

**adaptTo()**

APACHE SLING & FRIENDS TECH MEETUP  
10-12 SEPTEMBER 2018

Application Integration  
Alexander Berndt

# About me – Alexander Berndt

## Freelance IT Architect

- 10 years in large-scale projects  
(150-600 people), Accenture + TC
- Since 2011 CQ/AEM



[https://www.xing.com/profile/Alexander\\_Berndt](https://www.xing.com/profile/Alexander_Berndt)



# What is an application?



# What is an application?

- **Transaction Tools** (e.g. flight booking, online banking, appointments)
- **Interactive Content** (e.g. games, maps & routing)
- **Data Query Tools** (e.g. store finder)
- **Data Visualization** (e.g. data charts, 3d-viewer)
- **Usability Tools** (e.g. favorite list)
- **Configuration & Planning Tools** (e.g. car configurator, kitchen planner)
- **Calculators** (e.g. savings calculator)
- **Social Collaboration** (e.g. chat, product ratings)
- **Personalized Content** (e.g. recommendations)



# Why is it complicated?

# Why is it complicated?



iStock.com/TT

- Abnormal Conditions

# Why is it complicated?



iStock.com/aapsky

- Abnormal Conditions
- Unstated requirements

# Why is it complicated?



- Abnormal Conditions
- Unstated requirements
- Steady scope increases

iStock.com/ChiccoDodiFC

# Why is it complicated?



- Abnormal Conditions
- Unstated requirements
- Steady scope increases

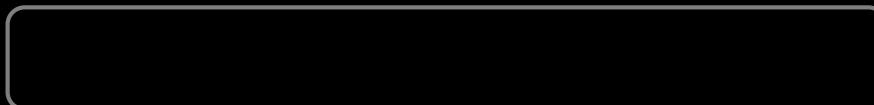
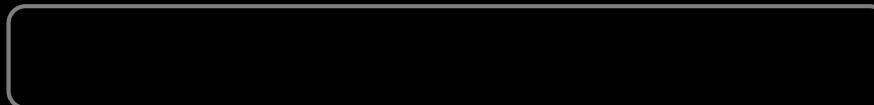
**It's not that easy,  
as it might look first!**



# Integration Patterns



# Integration Patterns



Side-by-side

# Side-by-side: Alternatives

## a) Multiple Subdomains

- Demo  
<https://www.thomascook.de>

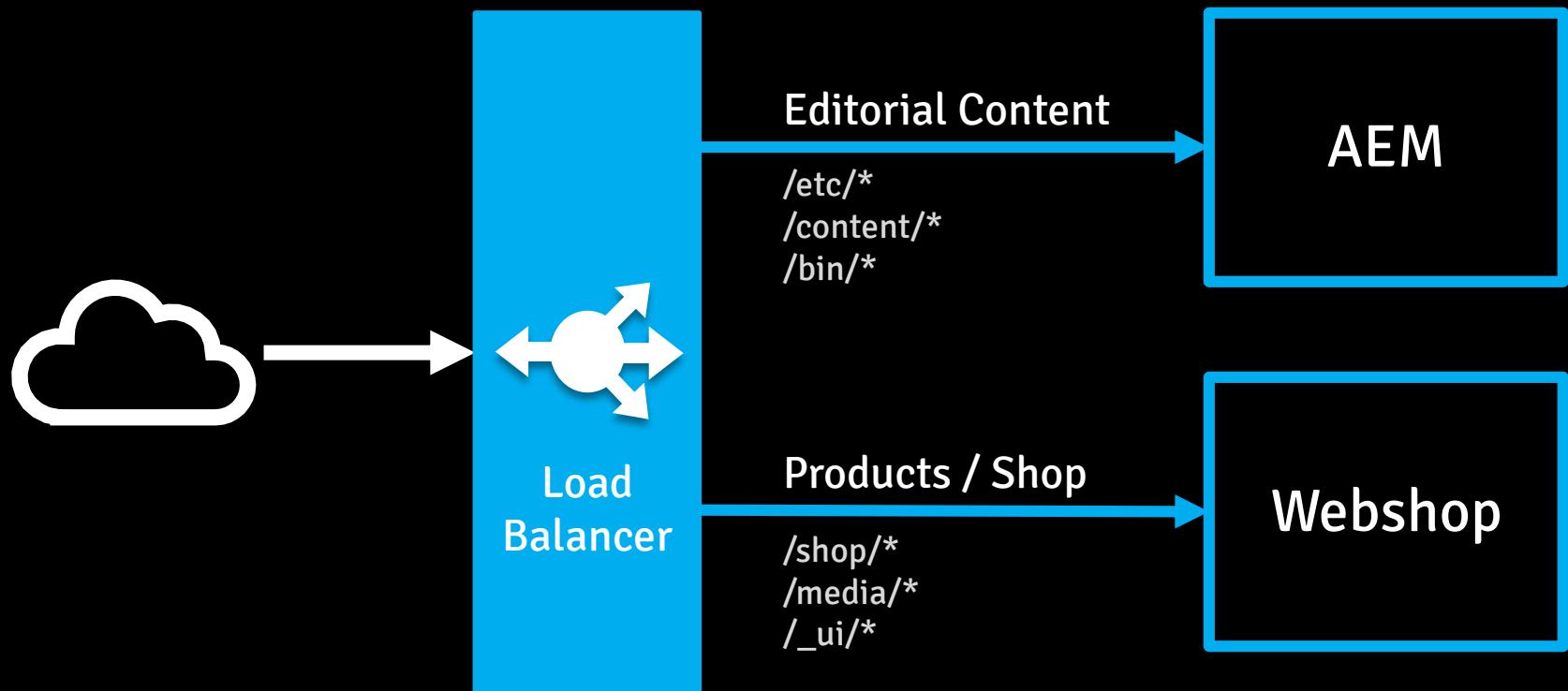
Flights and Booking-Journey are independent Web-Apps

