Cerner

code Learning Lab 2019

SMART Apps with MPages Integration

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Cerner

Agenda

- MPages Overview & Features
- SMART Apps with MPages Integration Overview
- Examples apps
- Architecture Diagrams
- Project Setup
- Dependencies
- Frequent Issues
- Troubleshooting
- Demo

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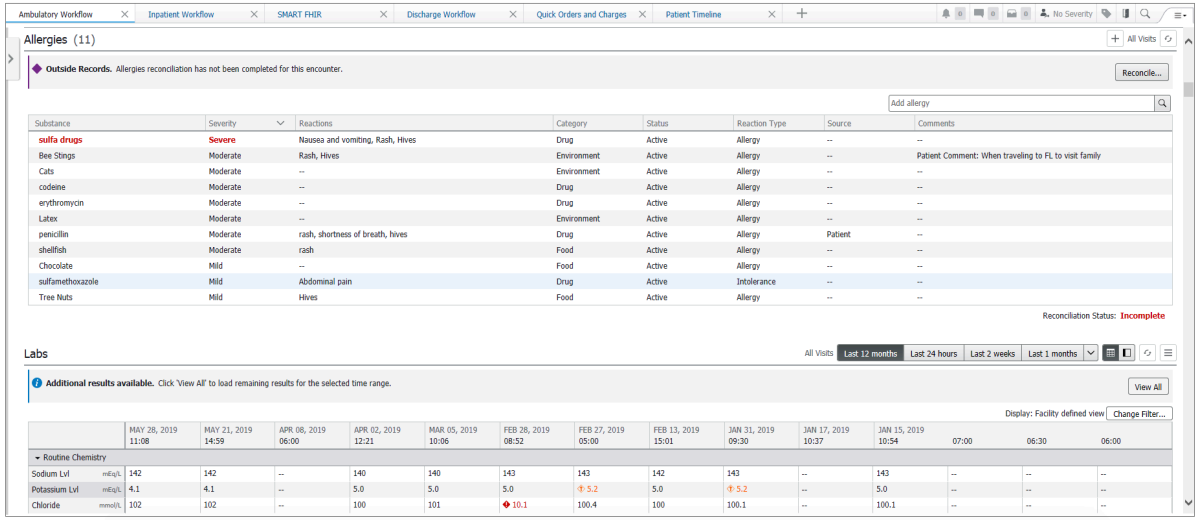
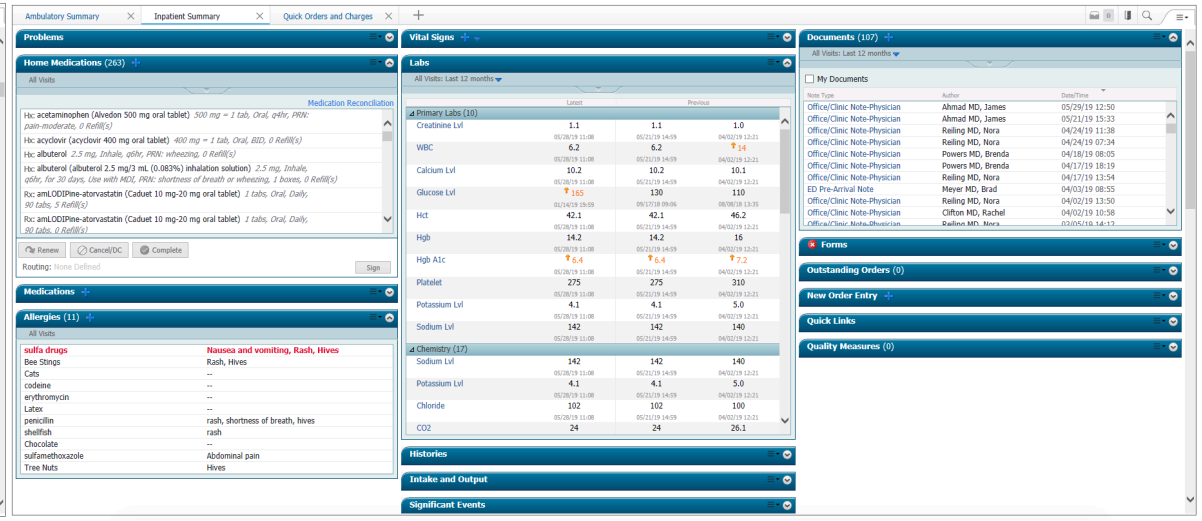
MPages Overview

