



The only permanence is change

Tassos Koutlas

FFW

Global scale, local presence
Working as one



**Once upon a time,
life for web
developers,
was much simpler.**



**Over the last few years the average
digital project has changed
significantly.**

**From sizable web builds we are now
landing contracts for multi-million dollar
composable digital experience platforms.**

**With decoupled front-ends, elaborate
system architectures and multiple third
party integrations.**

**Infrastructure needs
have changed too.**

**From a few servers with simple go to
market mechanisms.**

**To containerised public clouds, distributed
file systems and high availability
databases.**

**And complex integration and deployment
pipelines.**

**Our ways of working
have shifted also.**

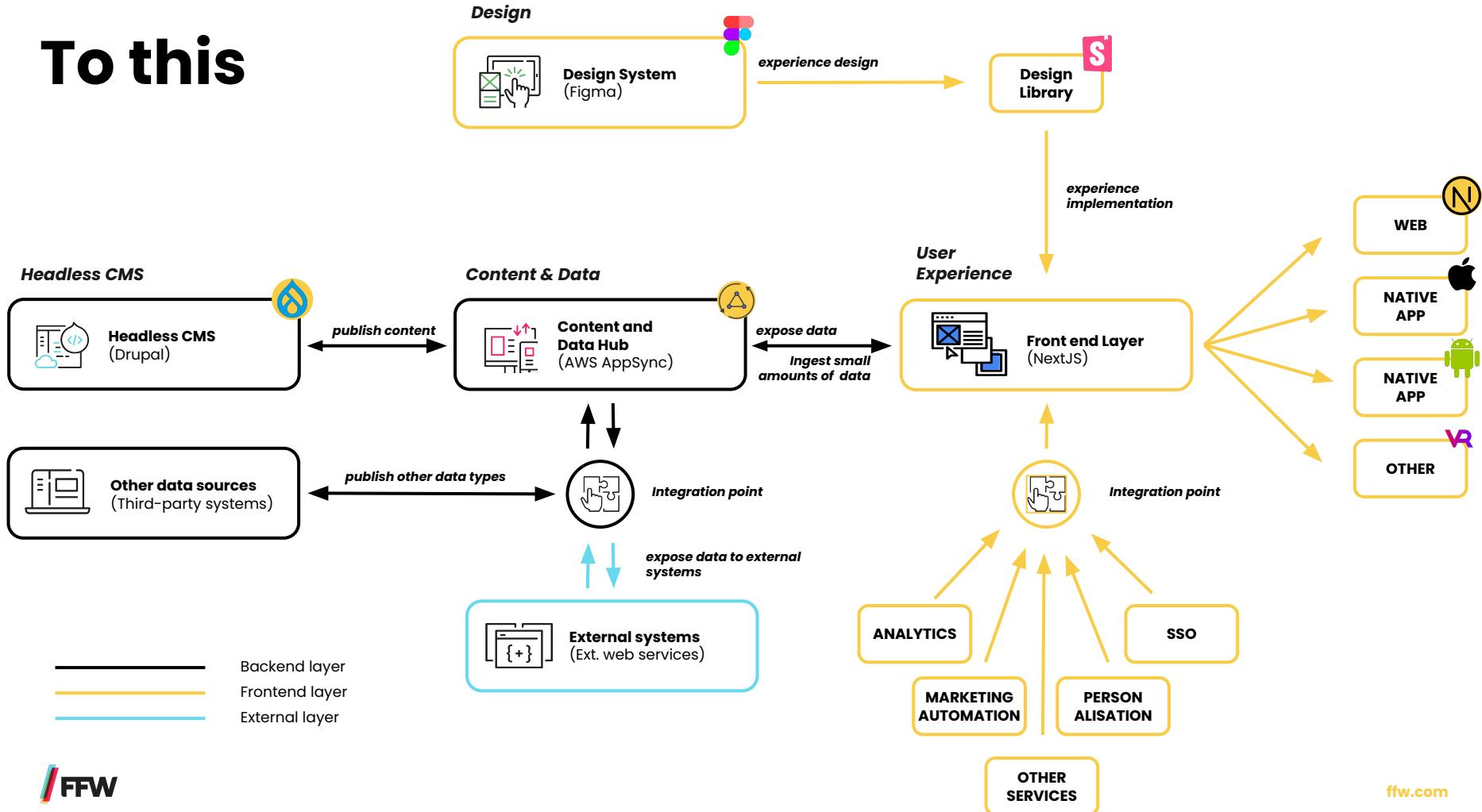
**From a couple of developers and few
photoshop files, finished before
development started.**

**To multidisciplinary agile teams,
iterative component based design,
decoupled JS front-end frameworks,
third-party component libraries
and multiple touchpoints and channels ...**

We moved from this



To this



Digital does not have an end date.

Today everything is in product-mode.

Products not projects

Our work often is not governed by a beginning, a middle and an end.

We are working on products, platforms or services, with a fluid scope, flexible timelines and adjustable budgets.

Our work often needs refinement, refactoring, adaptation.

We are in a constant state of flux.

**And that comes with a whole set of
challenges.**

How do you make the best technical decisions in such a dynamic environment?

How do you know if an approach is good enough for now and effectively manage scope?

How do you quantify and manage the technical debt introduced?

How do you document those decisions so they can be revisited later on?

How do you give voice to everyone who has something valuable to contribute?

How do you create consensus within your team?

Today

I will present a methodology,
for driving **key technical decisions (KTDs)**,
when implementing,
composable digital experience platforms (DXPs)
and **digital products**.



**Tassos
Koutlas**

Who am I?