## b) Path-based Routing

- Demo  
<https://www.hilti.ch>

Web-Shop and AEM mapped into single domain

# Path-based Routing





# Evaluation: Side-by-side

## Side-by-side

### Development

---

Independence	-
Required skills	-

### Operations

---

Root-cause analysis	+++
Independence	+++

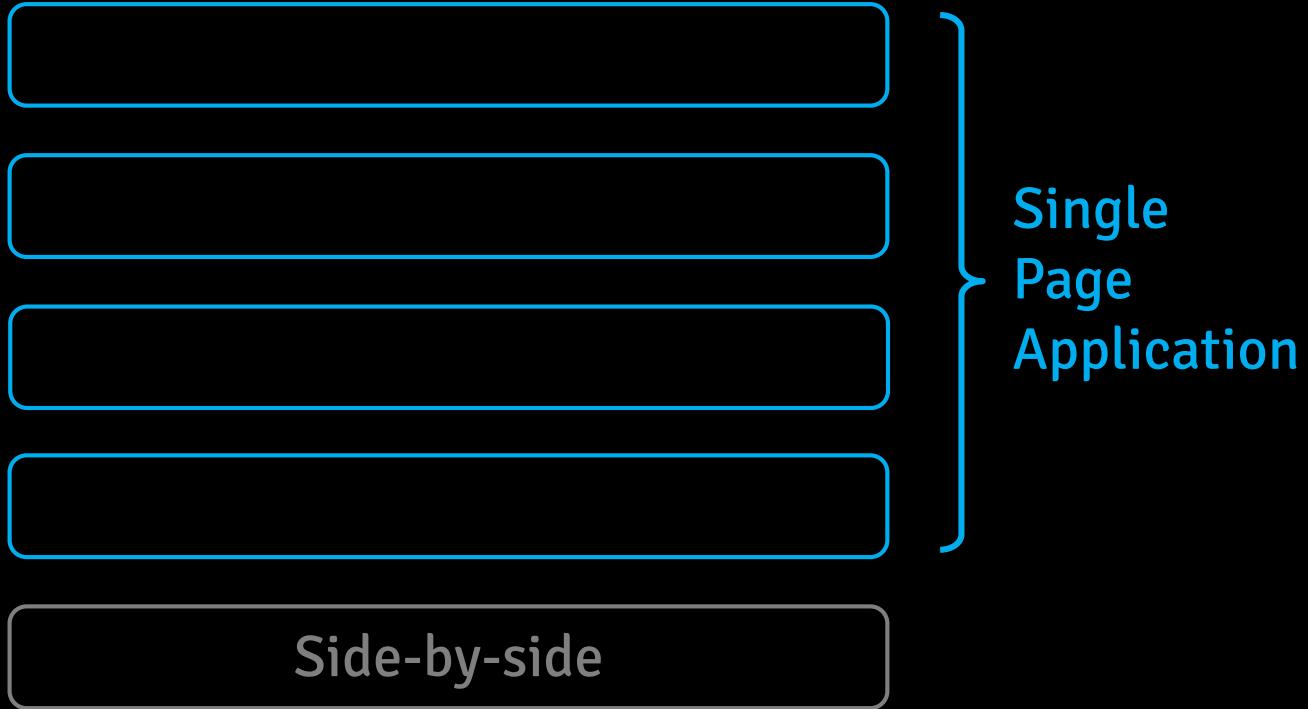
### User Experience

---

Integration Features	--
----------------------	----

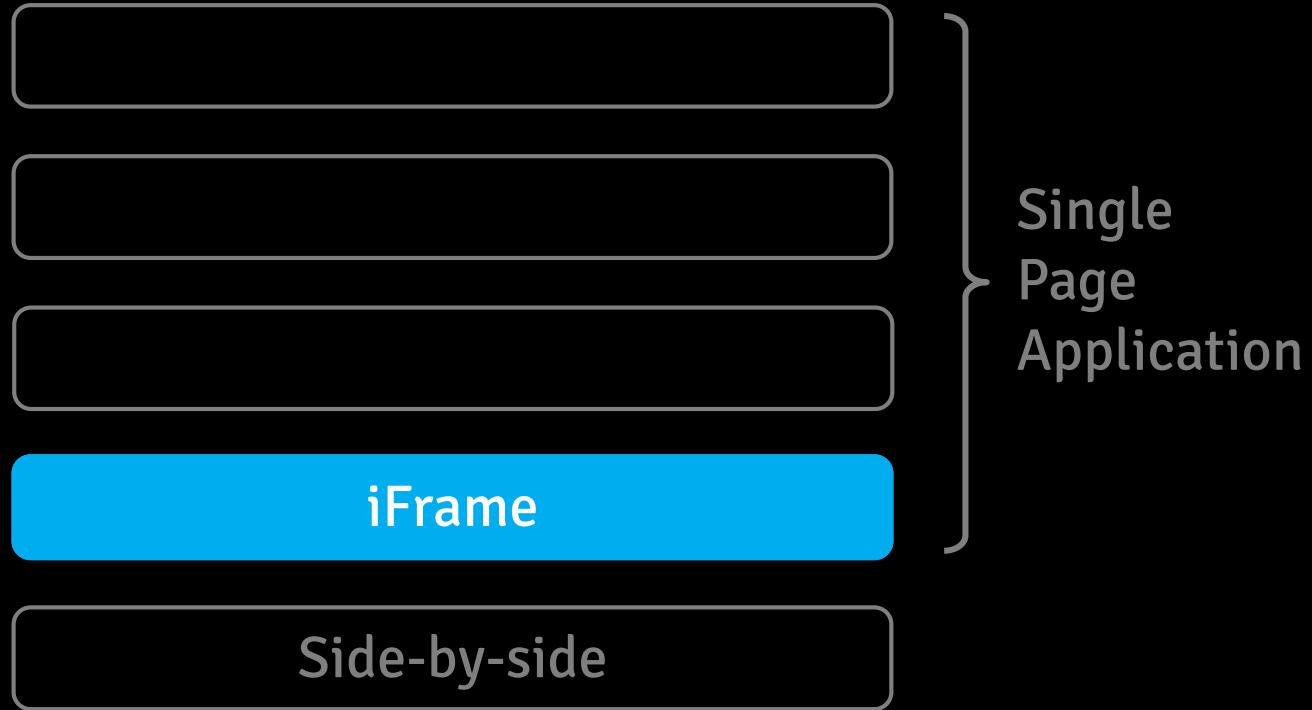


# Integration Patterns



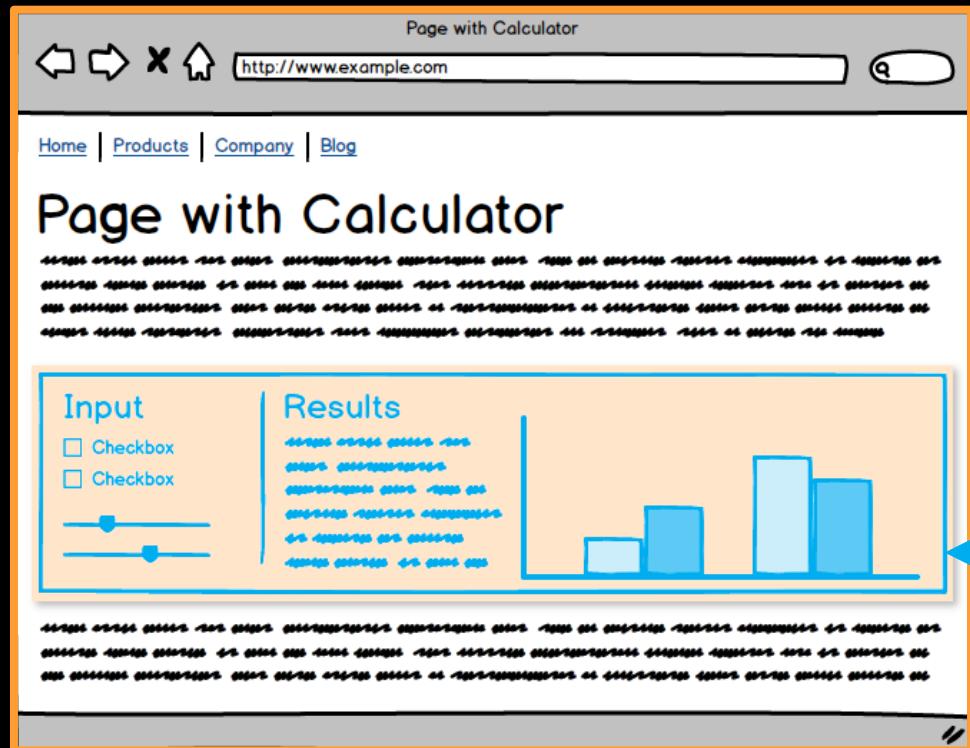


