Agile Product Roadmaps for Software Architecture

James Siddle, Skyhook Consulting Ltd
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Before we begin...

What’s this all about, and who are you?
What, exactly, is a Product Manager?
Topics for this session

Product Management Intro
Software Architecture in a nutshell
Strategic Product Tools - for architects
Roadmapping worked example
Delivery Tools / Stakeholder engagement
Architecture as a Product

Agile Roadmaps for Software Architecture? I still don't know what you're planning to talk about.

Please start the presentation already.
A Product Manager

Is the **voice** of the customer
... who cares about **creating** products
... and wants to **delight** users
### (Agile) Product Management Tools

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<tr>
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Software Architecture
In a nutshell

High-level technical structure

Major, hard to change decisions

Qualities and trade-offs

Architectural styles, patterns
Examples

A new app hosting platform
Reworking an existing system
Introduction of common patterns
Strategic Product Tools

Tell me more about the product management tools, they sound really cool and useful.

I want to know what they have to do with Software Architecture.
Product Tools applied to Architecture

**Product Vision**
- Goals
- Testable Hypo’s and Metrics
- Roadmaps
- Product Backlog
- Sprint Timeline

Key concepts, qualities
- Skeletal stepping stones
- Proven in reality
- Show evolution
- Delivery and dependencies
- Balance features with tech
Product Vision

Key concepts
Core structure

Motivating qualities
Architecture purpose

Major decisions
...in principle

Proposed patterns
"We will build a platform to ingest and expose previously siloed, high-value data from across the business, for all new application development. This will transform the company’s ability to adapt to changes in the marketplace, and will give us the opportunity to consolidate duplicated data, improve efficiency, and reduce costs. We’ll implement a data transformation broker, highly scalable document-centric data store, and cloud-based microservices to achieve this."
“We will **build a platform to ingest and expose previously siloed, high-value data** from across the business, for all **new application development**. This will transform the company’s ability to adapt to changes in the marketplace, and will give us the opportunity to **consolidate duplicated data**, improve efficiency, and reduce costs. We’ll implement a data transformation broker, highly scalable document-centric data store, and cloud based microservices to achieve this."
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Product Tools applied to Architecture

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Key concepts, qualities
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- Proven in reality
- Show evolution
- Delivery and dependencies
- Balance features with tech
Belay points
Goals

- Structural elaboration
- Architecture evolution
- Technical decisions
- De-risking decisions
- NFR delivery
- Quality realisation
- Expected tradeoffs
- Pattern sequence
# Platform Goals

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<td><strong>2.</strong></td>
<td><strong>Elaborate Data Integration Architecture</strong></td>
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<tr>
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<td>a. Make changes as needed, but incrementally to address key risks first</td>
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<td>b. Develop in a staging environment</td>
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<td>c. Primary goal is to prove that key data integration use cases are supported</td>
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<td><strong>3.</strong></td>
<td><strong>Promote new architecture into production</strong></td>
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<td>a. Requires parity with existing data available to users</td>
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<td><strong>4.</strong></td>
<td><strong>Integrate key skincare datasets to enable Athlete’s Foot and Psoriasis research</strong></td>
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<tr>
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<td>a. Ensure minimum data is available to support initial research programmes</td>
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<td><strong>5.</strong></td>
<td><strong>Ensure user tools meet minimum user needs for research programmes</strong></td>
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2. **Elaborate Data Integration Architecture**
   a. Make changes as needed, but incrementally to address key risks first
   b. Develop in a staging environment
   c. Primary goal is to prove that key data integration use cases are supported
3. **Promote new architecture into production**
   a. Requires parity with existing data available to users
4. **Integrate key skincare datasets to enable Athlete’s Foot and Psoriasis research**
   a. Ensure minimum data is available to support initial research programmes
5. **Ensure user tools meet minimum user needs for research programmes**
   a. Add capabilities to expose underlying data as needed (TBD)
6. **Enhance user tools based on rapid user feedback cycle**
Goals Example - key steps

1. Stabilize production infrastructure
Goals Example - key steps

1. Stabilize production infrastructure

Major risk
Goals Example - key steps

1. Stabilize production infrastructure
2. Deliver skeletal data integration platform

Major risk
Goals Example - key steps

1. Stabilize production infrastructure
2. Deliver skeletal data integration platform

Major risk
Platform viability
Goals Example - key steps

1. Stabilize production infrastructure
2. Deliver skeletal data integration platform
3. Integrate core research data and deliver tools to scientists

Major risk: Platform viability
Goals Example - key steps

1. Stabilize production infrastructure
2. Deliver skeletal data integration platform
3. Integrate core research data and deliver tools to scientists

Major risk
Platform viability
Real world usage
Product Tools applied to Architecture

Product Vision
  Goals
  **Testable Hypo’s and Metrics**
  Roadmaps
  Product Backlog
  Sprint Timeline