- Deputy VP Digital Solutions Europe for FFW
- Expert on digital, agile, tech & data
- Architect of complex digital solutions
- Specialised on enterprises, government and NGOs
- Focused on EMEA, NA, APAC
- PhD on AI (Machine Vision & Machine Learning)
- Before it sounded as sexy as it does today ;)

Take a deep breath and let's go for it ...

Agenda

- 01 What's a KTD
- 02 Anatomy of a KTD
- 03 Workflows
- 04 A real example
- 05 Lessons learnt
- 06 Discussion

01

What's a Key Technical Decision (KTD)

Key Technical Decisions

Are decisions, that have profound strategic and architectural implications, for the organisation.

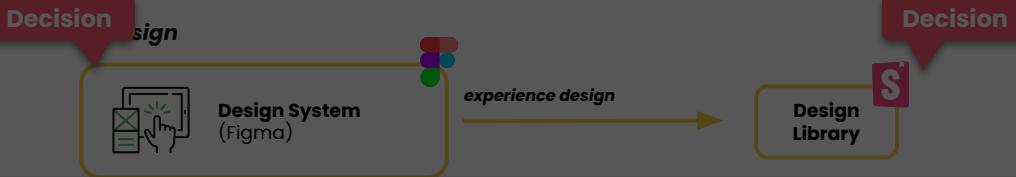
They enable or inhibit strategic goals: evolution, growth and value creation.

KTDs are not User Stories

User stories are about technical implementation details, functionality.

They still may require discussion over details, but the approach has already been given.

They influence project delivery, not strategy.



Decision

Headless CMS



Headless
(Drupal)



Other
(Third-

That's a lot of decisions ...

Backend layer

Frontend layer

External layer

LAYER (Ext. Web services)

MARKETING AUTOMATION

PERSON Decision

OTHER SERVICES

Decision

N

WEB



Decision

NATIVE APP



Decision

NATIVE APP



Decision

OTHER

Decision

Most of the times the distinction between an architectural decision and a technical implementation detail is very clear.

Sometimes, a team needs to define its own boundaries to keep the balance.

02

Anatomy of a KTD

KTD-00 Template - COPY ME

Owned by Tassos Koutlas ...

Last updated: May 16, 2023 • 1 min read • 10 people viewed

Status	SCHEDULED / CONFIRMED / DECIDED
Impact	LOW / MEDIUM / HIGH
Related KTDs	Add link to other KTDs.
Related user stories	Add link to backlog items.
Business owner	@Tassos Koutlas
Driver	@Tassos Koutlas
Approver	@Tassos Koutlas
Contributors	@Tassos Koutlas @Boyan Borisov
Approver	@Boyan Borisov
KTD tasks	Add link to backlog items that are part of this KTD (ie PoCs).

Challenge
Define in a few sentences the challenge that needs to be addressed with this key technical decision.

Background information

Provide any background items or link any relevant information (diagrams, wiki pages, scope items, etc) pertaining to the particular challenge.

Key requirements

- Provide a list of high level requirements
- As defined by the client
- The list should accurately define the scope of the potential solutions

Clarification questions

Question	Answer

Solution comparison

Solution description	Solution A	Solution B	Solution C
	Provide a relevant description of the solution approach.	Provide a relevant description of the solution approach.	Provide a relevant description of the solution approach.
Advantages / Disadvantages	GREEN This is an advantage RED This is a disadvantage	GREEN This is an advantage GREEN This is an advantage RED This is a disadvantage RED This is a disadvantage	GREEN This is an advantage GREEN This is an advantage RED This is a disadvantage RED This is a disadvantage RED This is a disadvantage RED This is a disadvantage
Performance	AWFUL	POOR	BEST
Scalability	GOOD	GOOD	BEST
Portability	AWFUL	AWFUL	BEST
Accessibility	AWFUL	AWFUL	BEST
Ease of use	GOOD	GOOD	GOOD
Complexity	LOW	MEDIUM	HIGH
Maintainability	LOW	MEDIUM	HIGH
Implementation costs	LOW	LOW	MEDIUM
Operational costs	MEDIUM	HIGH	LOW

Follow up questions

Question	Answer

Assumptions

- Extra main assumptions,
- If this is the suggested solution,
- our here.

Key points

- Add key points of the
- Decision in this list

Decision

Capture the decision here

Header section

Contains basic information about the decision governance and how it fits within the current project.

KTD-00 Template - COPY ME



Owned by Tassos Koutlas ...

Last updated: May 16, 2023 • 1 min read • 10 people viewed

Status	SCHEDULED / CONFIRMED / DECIDED
Impact	LOW / MEDIUM / HIGH
Related KTDs	Add link to other KTDs.
Related user stories	Add link to backlog items.
Business owner	@Tassos Koutlas
Driver	@Tassos Koutlas
Approver	@Tassos Koutlas
Contributors	@Tassos Koutlas @Tassos Koutlas @Boyan Borisov
Approver	@Boyan Borisov
KTD tasks	Add link to backlog items that are part of this KTD (ie PoCs).

Created by Janne Koski Last updated May 18, 2023 Time spent: 1h 19m People involved: 1

Status	<input checked="" type="checkbox"/> PENDING / <input type="checkbox"/> CONFIRMED / <input type="checkbox"/> DECISION
Impact	<input type="checkbox"/> Low / <input checked="" type="checkbox"/> Medium / <input type="checkbox"/> High
Related KTD	Add link to other KTDs
Related user stories	Add link to backlog items
Business owner	<input type="checkbox"/> Business Feature
Driver	<input type="checkbox"/> Feature Request
Approver	<input type="checkbox"/> Business Feature
Contributors	<input type="checkbox"/> Business Feature
Approver	<input type="checkbox"/> Business Feature
KTD links	Add link to backlog items that are part of this KTD (e.g. PoCs).

Challenge
Define in a few sentences the challenge that needs to be addressed with this key technical decision.