# Integration Patterns





# iFrame – Integration Pattern



Content Page  
with iFrame



HTML/JS  
+ Static Resources  
+ Dynamic Endpoints





# Example: iFrame of 123formbuilder.com

```
<iframe id="1535293493707_253331785549840"  
       src="//form.123formbuilder.com/js-form-username-18551.html?  
           _embedType_=embed.js&_iframeID_=1535293493707"  
       frameborder="0"  
       scrolling="no"  
       style="padding:0px; margin:0px; display:block; width:100%;  
              background-color:transparent; overflow:hidden;  
              height: 1289px;">  
</iframe>
```

# Evaluation: iFrame

## Side-by-side      iFrame

### Development

	Side-by-side	iFrame
Independence	-	+++
Required skills	-	+++

### Operations

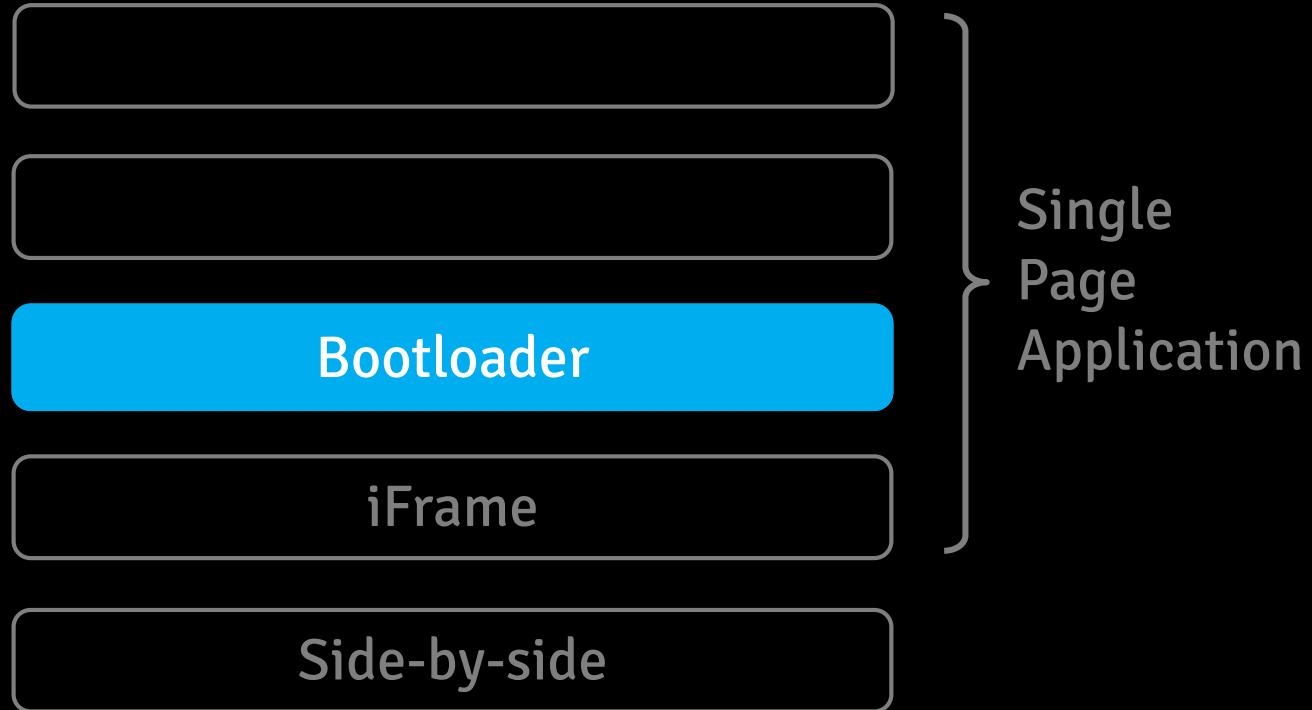
	Side-by-side	iFrame
Root-cause analysis	+++	+
Pro-active monitoring	++	---
Independence	+++	+++

### User Experience

	Side-by-side	iFrame
Integration Features	--	--
Performance	++	--
Fall-back Mode	+++	---