- MPages provides a consolidated view of information contained throughout the electronic medical record and is accessible from within *PowerChart*, *FirstNet*, and *SurgiNet*.





MPages Workflow **MPages Summary**

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MPage Features

- *MPages* provides the following features:
  - Interactive, visually rich views of real-time clinical information
  - A standard library of components that are included as part of many *Cerner Millennium* solutions' licenses and are available to configure and organize into localized views and viewpoints
  - Supports both multi- and single-patient views and can be set up to meet the varied needs of specific roles, venues, and conditions at your location
  - An *MPages* Development Toolkit is available for an additional license which allows you to develop your own content for use in customized components and views using *Discern Explorer* Cerner Command Language (CCL) and HTML, *JavaScript*, and CSS standards

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MPages Features (Continued)

- *MPages* improves clinicians' efficiency and satisfaction in the following ways:
  - The information a clinician needs to understand the patient's story is available in a single view, providing important context that can otherwise be missed when having to navigate to various portions of the electronic medical record
  - Many of the actions a clinician must take to deliver care may be initiated directly from the view, decreasing clicks and reducing navigation barriers
  - Clinicians can personalize their views so they are presented with the information at the point they need it during their natural workflow

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SMART Apps with MPages Integration Overview

- Enable developers to securely embed their SMART apps in any Workflow/Summary MPage component
- Leverage Cerner open source xfc library for secure iframe embedding
- Require Embedded Server (cloud hosted) for the second iframe
- Require cerner-smart-embeddable-lib open source lib for host whitelisting, xfc initialization, others

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Benefits

- Embed an (existing) SMART app into an existing clinicians' workflow
- Cloud deployment model, easy to update existing SMART apps
- SMART apps, and native MPage components share the same view
- Use same tooling as native MPage components for configuration

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Examples

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PETERS, TIMOTHY - 10000883 Opened by Kheang, Kol

Task Edit View Patient Chart Links Notifications Navigation Help

Message Center | Ambulatory Organizer | Staff Assignment | Physician Handoff | Home | Cerner Support (crt) | Cerner Support (tst) | Cerner Support (dev) | Test App | Patient List | Rounds List | Schedule | Census Task List | CareCompass | Links

New Sticky Note | View Sticky Notes | Tear Off | Change | Charges | Charge Entry | Exit | Calculator | Message Sender | AdHoc | Medication Administration | PM Conversation | Depart | Communicate | Patient Education | Medical Record Request | Result Copy

PETERS, TIMOTHY

List | Recent | Name

PETERS, TIMOTHY
Allergies: Acetaminophen, Caffeine, Nutraderm 30, peni...
IQHealth: No

PCP:Schneider, Chuck
Phone:(816) 822-9122
Age:58 years

DOB:4/30/1961
Wt:55 kg
Sex:Male

Pref. Labs/Diagnostics:
MRN:10000883
Inpatient FIN: 20001720 [Admit Dt: <No - Inpatient admit date>] Loc: 1S, Baseline West