Background information
Provide any background items or link any relevant information (diagrams, wiki pages, scope items, etc) pertaining to this particular challenge.

Key requirements

- Provide a list of high level requirements
- As defined by the client
- This list should accurately define the scope of the potential solutions

Clarification questions

Question	Answer

Solution comparison

	Solution A	Solution B	Solution C
Solution description	Provide a relevant description of the solution approach.	Provide a relevant description of the solution approach.	Provide a relevant description of the solution approach.
Advantages / Disadvantages	<ul style="list-style-type: none"> This is an advantage This is a disadvantage 	<ul style="list-style-type: none"> This is an advantage This is an advantage This is an advantage This is a disadvantage This is a disadvantage 	<ul style="list-style-type: none"> This is an advantage This is an advantage This is an advantage This is an advantage This is a disadvantage This is a disadvantage This is a disadvantage This is a disadvantage
Performance	AWFUL	POOR	BEST
Scalability	BEST	POOR	BEST
Portability	AWFUL	AWFUL	BEST
Accessibility	AWFUL	AWFUL	BEST
Ease of use	BEST	BEST	BEST
Complexity	LOW	MEDIUM	HIGH
Maintainability	LOW	MEDIUM	HIGH
Implementation costs	LOW	LOW	MEDIUM
Operational costs	MEDIUM	HIGH	LOW

Follow up questions

Question	Answer

Assumptions

- At least one main assumption.
- 1 of the suggested solutions.
- Our hero.

Key points

- Add key points from the list.
- Decision in this list.

Decision
Capture the decision here.

Background section

Contains information and context on the challenge and provides a structured way to clarify any questions that may come up.

Challenge

Define in a few sentences the challenge that needs to be addressed with this key technical decision.

Background information

Provide any background items or link any relevant information (diagrams, wiki pages, scope items, etc) pertaining to this particular challenge.

Key requirements

- Provide a list of high level requirements
- As defined by the client
- This list should accurately define the scope of the potential solutions

Clarification questions

Question	Answer

Created by: Janine Borchert | Last updated: May 18, 2023 | Total view: 16, 19 people invited

Status	SCHEDULED / CONFIRMED / DECISION
Impact	LOW / MEDIUM / HIGH
Related KT0	Add link to other KT0s.
Related user stories	Add link to backlog items.
Business owner	@Janine Borchert
Driver	@Janine Borchert
Approver	@Janine Borchert
Contributors	@Janine Borchert, @Sergej Borsig
Approver	@Sergej Borsig
KT0 tasks	Add link to backlog items that are part of this KT0 (ie PoCs).

Challenge
Define in a few sentences the challenge that needs to be addressed with this key technical decision.

Background information
Provide any background items or link any relevant information (diagrams, wiki pages, scope items, etc) pertaining to this particular challenge.

- Key requirements**
- Provide a list of high level requirements
 - As defined by the client
 - The list should accurately define the scope of the potential solutions

Clarification questions

Question	Answer

Solution comparison

	Solution A	Solution B	Solution C
Solution description	Provide a relevant description of the solution approach.	Provide a relevant description of the solution approach.	Provide a relevant description of the solution approach.
Advantages / Disadvantages	+ This is an advantage - This is a disadvantage + This is an advantage + This is an advantage - This is a disadvantage + This is an advantage - This is a disadvantage + This is an advantage - This is a disadvantage + This is an advantage - This is a disadvantage	+ This is an advantage - This is a disadvantage + This is an advantage + This is an advantage - This is a disadvantage + This is an advantage - This is a disadvantage + This is an advantage - This is a disadvantage + This is an advantage - This is a disadvantage	+ This is an advantage - This is a disadvantage + This is an advantage + This is an advantage - This is a disadvantage + This is an advantage - This is a disadvantage + This is an advantage - This is a disadvantage + This is an advantage - This is a disadvantage
Performance	AVERAGE	GOOD	BEST
Scalability	GOOD	GOOD	BEST
Portability	AVERAGE	AVERAGE	BEST
Accessibility	AVERAGE	AVERAGE	BEST
Ease of use	GOOD	GOOD	GOOD
Complexity	LOW	MEDIUM	HIGH
Maintainability	LOW	MEDIUM	HIGH
Implementation costs	LOW	LOW	MEDIUM
Operational costs	MEDIUM	HIGH	LOW

Follow up questions

Question	Answer

Assumptions

- Extra main assumptions,
- If of the suggested solution,
- our here.

Key points

- Add key points of the
- Decision in this list

Decision

Capture the decision here.

Solutions section

Contains solution information and allows comparison between different approaches for the given context.

Solution comparison			
	Solution A	Solution B	Solution C
Solution description	Provide a relevant description of the solution approach.	Provide a relevant description of the solution approach.	Provide a relevant description of the solution approach.
Advantages / Disadvantages	+ This is an advantage - This is a disadvantage + This is an advantage + This is an advantage - This is a disadvantage + This is an advantage - This is a disadvantage + This is an advantage - This is a disadvantage + This is an advantage - This is a disadvantage	+ This is an advantage - This is a disadvantage + This is an advantage + This is an advantage - This is a disadvantage + This is an advantage - This is a disadvantage + This is an advantage - This is a disadvantage + This is an advantage - This is a disadvantage	+ This is an advantage - This is a disadvantage + This is an advantage + This is an advantage - This is a disadvantage + This is an advantage - This is a disadvantage + This is an advantage - This is a disadvantage + This is an advantage - This is a disadvantage
Performance	AVERAGE	GOOD	BEST
Scalability	GOOD	GOOD	BEST
Portability	AVERAGE	AVERAGE	BEST
Accessibility	AVERAGE	AVERAGE	BEST
Ease of use	GOOD	GOOD	GOOD
Complexity	LOW	MEDIUM	HIGH
Maintainability	LOW	MEDIUM	HIGH
Implementation costs	LOW	LOW	MEDIUM
Operational costs	MEDIUM	HIGH	LOW

Pro Tip

Use specific project KPIs to make sure the traffic light section is relevant to business stakeholders.