# Integration Patterns





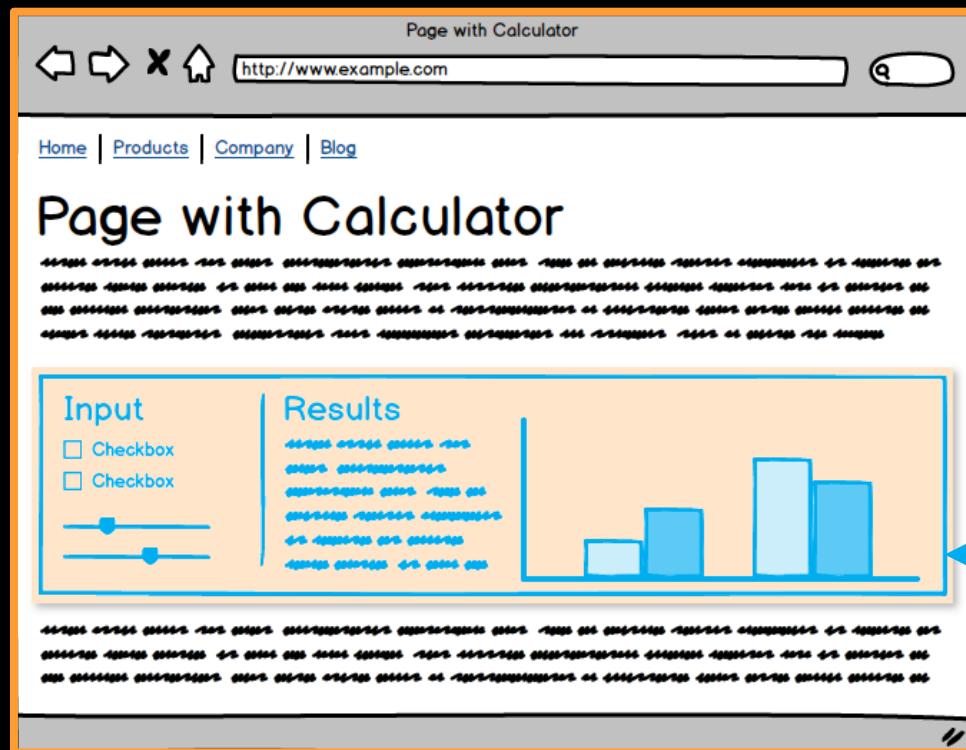
# Bootloader

## ■ Example: Google Maps

```
<body>
<div id="map"></div>
<script>
    var map;
    function initMap() {
        map = new google.maps.Map(document.getElementById('map'), {
            center: {lat: -34.397, lng: 150.644}, zoom: 8});
    }
</script>
<script src="https://maps.googleapis.com/..." async defer></script>
</body>
```



# Bootloader – Integration Pattern



Content Page  
with Bootloader



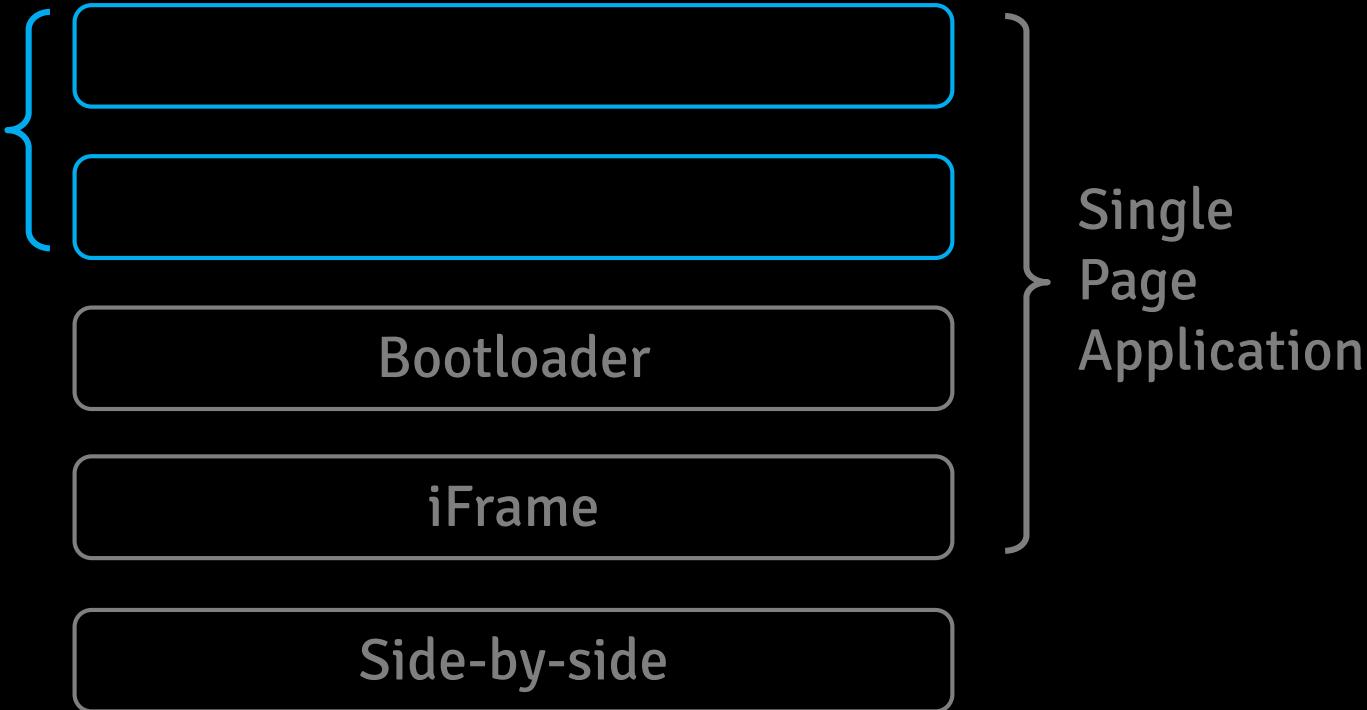
JavaScript  
+ Static Resources  
+ Dynamic Endpoints