Menu

SMART in MPage | Full screen | Print | 6 minutes ag

100%

MPages View | MPages View | MPages View | MPages View | MPages View

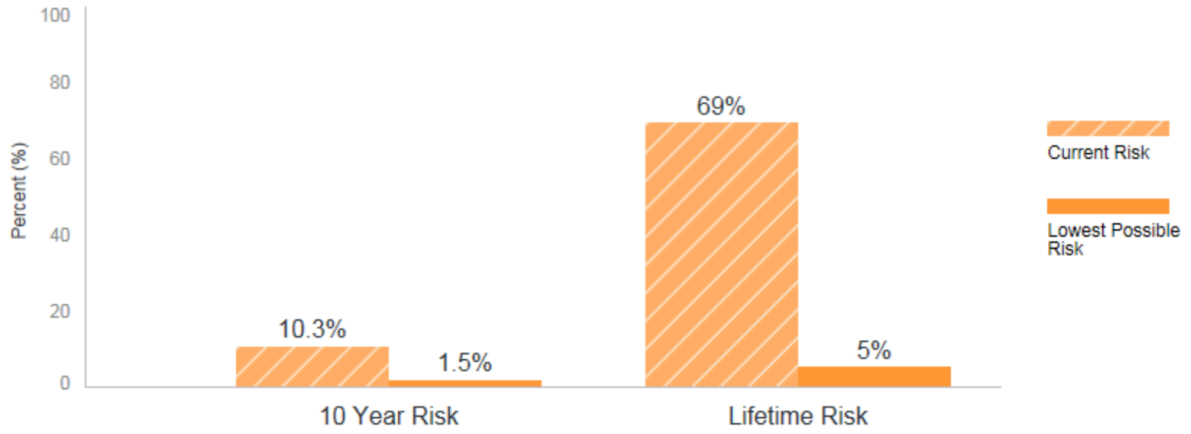
SMART App Validator
ASCVD Risk App

ASCVD Risk App

ASCVD Risk Calculator

Results | Risk Factors | Recommendations

Chance of heart attack or stroke



Simulated 10 Year Risk

PETERS, TIMOTHY - 10000883 Opened by Kheang, Kol

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100%

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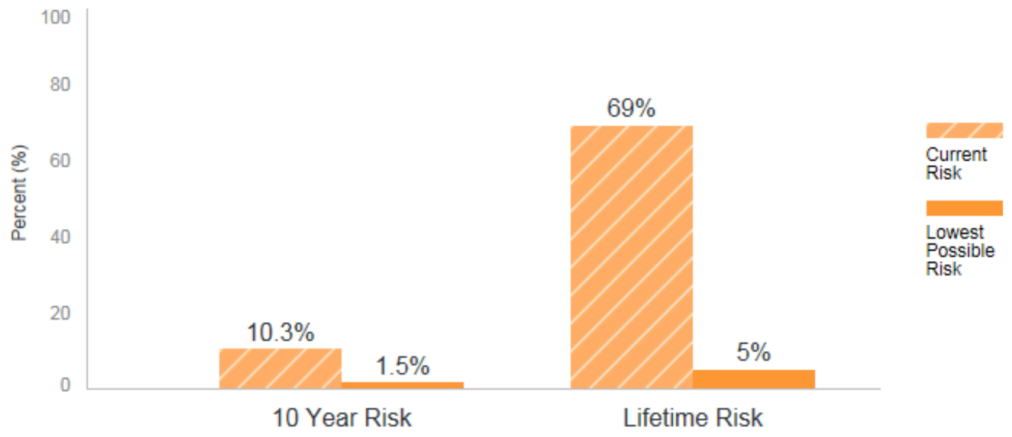
SMART ASCVD Risk App

ASCVD Risk Calculator

Results | Risk Factors | Recommendations

Chance of heart attack or stroke



Simulated 10 Year Risk

Current Risk

SMART App Validator

SMART App Validator

Tenant : 0b8a0111-e8e6-4c26-a91c-5069cbc6b1ca

Resources Version Supported : DSTU2

Browser Info

✓ Browser: {"msie":true,"version":"7.0"}

✓ User Agent: mozilla/4.0 (compatible; msie 7.0; windows nt 6.1; wow64; trident/7.0; slcc2; .net clr 2.0.50727; .net clr 3.5.30729; .net clr 3.0.30729; .net4.0c; .net4.0e)