That's an easy way to outline the chosen solution and build trust.

Created by: Janine Borchert --- Last updated: May 18, 2023 - 1 hr read - 16, 19 people involved

Status	<input checked="" type="checkbox"/> PENDING / <input type="checkbox"/> CONFIRMED / <input type="checkbox"/> DECISION
Impact	<input type="checkbox"/> LOW / <input type="checkbox"/> MEDIUM / <input checked="" type="checkbox"/> HIGH
Related KTD	Add link to other KTDs.
Related user stories	Add link to backlog items.
Business owner	<input type="checkbox"/> Business Feature
Driver	<input type="checkbox"/> Feature Request
Approver	<input type="checkbox"/> Business Feature
Contributors	<input type="checkbox"/> Business Feature / <input type="checkbox"/> Feature Request
Approver	@Bojan Borcic
KTD tasks	Add link to backlog items that are part of this KTD (ie POCs).

Challenge
Define in a few sentences the challenge that needs to be addressed with this key technical decision.

Background information

Provide any background items or link any relevant information (diagrams, wiki pages, scope items, etc) pertaining to this particular challenge.

Key requirements

- Provide a list of high level requirements
- As defined by the client
- The list should accurately define the scope of the potential solutions

Clarification questions

Question	Answer

Solution comparison

Solution description	Solution A	Solution B	Solution C
	Provide a relevant description of the solution approach.	Provide a relevant description of the solution approach.	Provide a relevant description of the solution approach.
Advantages / Disadvantages	<input checked="" type="radio"/> This is an advantage <input type="radio"/> This is a disadvantage	<input checked="" type="radio"/> This is an advantage <input type="radio"/> This is an advantage <input type="radio"/> This is a disadvantage	<input checked="" type="radio"/> This is an advantage <input checked="" type="radio"/> This is an advantage <input type="radio"/> This is an advantage <input type="radio"/> This is a disadvantage
Performance	AWFUL	POOR	BEST
Scalability	BEST	POOR	BEST
Portability	AWFUL	AWFUL	BEST
Accessibility	AWFUL	AWFUL	BEST
Ease of use	BEST	BEST	BEST
Complexity	LOW	MEDIUM	HIGH
Maintainability	LOW	MEDIUM	HIGH
Implementation costs	LOW	LOW	MEDIUM
Operational costs	MEDIUM	HIGH	LOW

Follow up questions

Question	Answer

Assumptions

- Let me know main assumptions,
- of the suggested solution.
- over here.

Key points

- Add key points of the
- Decision in this list

Decision

Capture the decision here.

Discussion & Decision section

Enables discussion with client of preferred approach and creates a record of the decision taken.

Follow up questions

Question	Answer

Assumptions

- List the main assumptions,
- of the suggested solution.
- over here.

Key points

- Add key points of the
- Decision in this list

Decision

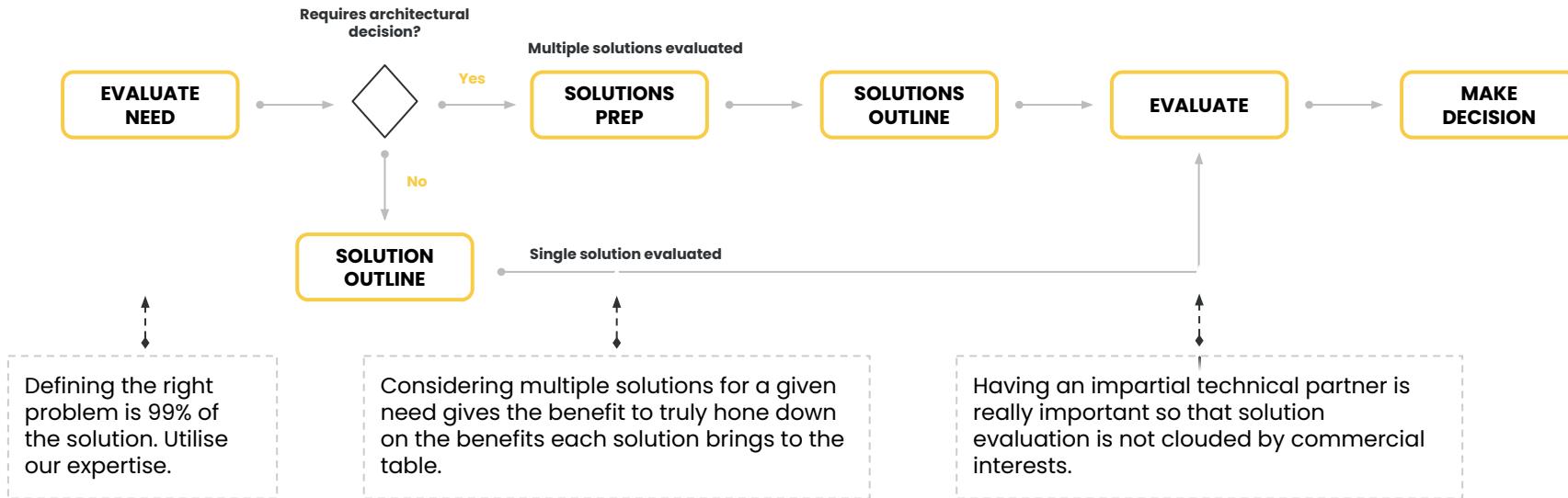
Capture the decision here.

