database transactions.
  - Product recommendations based on both a customer's history and on purchasing behaviour of similar customers.
  - Recording all customer interactions in the application.
- Sales department wants customers to be able to change between using mobile and web applications without interrupting their sales experience.
- Development team has experience using Java.

### Decision

---

All business logic will be implemented in its own tier of the software architecture. Web and mobile applications will implement the interaction tier. They will communicate with the backend to perform all logic processing. This provides clear separation of concerns and ensures consistency of business logic across frontend applications. It means the business logic only needs to be implemented once. This follows good design practices and common user interface design patterns.

The business logic will be implemented in Java. This suits the current development team's experience and is a common environment. Java has good performance characteristics. Java has good support for interacting with databases, to deliver the data storage and transaction processing requirements.

### Consequences

---

#### Advantages

- Separation of concerns, keeping application logic and interface logic separate.
- Ensures consistency, if business logic is only implemented in one place.
- Business logic can execute in a computing environment optimised for processing and transactions.
  - Also makes load balancing easier to implement.

Neutral



*Reading...*

“Architectural Decision Records” Notes *[Thomas, 2023]*

## References

[Nygard, 2011] Nygard, M. (2011).

Documenting architecture decisions.

[https:](https://cognitect.com/blog/2011/11/15/documenting-architecture-decisions)

[//cognitect.com/blog/2011/11/15/documenting-architecture-decisions.](https://cognitect.com/blog/2011/11/15/documenting-architecture-decisions)

Accessed: 2022-01-27.

[Thomas, 2023] Thomas, R. (2023).

Architectural decision records.

[https://csse6400.uqcloud.net/handouts/adr.pdf.](https://csse6400.uqcloud.net/handouts/adr.pdf)