Health Checks

✓ SMART App Service Health Check: success - 200

✓ Authorization (OAuth2): success - 200

✓ FHIR Service Health Check: success - 200

Resources Expand All

✓ Conformance: success - 200 Show/Hide details Copy

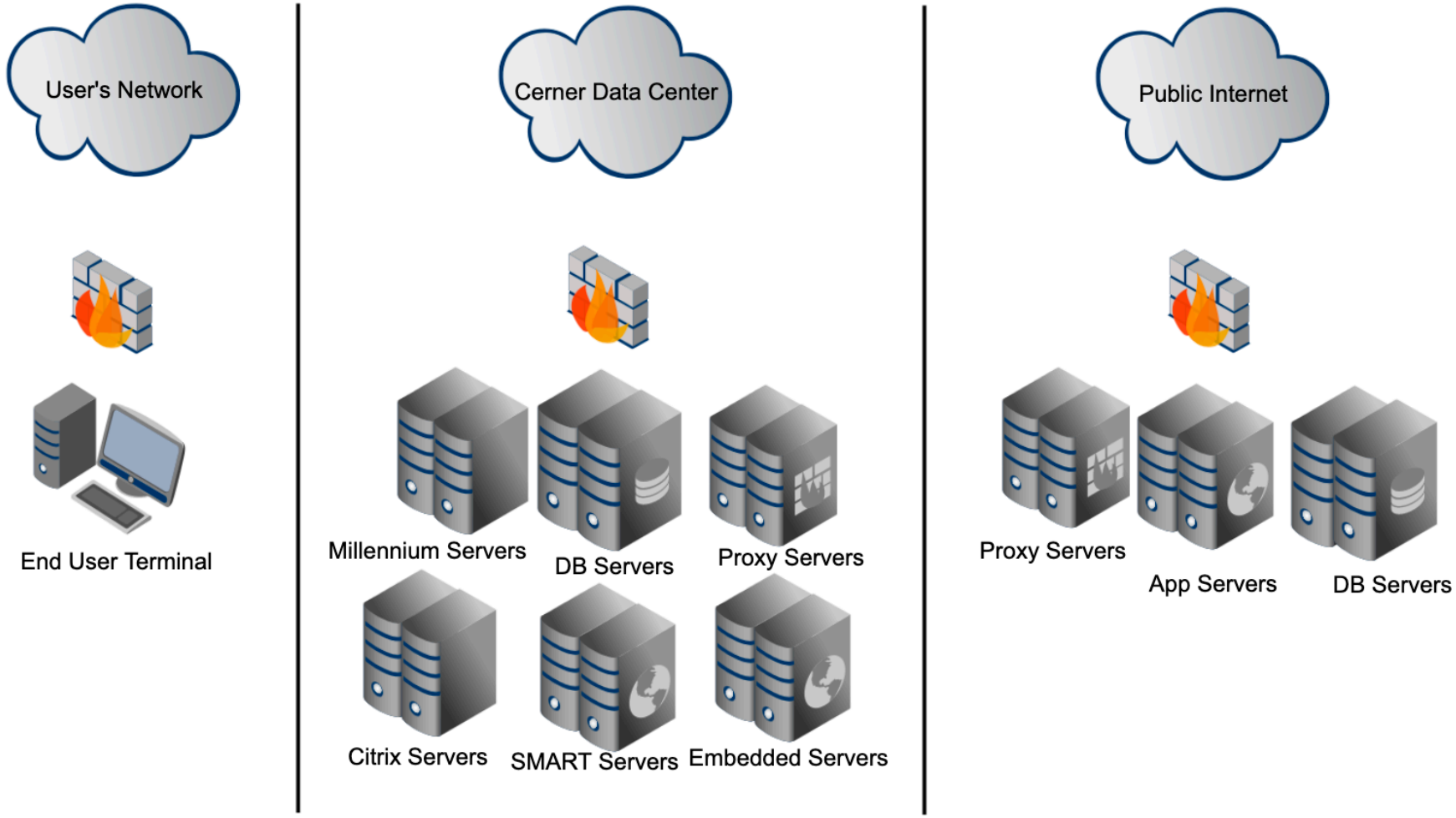
✓ Patient: success - 200 - Result count: 1 Show/Hide details Copy