Key concepts, qualities
  Skeletal stepping stones
  Proven in reality
  Show evolution
  Delivery and dependencies
  Balance features with tech
Testable Hypotheses and Metrics

- Test your architectural assumptions
- Evidence of sound decisions, expected consequences
- Reduce technical debt
- Patterns in reality
- Confirm context
Hypothesis

We assert that the new passport processing system:

1. Can establish a secure link to legacy data used for validating user details in passport applications
2. Will get the same results (in real-time) as the legacy application, indicating if the application is valid
3. Can utilize legacy data stores without adversely impacting existing operational workflows
4. Is viable as replacement for user detail validation currently performed by the legacy system
Establish secure connection
Hypothesis

Same results as legacy application

Replacement

Establish secure connection

Legacy Application

Her Majesty’s Passport Office / Passport Processing
Hypothesis

Same results as legacy application

Establish secure connection

Replacement

Legacy Application

No adverse operational impact
Hypothesis

Same results as legacy application

Establish secure connection

Viable replacement for legacy

Replacement

Legacy Application

No adverse operational impact

Her Majesty’s Passport Office / Passport Processing
Passport Processing - initial metrics

# of applications validated  Daily, eg. 472 today

# operational issues in legacy  1

# appls. rejected vs accepted  470 ✔ 2 ✗
Product Tools applied to Architecture

- Product Vision
- Goals
- Testable Hypo’s and Metrics
- **Roadmaps**
- Product Backlog
- Sprint Timeline

- Key concepts, qualities
- Skeletal stepping stones
- Proven in reality
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**InCites 2017 Product Roadmap**

**Q1**
- **New Authors per Document filter**
  Eliminate papers with hundreds or thousands of authors from your analysis so you can focus on meaningful collaborations.
- **Expanded custom datasets**
  Save up to 20 datasets from Web of Science at one time.
- **5-year trend graph**
  New graph restricts sources and citation to 5 year groups to produce consistent, upward trends.

**Q2**
- **Flexible Workflow**
  Upload and reuse datasets to build tiles, so that custom entities and groups can be represented and benchmarked together.
- **New journal indicators**
  Journal Quartiles will aid in evaluating output in top journals.

**Q3**
- **New system dashboards**
  New thematic dashboards to answer primary customer questions on research performance and collaboration.
- **Onboarding updates**
  Explore the InCites dataset with updated navigation.

**Q4**
- **New region classification**
  Assess the research output and impact of by European Union socio-economic region.
- **New subject classification**
  CAPES classification scheme based on Web of Science subject categories.
Roadmaps

- Illustrate elaboration
- Component deliveries
- Key dependencies

- Flag key decisions

- Show qualities and tradeoffs over time

- Show sequencing
<table>
<thead>
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<td>The release date or timeframe</td>
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<td><strong>When will the release be available?</strong></td>
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<td>The name of the new release</td>
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<td><strong>What is it called?</strong></td>
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<td>GOAL</td>
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<td>The reason for creating the new release</td>
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<td><strong>Why is it developed?</strong></td>
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<td><strong>Which benefit does it offer?</strong></td>
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<td>FEATURES</td>
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<td>The high-level features necessary to meet the goal</td>
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<td><strong>What are the 3-5 key features?</strong></td>
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<td>METRICS</td>
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<td>The metrics to determine if the goal has been met</td>
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<td><strong>How do we know that the goal is met?</strong></td>
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<td>APP WORKFLOW</td>
<td>Step 1</td>
<td>Step 2</td>
<td>Step 3</td>
<td>Step 4</td>
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*Feature Map* Roadmap format
Roadmapping: Worked Example

Can you please bring those things together so that I can make sense of them?
Vision: HR Company

Key concepts
- Recruitment intelligence
- Data harvesting, integration
- Tooling innovation, recommendations

Motivating qualities
- ML-ready data quality / integrity
- Ability to innovate quickly
- Security and regulation compliance

Decisions in principle
- Use Spark / HDFS for data processing
- Neo4J - host knowledge graph
- Amazon Web Services / EC2

Proposed Patterns
- Microservices
- Pipes and Filters
(1) Create a timeline
(2) Convey intent and theme
1 month: Data Foundations
Implement basic data retrieval, integration, distribution patterns

3 months: Core Platform
Build & deploy an alpha app, and quickly iterate on recommenders

6 months: Scaled Platform
Easily add new/interesting datasets, beta application

(3) Summarise your stepping stones
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<td>- harvest core datasets</td>
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<td>(4) Select a hypothesis to test your assumptions</td>
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<td>- make employers/ees searchable</td>
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<td></td>
<td>- build demo HR intelligence tool</td>
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<td></td>
<td>- experiment with recommenders</td>
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3 months: Core Platform
6 months: Scaled Platform

Goal
Implement basic data retrieval, integration, distribution patterns
Build & deploy an alpha app, and quickly iterate on recommenders
Integrate further interesting datasets, beta application