03

Workflows

The KTD process

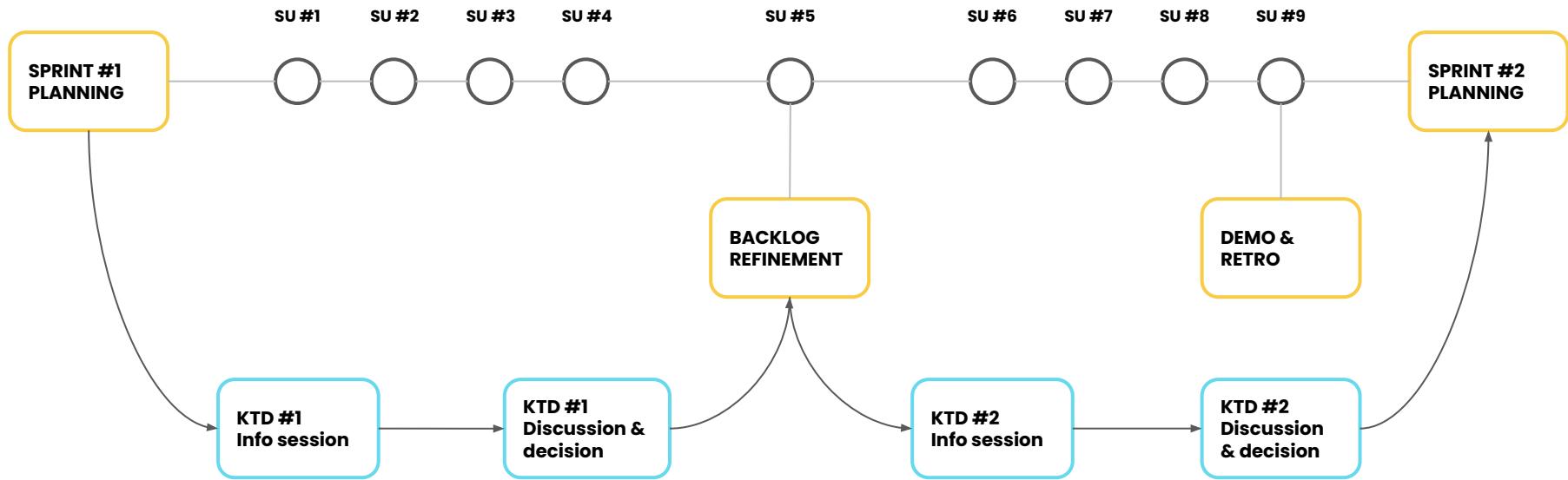
The KTD process is a lightweight but powerful methodology for driving key technical decisions when implementing composable digital experience platforms and digital products. Using it to drive key technical decisions, organisations are able to accommodate change in dynamic environments and create alignment, consensus and trust with stakeholders.



KTDs in agile sprints

The KTD process can work alongside waterfall or agile methods. For agile methods, the sprint cadence needs to be combined with KTD process so one informs the other during project delivery.

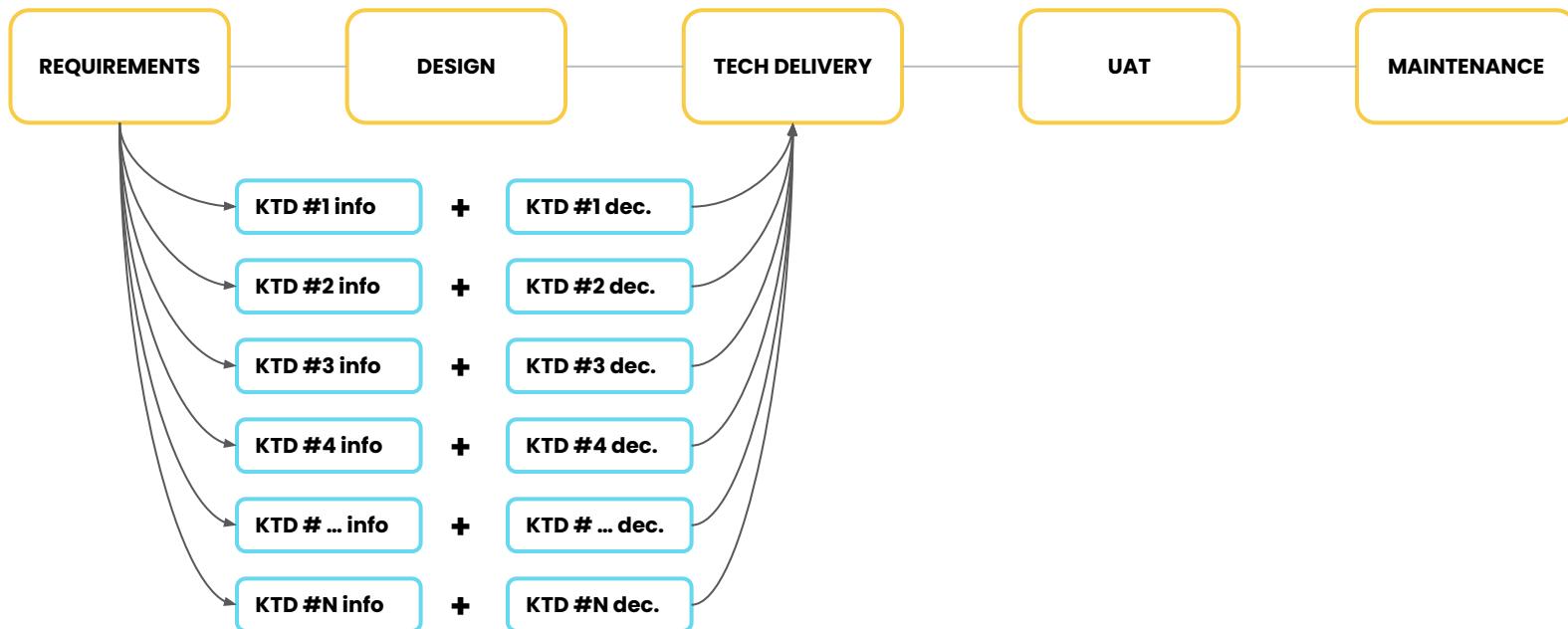
The following diagram showcases how it has been used within agile sprints.