✓ Observation: success - 200 - Result count: 61 Show/Hide details Copy

✓ Observation-laboratory: success - 200 - Result count: 48 Show/Hide details Copy

✓ Observation-vital-signs: success - 200 - Result count: 40 Show/Hide details Copy

Network Diagram



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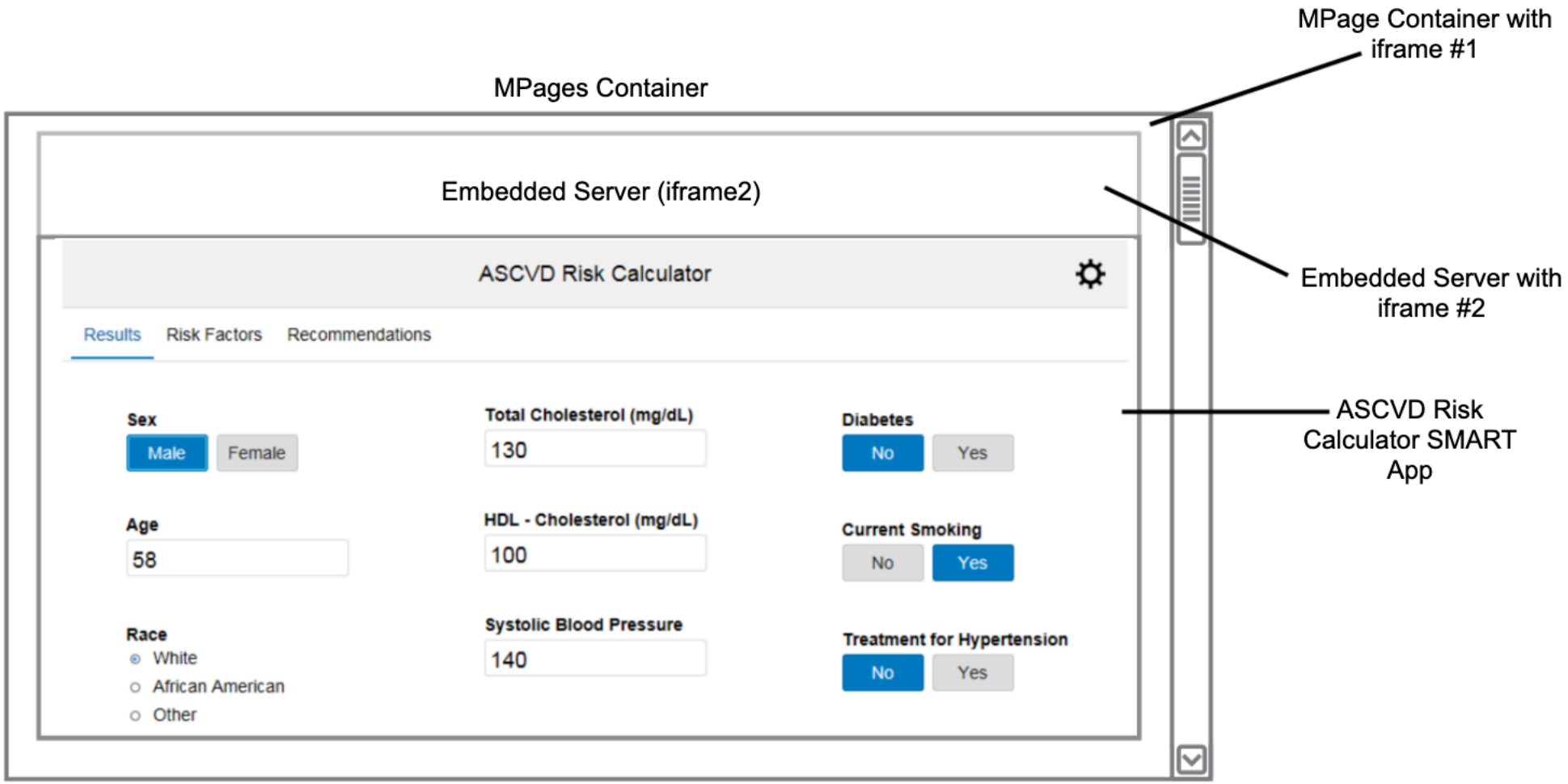
iFrames Diagram



