



Presented by: Derek Maciak  
**CTO/Partner**  
**Surround Technologies**

surroundtech.com | @SurroundTech

## Virginia Beach IBM i User Conference 2016

# Bootstrap Responsive Web Development for the IBM i

October 7, 2016 – (8:40 AM-9:40 AM)

# Today's Speaker



Derek Maciak

**CTO/Partner Surround Technologies**

[dmaciak@surroundtech.com](mailto:dmaciak@surroundtech.com) | [www.surroundtech.com](http://www.surroundtech.com)

***Socialize:***

 [linkedin.com/company/128638](https://www.linkedin.com/company/128638)

 tweet me @SurroundTech

 [facebook.com/surroundtech](https://www.facebook.com/surroundtech)



# TODAY'S SESSION:

## Responsive .NET Development for IBM i Line of Business and other Web Apps

Bootstrap is now one of the most popular HTML, CSS, and JS frameworks for developing responsive applications on the web. This session will discuss how to best build Responsive Web Applications using .NET, Bootstrap and your IBM i.

In this session you'll learn about:

- **Multi-device User Experiences**  
*If you haven't heard, it's all about being responsive.*
- **Architecture, Technologies and Best Practices**  
*We've figured it out so you don't have to.*
- **Introducing Bootstrap**  
*A popular front-end web development framework*
- **Bootstrap framework customizations**  
*Pimping out the ride.*
- **Accessing data and programs on your IBM i**  
*Because that's where all the good stuff is.*
- **Bootstrap themes & templates**



# By A Show of Hands

---



**We want to know:**

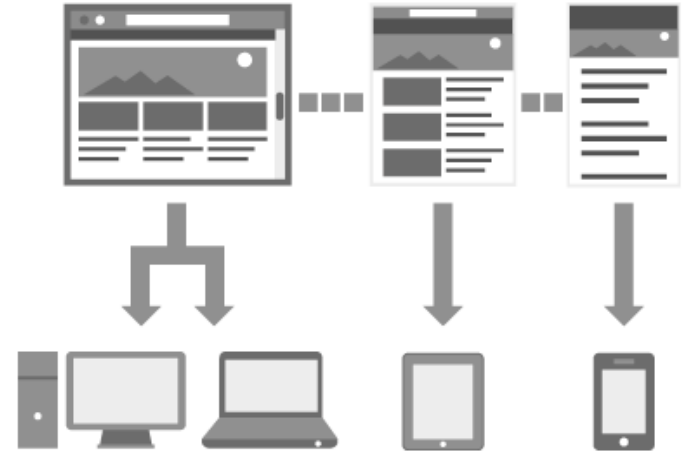
**How familiar are you with  
Responsive Design?**