KTDs in waterfall projects

The KTD process can work alongside waterfall or agile methods. For waterfall the workflow is straightforward, make all the decisions prior to technical project delivery.

The following diagram showcases how it has been used within waterfall projects.



04

A real example

A real KTD

Problem

While $\frac{1}{3}$ of the way into delivery, new requirements came to light, that challenged the way hosting has been thought of up until that point.

Challenge

Find the best solution to accommodate newest requirements, whilst maintaining platform & project stability

Solution

Run a KTD to decide.



which involve having different implementation and operational costs and allow for different scaling with future phases in mind.

This decision should not be considered in isolation in the project and should take into account the scalability requirements.

Status	CONFIRMED
Impact	HIGH
Driver	@Emil Stolanov @Jens.Lonkowsk
Approver	[] []
Contributors	@Rob Dunkley @Jens.Lonkowsk @Emil Stolanov @Tassos Koutoulas
Informed	@Line Birkelund @Paulina Ryters

Background

The initial decision for hosting the backend/front-end part of the [] application has been Platform.sh (PSH). A number of requirements have surfaced that drives us to revisit the issue and provide alternatives to [] so they can choose an option based on long term scalability of the project.

We anticipated and offered annual costs of [] agreed to pay upfront. The costs originate from an Enterprise subscription [] month and a Professional Standard subscription for €40 per month (<https://platform.sh/pricing>).

Relevant information

Use case document: [Label USE CASES and MVP scope](#)

Entity diagram: [Flowchart Maker & Online Diagram Software](#)

Data structure document: [https://docs.google.com/spreadsheets/d/1IUTGdDLDPK-VNB6otf6dklkW2zscgjEmHeFaMwU/edit#gid=1365463591 - Connect to preview](https://docs.google.com/spreadsheets/d/1IUTGdDLDPK-VNB6otf6dklkW2zscgjEmHeFaMwU/edit#gid=1365463591)

High level requirements from []

- User authentication for the app
- User authentication for the CMS
- User data storage (probably document based) for app
- Elastic service for storing [] records per year) and searching
- Bulk downloads of [] data from [] other third parties.

Comparison table

	PSH (PSH)	Hybrid (PSH + Third Parties)	Native Cloud (AWS)
Description	Use a subscription-based Platform as a Service that provides functionality out-of-the-box. PSH does not have a built-in authentication service so we're required to go hybrid or native.	Use PSH for MVP and on-demand services as needed. E.g. AWS OpenSearch Service, AWS Cognito, AWS DocumentDB	Use DevOps resources to create the needed infrastructure.
Pros/Cons	<ul style="list-style-type: none">+ Not having to manage infrastructure- Not able to introduce all services needed	<ul style="list-style-type: none">+ Good scalability for critical services+ Easy development setup+ Managed platform so less SLA to worry about- Cost implications as usage increases- Vendor lock-in to particular service	<ul style="list-style-type: none">+ Able to accommodate all changing needs of []+ Native support for user accounts+ Ability for Social Login option (SAML)+ Less latency+ Better MVP cost- Cost implications as usage increases- Pay as you use model- Additional SLA needed
Future proofing	AVERAGE	GOOD	BEST
Scalability	GOOD	GOOD	BEST
Portability	AVERAGE	AVERAGE	BEST
Ease of use	GOOD	GOOD	GOOD
Complexity	LOW	MEDIUM	HIGH
Implementation cost	LOW	LOW	MEDIUM
Operational cost (MVP)	MEDIUM	HIGH	LOW
Operational cost (Long term)	HIGH	HIGH	MEDIUM

Open questions

- Can the Elastic instance of PSH be used for the amount of data that FACA needs to store for MVP?

Key Technical Decisions

Hosting



Created by Tassos Koutlas

Last updated: Nov 09, 2021 by Line Birkelund • 4 min read • 14 people viewed

Based on the requirements put forward by [] there are several ways that hosting can be implemented which involve having different implementation and operational costs and allow for different scaling with future phases in mind.

This decision should not be considered in isolation in the project and should take into account the scalability requirements.

Status	CONFIRMED
Impact	HIGH
Driver	@Emil Stoianov @Jens.Lonkowski
Approver	[]
Contributors	@Rob Dunkley @Jens.Lonkowski @Emil Stoianov @Tassos Koutlas
Informed	@Line Birkelund @Paulina Ryters

Key Technical Decisions



Background

The initial decision for hosting the backend/front-end part of the [redacted] application has been [redacted] (PSI). A number of requirements have surfaced that drives us to revisit the issue and provide alternatives [redacted] so they can choose an option based on long term scalability of the project.

We anticipated and offered annual costs of [redacted] agreed to pay upfront. The costs originate from an Enterprise subscription for €1 [redacted] per month and a Professional Standard subscription for €40 per mont [redacted]

Relevant information

Use case document: [Label USE CASES and MVP scope](#)

Entity diagram: [Flowchart Maker & Online Diagram Software](#)

Data structure document: <https://docs.google.com/spreadsheets/d/11UTGdDLDPK-VNB6ot6Zdklkwb22zscgiEmHeFFaMwU/edit#gid=1365463591> - Connect to preview

High level requirements from [redacted]

- User authentication for the app
- User authentication for the [redacted]
- User data storage (p [redacted] for app [redacted])
- Elastic service for storing flight data (~3.6M records per year) and searching
- Bulk downloads of flight environmental label data from OTAs and other third parties.