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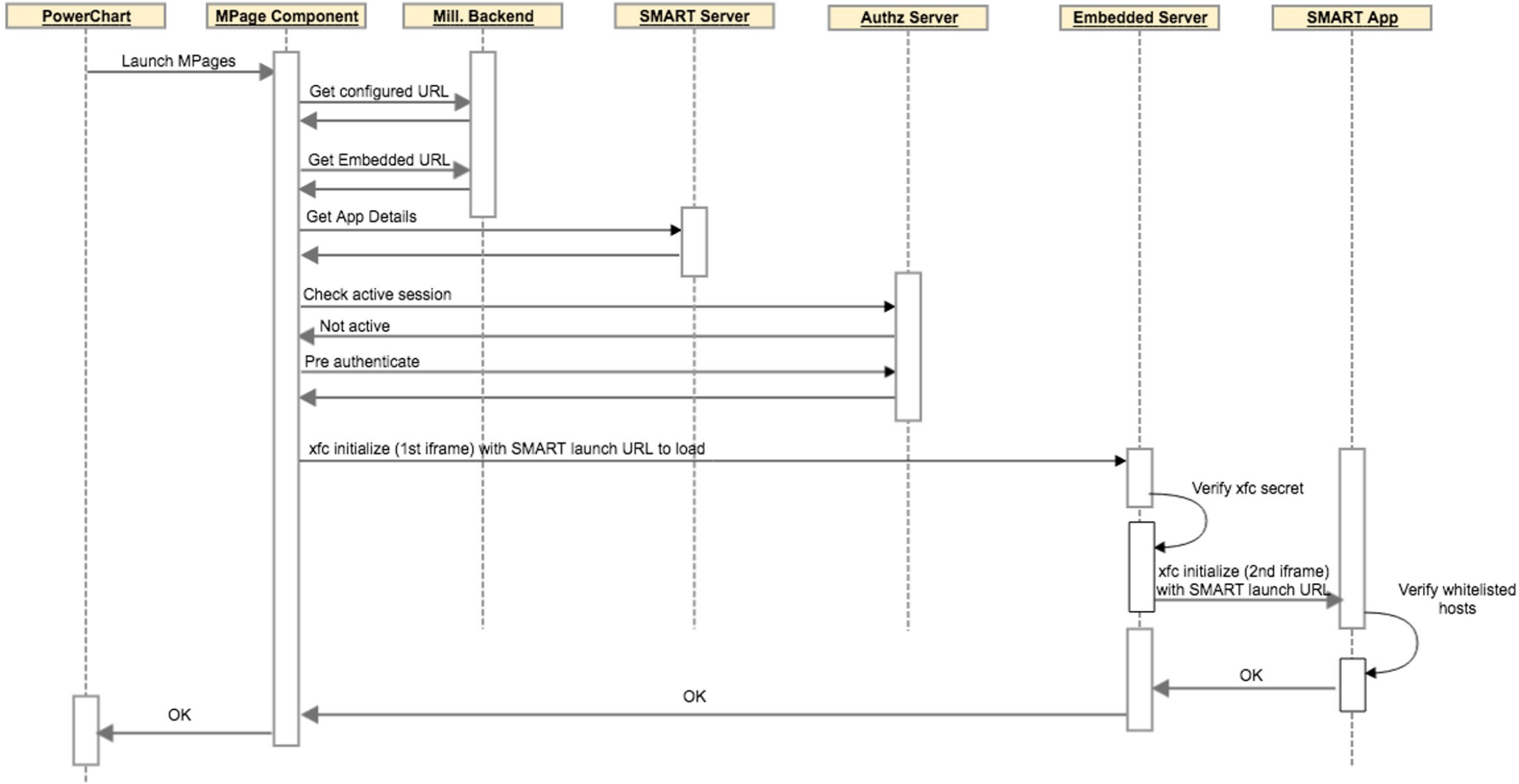
SMART apps in MPages Sequence Diagram