Hypothesis
We believe we can...
- harvest core datasets
- disambiguate and integrate data
- make employers/ees searchable
- build demo HR intelligence tool
- experiment with recommenders

Success metrics
0.8 f-score vs test set
Zero security incidents
Zero high sev PEN test results

(5) Quantify how you’ll prove your hypothesis

Features

NFR impact
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- disambiguate and integrate data  
- make employers/ees searchable  
- build demo HR intelligence tool  
- experiment with recommenders | 0.8 f-score vs test set  
Zero security incidents  
Zero high sev PEN test results | New app/model deploy < 12 hours  
Issue response < 48 hours  
App usage metrics available | |
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<td>- implement prod. infrastructure</td>
<td>- add three more datasets</td>
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<td>- disambiguate and integrate data</td>
<td>- roll an application out into alpha</td>
<td>- roll an application into beta</td>
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<td>- make employers/ees searchable</td>
<td>- gather feedback</td>
<td>- demo additional tools</td>
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<td>- build demo HR intelligence tool</td>
<td>- integrate a recommender</td>
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(6) Describe what will be built
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**Scalability (data processing)**  
**Operability (data management)** | (7) Show impact on qualities (+/-) |
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**Hypothesis**

*We believe we can...*

- harvest core datasets
- disambiguate and integrate data
- make employers/ees searchable
- build demo HR intelligence tool
- experiment with recommenders

- implement prod. infrastructure
- roll an application out into alpha
- gather feedback
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- iterate on recommenders

- add three more datasets
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**Success metrics**

- 0.8 f-score vs test set
- Zero security incidents
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- New app/model deploy < 12 hours
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**Features**

- Data harvesters / Spark / HDFS
- Entity disambiguator
- Core Knowledge Graph in Neo4J
- Recommender PoC

- Production infrastructure
- Microservice platform
- Recommender framework
- Instrumentation
- Alpha support model

**NFR impact**

- Data Integrity and Security
- Scalability (data processing)
- Operability (data management)

- Fault tolerance
- Scalability (development)
- Development complexity
- Performance (memory)

**Skeletal Stepping stones**

- Proven in reality

**NFR-based metrics**

- New harvesters / dictionaries
- HA Infrastructure
- Beta support model
- Tooling experiments

**Major tech decisions**

- Components
- Patterns

**Quality Realisation**

- Tradeoffs
Tactical Product Tools

So I have a roadmap, but what happens next?
Product Tools applied to Architecture

Product Vision
Goals
Testable Hypo’s and Metrics
Roadmaps
Product Backlog
Sprint Timeline

Key concepts, qualities
Skeletal stepping stones
Proven in reality
Show evolution
Delivery and dependencies
Balance features with tech
Product Backlog

Technical tasks
Arch. dependencies

Spikes
Technical workshops
Actual decision making

Measurement tasks
Acceptance criteria

Pattern experiments
Implementations
Credit: *Folding Burritos*
20 Product Prioritization Techniques

https://foldingburritos.com/product-prioritization-techniques/
Product Tools applied to Architecture

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Key concepts, qualities
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- Show evolution
- Delivery and dependencies
- Balance features with tech
Sprint Timeline

- Feature/tech balance
- Scheduling
- Technical dependencies
- Technical feedback
- Architecture reviews
- Imminent decisions
- Decision visibility
- Plan rollout
HMPO sprint timeline example
(poor quality image intentional)
Stakeholder Management

That’s all well and good, but it’s stakeholder management that really makes me want to stick a fork in my eye.

Please make it less painful for me.
Negotiation Points

Agree overarching purpose, benefits, and scope
Agree acceptable risks, overall logistics
Agree expected evidence vs assumptions
Agree product and technical specifics
Decide near term priorities
Decide near term development logistics
## Some Scenarios

<table>
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<th>Analysis paralysis</th>
<th>Conflicting priorities</th>
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<td>Ambiguous authority</td>
<td>Contradictory directives</td>
</tr>
<tr>
<td>Competing initiatives</td>
<td>Trumped by direct business value</td>
</tr>
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<td>Steamrollers / Asshats</td>
<td>Ignorant stakeholders</td>
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Key Takeaways

That’s nice, but I’ve already been to four sessions today and I’m on my fifth cup of coffee.

Can you wrap it up so I have some good sound bites to tell my manager?
(Agile) Product Tools applied to Architecture

- Product Vision
- Goals
- Testable Hypo’s and Metrics
- Roadmaps
- Product Backlog
- Sprint Timeline

Key concepts, qualities
- Skeletal stepping stones
- Proven in reality
- Show evolution
- Delivery and dependencies
- Balance features with tech
Questions?
I wasn’t really paying attention, would you mind repeating everything from the first slide onward?
Thank you

Lyndsay Prewer / Equal Experts
Simon Bostock / Equal Experts
Alison Taylor / M&S
Andrew Neilson / M&S
Roman Pichler / Pichler Consulting

Her Majesty's Passport Office
M&S
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