# Evaluation: Bootloader

	Side-by-side	iFrame	Bootloader
<b>Development</b>			
Independence	-	+++	++
Required skills	-	+++	+
<b>Operations</b>			
Root-cause analysis	+++	+	+
Pro-active monitoring	++	---	---
Independence	+++	+++	++
<b>User Experience</b>			
Integration Features	--	--	++
Performance	++	--	--
Fall-back Mode	+++	---	---

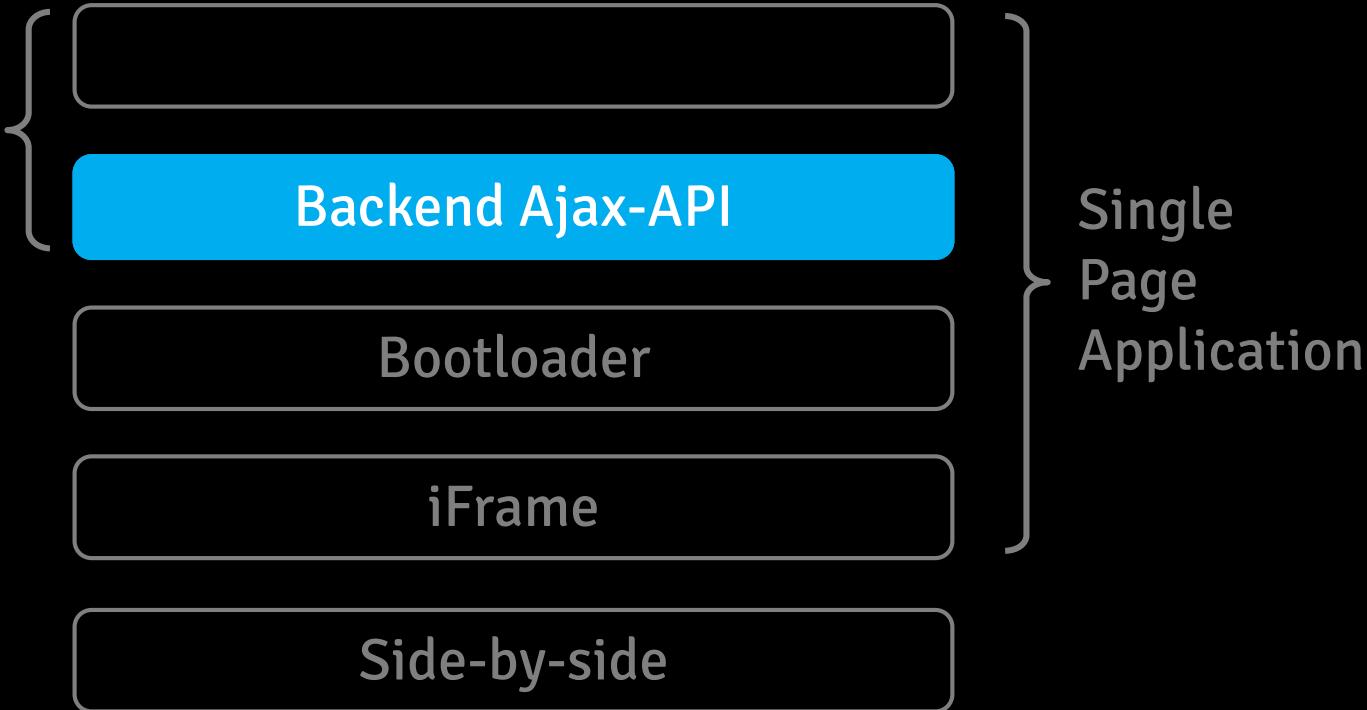
# Integration Patterns

App as part of  
Content Page



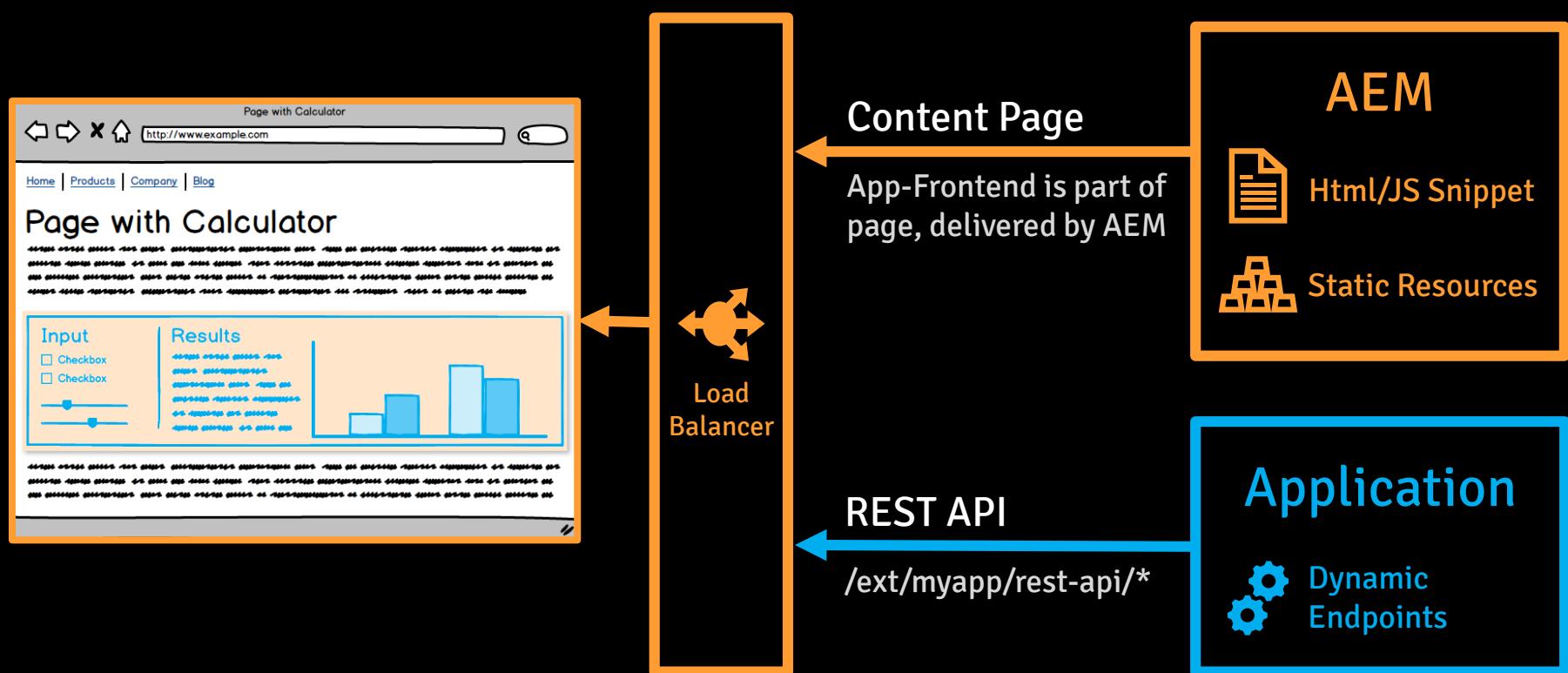
# Integration Patterns

App as part of  
Content Page





# Backend Ajax API



# Evaluation: Backend Ajax API

	Side-by-side	iFrame	Bootloader	Backend Ajax API
<b>Development</b>				
Independence	-	+++	++	---
Required skills	-	+++	+	+
<b>Operations</b>				
Root-cause analysis	+++	+	+	++
Pro-active monitoring	++	---	---	++
Independence	+++	+++	++	---
<b>User Experience</b>				
Integration Features	--	--	++	+++
Performance	++	--	--	+++
Fall-back Mode	+++	---	---	++

# Integration Patterns

App as part of  
Content Page

Backend Integration

Backend Ajax-API

Bootloader

iFrame

Side-by-side

Single  
Page  
Application



# Development Time

AEM



Content Page

Application



Single Html Page



Static Resources



Dynamic Endpoints

# Development Time vs. Runtime

## AEM



Content Page  
+ HTML Snippet of App

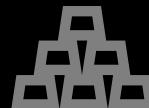


Static Resources

## Application



Single Html Page



Static Resources



Dynamic Endpoints

# Potential Approaches

- ~~Copy & Paste~~ 
- ~~Maven Build~~ 
- ~~Reverse Proxy~~ 
- Backend Crawler

# Backend Integration



- Query Instances
- Evaluate Context
- Load HTML Page
- Verify HTML
- Extract Html Snippet
- Extract Static Resources



# Extract HTML Snippet

```
<html lang="en" manifest="cache.manifest">
<head>
    <title>Sample Calculator Test Page</title>
    <meta name="keywords" content="Sample, Calculator, adaptTo() ">
    <link rel="stylesheet" href="css/style.css" data-webapp="export">
</head>
<body>
    <h1>Sample Calculator Test Page</h1>
    <div class="sample-calculator" data-webapp="export">
        <!-- here is the calculator html! -->
    </div>
    <script src="js/jquery.min.js"></script>
    <script src="js/calculator-ui.js" data-webapp="export"></script>
</body></html>
```