Embedded Server

- It acts as a middleman between MPage and the SMART app
- Allow for easy provisioning of any apps using cerner-smart-embeddable-lib and URLs whitelisting
- Consumes xfc library
  - It’s a content provider and a consumer
  - Uses secret for authentication between MPage and Embedded Server
  - Uses URL whitelisting between Embedded Server and SMART app

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cerner-smart-embeddable-lib

- JavaScript library to allow SMART web app to be embeddable in Cerner's MPage Workflow/Summary view
- Wrapper project, leverages xfc library to prevent Clickjacking (UI redress) attack
- Contains whitelisted Embedded Server hosts
- Iframe resizer event listener/trigger
  - Listens for changes in app and trigger an event to the Embedded Server

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Example Page Setup

```
<!DOCTYPE html>
<html lang="en" hidden>
  <head>
    <meta http-equiv="X-UA-Compatible" content="IE=edge" />
    <meta http-equiv="Content-Type" content="text/html; charset=utf-8" />
    <title>Example SMART Application</title>
    <link rel='stylesheet' type='text/css' href='cerner-smart-embeddable-lib-1.2.0.min.css'>
  </head>
<body>
<!-- app's code here -->

  <script src='path/to/babel-polyfill.js'></script>
  <script src='cerner-smart-embeddable-lib-1.2.0.min.js'></script>

  <!-- Optional. Override when the default height calculation does not fit your need. -->
  <script src='path/to/override-height-calculation.js'></script>
</body>
</html>
```

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Dependencies

- babel-polyfill
  - Max 1 instance

OR

- Array includes() polyfill
- es6-shim polyfill

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Frequent Issues

- Application code not compatible with IE 10
  - MPages renders using IE10 compatibility document mode
- X-Frame-Options header is still set
  - This header cannot be set
- Content-Security-Policy (CSP) frame-ancestors is set
  - This header cannot be set
- 3rd party cookies not accepted by the browser in iframe for IE
  - Make sure that P3P header is set

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Frequently Asked Questions

- What happen when my app is not framed but has the library included?
  - App should work like normal launch flow
- Do I need to include the JavaScript/css files in all of the pages?
  - Yes
- What happen when another site frame my app without xfc?
  - App will be hidden to prevent Clickjacking (UI redress) attack
- What happen when Cerner MPages frame my app?
  - App only displays when all required dependencies are included, and the whitelisted hosts matched the Cerner Embedded Servers
- Why is my app showing a blank screen?
  - Multiple reasons:
    - Is X-Frame-Options header still set?
    - Is the app server capable of accepting large URI string?
    - Is the app server logs providing any clue for troubleshooting?

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Troubleshooting Tools

- Microsoft Modern.IE VMs with various Internet Explorer versions
- Blackbird console in MPages. Bring up the console with:
  - Mac: CMD + \
  - Windows: CTRL + \
- IEChooser – full console for debugging (available in Windows Server 2016 and later)
- F-Twelve – Cerner open source JavaScript console
  - Demo @ https://engineering.cerner.com/f-twelve/demo/
  - Currently working on an issue with MPage integration

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Demo

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Thanks!

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