Key Technical Decisions



Comparison table

	PaaS (	Hybrid ( + Third Parties)	Native Cloud (AWS)
Description	Use a subscription-based model for development and deployment.	Use  for MVP and ongoing operations.	Use DevOps resources to manage infrastructure.
	PaaS (	Hybrid ( + Third Parties)	Native Cloud (AWS)
Pros/Cons	<ul style="list-style-type: none"> + Not having to manage infrastructure - Not able to introduce all services needed 	<ul style="list-style-type: none"> + Good scalability for critical services + Easy development setup + Managed platform so less SLA to worry about - Cost implications as usage increases - Vendor lock-in to particular service 	<ul style="list-style-type: none"> + Able to accommodate all changing needs of  + Native support for user accounts + Ability for Social Login option (SAML) + Less latency + Better MVP cost - Cost implications as usage increases - Pay as you use model - Additional SLA needed
Future proofing	AVERAGE	GOOD	BEST
Scalability	GOOD	GOOD	BEST
Portability	AVERAGE	AVERAGE	BEST
Ease of use	GOOD	GOOD	GOOD
Complexity	LOW	MEDIUM	HIGH
Implementation cost	LOW	LOW	MEDIUM
Operational cost (MVP)	MEDIUM	HIGH	LOW
Operational cost (Long term)	HIGH	HIGH	MEDIUM

Key Technical Decisions



Open questions

1. Can the Elastic instance of be used for the amount of data that needs to store for MVP?
 - a. standard project storage is 5GB that can be distributed between the app and its services (and upgradeable on demand). →
 - b. GPU and Memory can be allocated according to the chosen plan. → [Add services](#)
 - c. Requirements for (production) Elasticsearch seem pretty high. Elasticsearch should ideally have as much memory as data. For production multiple nodes are recommended. My feeling is PSH isn't a sufficient choice.
 - d. We met with and they're proposing a "dedicated" solution to meet our requirements.
2. Does offer an authentication service like AWS Cognito? → No, they don't have a built in service but also no restrictions so any other service can be used.
3. How easy/difficult would it be to migrate from PSH to AWS in future when PSH can't meet scaling demands anymore?
4. Can approve a solution based on AWS?
5. Can support a pay as you go model?
6. What is the optimal account setup on AWS for ? (for FFW to clarify)
7. For an MVP point of view how we would need monitoring and alert. What are the expectations of about the service provided on those two.

Estimate assumptions for Cloud Native architecture

- Cognito estimate was based on 25% of users having an account and 25% of those users accessing in a given month.
- Assuming all core infrastructure hosted in AWS Frankfurt. Cloudfront / CDN ensures static code is served near the user.
- Assuming specific IT requirements like VPN access to backend not needed.
- Each flight record estimated at 4KB

Key Technical Decisions



Cost Comparison for Cloud Native architecture

There are two estimates based upon initial load and estimated usage later in the project cycle:

	Initial	Large
<input type="checkbox"/> Records	4 Million	120 Million
End Users	10 Thousand	10 Million
Admin Users	100	250

Below is a summary of the monthly costs per AWS service for each of the AWS estimates:

	Initial	Large
Cloudfront / Lambda Edge	\$0.61	\$3031.69
Cognito	\$0	\$2965
Application Load Balancers	\$100.80	\$100.80
Opensearch	\$576.68	\$1317.37
S3	\$15.69	\$470.83
Amplify	\$6.11	\$6.11
RDS	\$164.42	\$1508.58
ElastiCache	\$54.72	\$82.08
Fargate	\$148.56	\$350.40
TOTAL	\$1067.59	\$9832.86

Key Technical Decisions



Uptime and Support

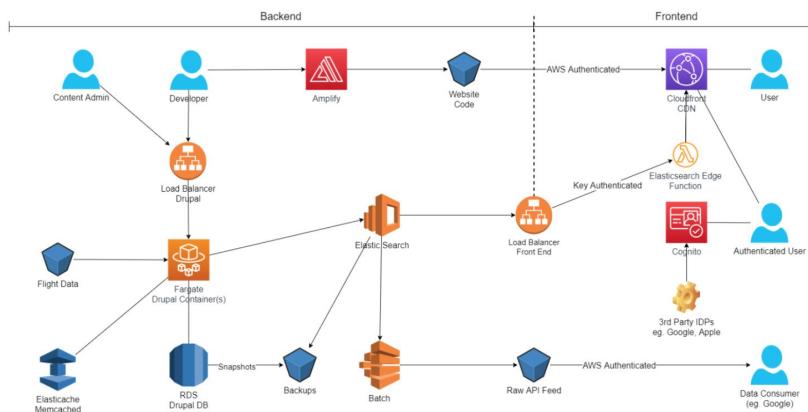
The estimate uses high availability across multiple regions for all production infrastructure. Test environment services have fault tolerant storage but some are not HA to reduce cost. All S3/Backup/File storage and database storage is multi AZ and has at least 99.99% expected uptime. Cloudfront and Cognito have a 99.9% uptime expectation. Elasticsearch / Opensearch runs a 5 or 7 node cluster with full fault tolerance leading to 99.9% uptime expectation.

All services are AWS managed for updates except Drupal, RDS/Database and Elasticsearch are auto-patched on a schedule, all auto-patched by AWS. It is averaged as earlier in the life cycle there will likely be functional tweaks whilst performance and detection of bad input data will likely become more prevalent later in the lifecycle.

We estimate 4 hours/month for maintenance efforts, however the actual needed amount of hours will be evaluated after 3 and 6 months and adapted accordingly if necessary.