# Backend Integration



- Load Cache Manifest
- Load Static Resources
- Extract References
- Verify



# Cache Manifest

```
# Files, to be cached = static resources
CACHE:
css/style.css
js/calculator-ui.js
img/background.png

# Only online
NETWORK:
rest-api/sendOffer

FALLBACK:
static.html
```

# Backend Integration



- A/B Switch
- Clear Dispatcher Cache
- Calculate Overall Status
- Next Run



# Backend Integration

- Source Code

<https://github.com/alberndt/aem-app-integration>

# Evaluation: Backend Integration

	<b>Side-by-side</b>	<b>iFrame</b>	<b>Bootloader</b>	<b>Backend Ajax API</b>	<b>Backend Integration</b>
<b>Development</b>					
Independence	-	+++	++	---	+++
Required skills	-	+++	+	+	++
<b>Operations</b>					
Root-cause analysis	+++	+	+	++	++
Pro-active monitoring	++	---	---	++	++
Independence	+++	+++	++	---	+++
<b>User Experience</b>					
Integration Features	--	--	++	+++	++
Performance	++	--	--	+++	+++
Fall-back Mode	+++	---	---	++	++



# Further Integration Patterns

- External Content
- Multi-Page Applications
- POST Requests
- Structured Content Import (xml/json)



adaptTo()

# Questions



# Appendix



# Outbound Patterns

Content Snippets

Shared Resources

Frontend JS-Libraries

Site Master Data

App.-Configuration

Application Rules



# Content Snippets

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Estimate and order with confidence.

The last thing you want for any anchoring job is to run out of adhesive with only a dozen anchors left to install. At the same time, you want to minimize waste—and avoid unnecessary costs and inventory.

The Hilti Adhesive Anchor Volume Calculator draws on installation data using all types of Hilti adhesives and anchors—and with multiple sizes of rebar. Use it to compare product options, and even modify your calculations based on the specific installation conditions at your job site.

**HILTI** Adhesive Anchor Volume Estimator

Determine the volume of adhesive needed\* by entering data below:

Base Material	Concrete
Product	Hilti 420
Anchors Type	H420-RP
Rebar Size (in)	1/2"
Rebar Spacing (in)	12"
Rebar Extension Depth (in)	10"
Number of Anchors	100
Working Conditions	General

\*Calculation Methodology

**Results**

H-T420 200 24.11 ft³ Volume  
H-T420 200 24.11 ft³ Volume  
H-T420 200 24.11 ft³ Volume

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Exported Footer





# Export Servlet vs. Deep URL

- Use an export servlet!
  - Nicer API's
  - Content structure remains flexible
  - Entry point for mappings (e.g. UK vs. GB)



# Export Content Snippets – Export Servlet

```
@Override  
protected void doGet(SlingHttpServletRequest request, ...) {  
    ResourceResolver resolver = resolverFactory.getServiceResourceResolver();  
    SlingHttpServletRequestWrapper wrappedRequest =  
        new SlingHttpServletRequestWrapper(request) {  
            @Override  
            public ResourceResolver getResourceResolver() {  
                return resolver;  
            }  
        };  
    RequestDispatcher dispatcher =  
        wrappedRequest.getRequestDispatcher("/content/myproject/...");  
    request.setAttribute(WCMMode.REQUEST_ATTRIBUTE_NAME, WCMMode.DISABLED);  
    dispatcher.forward(wrappedRequest, response);  
}
```



# Outbound Patterns

Content Snippets

Shared Resources

Frontend JS-Libraries

Site Master Data

App.-Configuration

Application Rules



# Shared Resources

- AEM provides resources (=API)
  - Fonts
  - JS Libraries (e.g. jQuery, ...)
  - Icons, Images
  - CSS (careful!)



# Outbound Patterns

Content Snippets

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Application Rules



# Frontend JavaScript Libraries

- AEM provides JavaScript-API's
  - Dynamic Layouting
    - Pop-ups, Flyouts, Layer, ...
  - Web-Analytics
  - Footnotes
  - Personalization
  - Navigation (forward/backward button)



# Outbound Patterns

Content Snippets

Shared Resources

Frontend JS-Libraries

Site Master Data

App.-Configuration

Application Rules

# Config- and Master Data

- AEM provides back-end interface
  - Site master data  
(countries, languages, domain-names, logo, ...)
  - Link API
    - e.g. Mercedes Benz:  
BE → fr → E-Class → Configurator  
CH → de → A-Class → Homepage



# Outbound Patterns

Content Snippets

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# Application Configuration

- AEM is “the” User Interface for Authors
- Property-files within the App are  
“non-configurable”



# Outbound Patterns

Content Snippets

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Frontend JS-Libraries

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App.-Configuration

Application Rules



# Application Rules

- Mixing multiple Applications requires rules
- Example:
  - CSS Namespaces
  - JS Namespaces
  - ...



# Further Outbound Patterns

- Service Management
- Platform Services
- Governance