Proposed infrastructure

The proposed AWS cloud model is shown below. Backend architecture defined in Terraform, frontend architecture controlled by Amplify.



Key Technical Decisions



Key points

- PSH has been put forward as hosting partner during proposal
- Additional requirements with regards to scalability (40M record of flight data) required to re-assess hosting options and proposal
- Additional requirements with regards to identity management (My trips) required to re-assess hosting options and proposal
- PSH + third party services has been considered as a solution along with cloud native architecture
- Cloud native architecture provides all functionality needed now and in the future
- Cloud native architecture offers lower cost for MVP development
- Cloud native architecture offers better cost management once project in production
- Cloud native architecture offers better scalability for the long term
- Additional tasks need to be established to ensure support and maintenance of the infrastructure

Outcome

The client has decided to follow the recommendation using a native cloud (AWS) solution.

See discussion here: [2021-10-26 Hosting solution](#)

Decision made: [2021-10-29 Expectations & priorities](#)

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- ✓ Key Technical Decisions
 - CI - CD Meeting decisions
 - Discussion regarding QA topics
 - Technical queries: Gatsby
 - KTD-0 COPY ME
 - KTD-01 Backend Content Model
 - KTD-02 Single Drupal with multiple Gatsby fr...
 - KTD-03 Gatsby repo structure
 - KTD-04 Strategy for multilingual, language, d...
 - KTD-05 config management
 - KTD-06 Gatsby multisite preview
 - KTD-07 Gatsby gated content and
 - KTD-08 Gatsby Valhalla and API gateway
 - KTD-09 Content syndication for HCP hubs
 - KTD-10 Gatsby v5 new features (slicing, etc)
 - KTD-11 Testing strategy (unit, visual, function...
 - KTD-12 Continuous integration and develop...

Solutions outline

Flexible Drupal paragraphs

A solution based on Drupal's contributed module "Paragraph". In this solution there are content components with a well defined content model, so they function really well from a content governance perspective. Also in our solution there will be some flexible content components that can be reused in different situations.

Pros	Cons
Well supported in Drupal world	Content component reusability not out of the box (but supported)
Simplified learning curve	Drupal opinionated approach
Most common way to create content	May require complex JSON API config if there are lots of nesting
Automated garbage collection on content when deleting content	Not in Drupal Core (with huge support however)
Best editorial experience for structured content	

Solutions comparison

	Slicing	Partial hydration	Head API	Script component	TypeGen	Image CDN	Incremental builds	Incremental Clouds
Performance	Very Good	Very Good	Very Good	Very Good	-	Very Good	Very Good	Very Good
Scalability	Very Good	-	-	-	Very Good	Very Good	Very Good	Very Good
Accessibility	-	Very Good	-	Very Good	-	-	-	-
Mobile-first	-	Very Good	-	Very Good	-	-	-	-
Authoring experience	Very Good	-	-	-	-	-	-	-
Complexity	Average	Good	Very Good	Good	Good	Yes	Has to be tested in the early stages to make sure it's compatible with Akamai	Yes
Portability	Average	Good	Average	Good	Good	Yes	Yes	Yes
Stability	Unknown	Very Good	Very Good	Very Good	Very Good	Yes	Yes	Yes
Maintainability	Good	Good	Very Good	Good	Very Good	Yes	Yes	Yes
Decoupled	Average	Good	Average	Average	Average	Yes	Yes	Yes

Decision
The table below summarizes our proposal on what Gatsby new features to be applied on the development of our MVP, based on our initial requirements.

Summary

Feature	Application to MVP	Additional notes
Slicing	yes	Has to be tested in the early stages to make sure it's compatible with Akamai
Partial hydration	yes	
Head API	yes	
Script component	yes	
TypeGen	yes	
Image CDN	yes	
Incremental builds	yes	
Incremental clouds	yes	Is dependent on Fastly.

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Lessons learnt

Observations

KTDs offer a transformative way to consult, decide and create consensus.

Generally a very well accepted method by teams and clients alike.

The collaborative nature of the process is not easy for everyone to follow, usually at the beginning.

Lessons

- 1. Trust makes decision making easier.**
- 2. Teams defining together deliver better.**
- 3. A decision must be followed through.**
- 4. Single decision per KTD, don't cram decisions.**
- 5. From KTD to User Story it's a long way.**
- 6. Good KTDs don't guarantee good delivery.**
- 7. Scope decisions for context, timeframes, budgets.**
- 8. Don't use KTD as an excuse for over analysing.**

Other standards

Architectural Decision Records

An architecture decision record ([ADR](#)) is a document that captures an important architecture decision made along with its context and consequences.

Arc42

[arc42](#) offers a clear, simple and effective structure to document and communicate your software system.

What people say:

“ I had the privilege of witnessing FFW's exceptional expertise in establishing a solid technical foundation through their KTD process, which greatly contributed to the success of our project helping us in early decision making, prioritization and determining the best path forward for our project.



Heiko Schmidt

Product Owner at Bayer

What people say:

“ FFW's structured process to drive the project's key technical decisions resulted in selecting the most suited technologies for creating a sturdy technical architecture that evolves as our business needs evolve.



Achilleas Achilleos

Strategic Programmes Officer at
EASA (EU Aviation Safety Agency)

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Discussion

Thank you.



Continue the conversation

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→ tassos.koutlas@ffw.com

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October 17:
17.15 – 18.00, Room 2.4
October 18:
10.30 – 11.15, Room 2.4
October 20:
09.00 – 12.30, Room 4.2

General Contribution

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09.00 – 18.00, Room 4.1
September 23:
09:00 – 18:00
Room 4.1 + 4.2

What people say:

“



Scott Hill

Global Strategy & Delivery Director
at Kaplan International