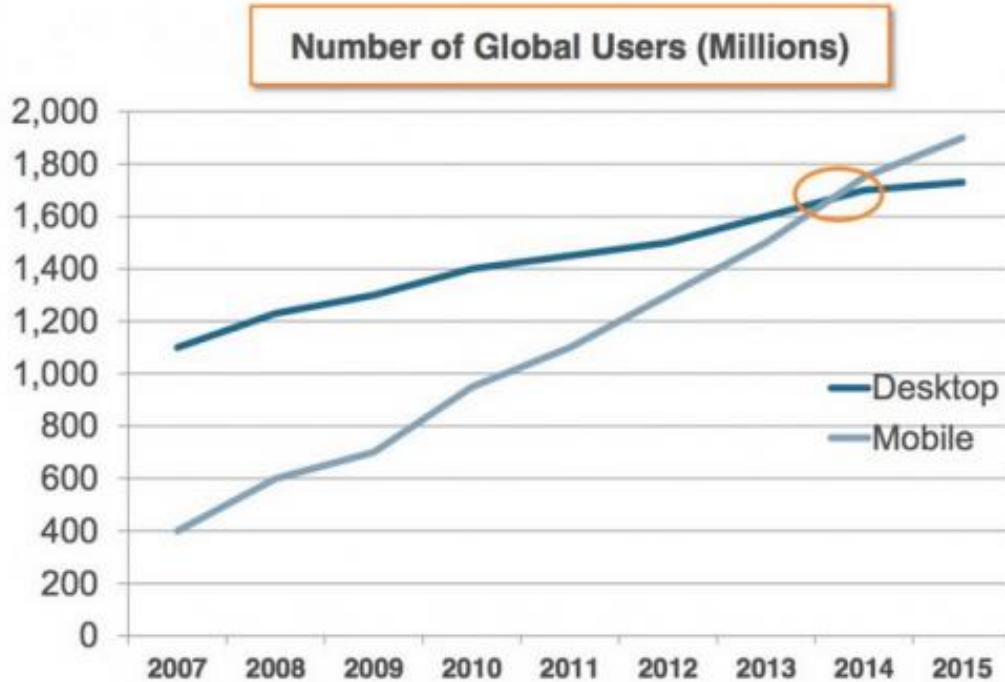
---

# Multi-device User Experiences

If you haven't heard, it's  
all about being **responsive**.



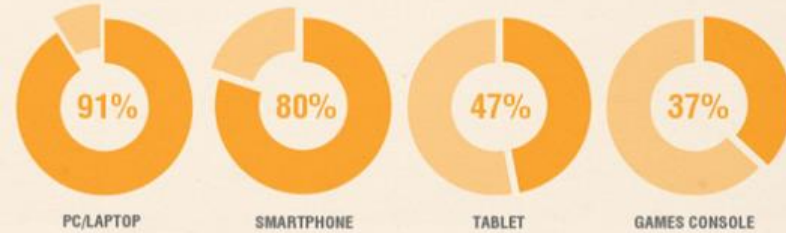
# Why Responsive Design?



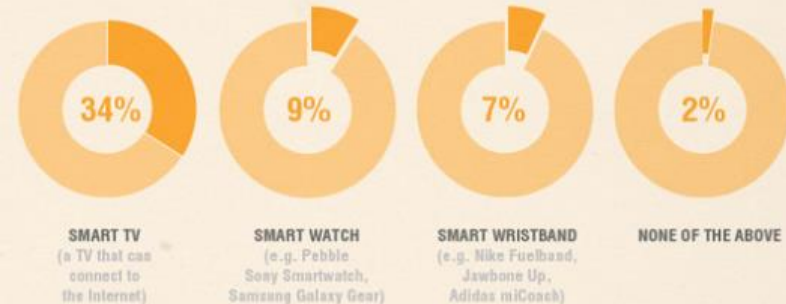
## WHICH DEVICES ARE MOST POPULAR?

80% OF INTERNET USERS OWN A SMARTPHONE

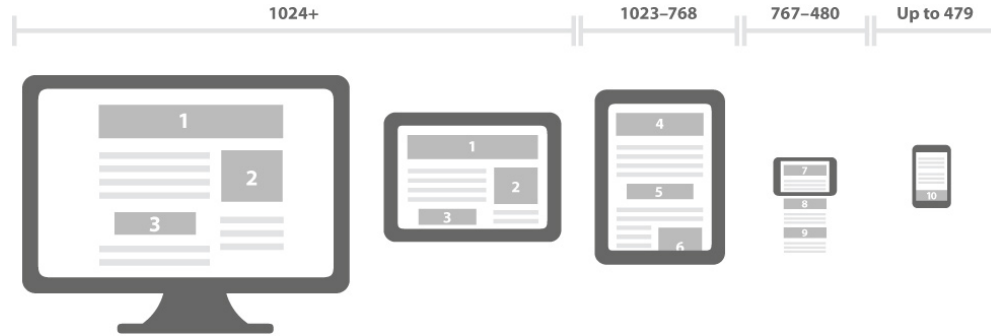
### Most Popular Devices Used to Search the Internet



### Emerging Devices Used to Search the Internet



# What is Responsive Design?



- Makes your web page look good on all devices.
- Uses only HTML and CSS.
- Is not a program or a JavaScript.
- Eliminates the need for different source code for different devices
- Developers use a mix of flexible grids and layouts, flexible images and the use of CSS media queries.

Responsive web design is becoming more and more important as ***the amount of mobile traffic, which now accounts for more than half of total internet traffic, increases.***

# Media Queries

- W3C CSS3 Recommended Standard in June 2012
- Uses @media rule to include CSS properties only if a certain condition is true.
- Always Design for Mobile First

## CSS Media Queries within a style sheet

```
/* Extra small devices (phones, less than 480px) */  
@media (max-width:480px) {  
    << device specific CSS >>  
}  
}
```

```
/* Small devices (tablets, 768px and up) */  
@media (min-width:768px) {  
    << device specific CSS >>  
}  
}
```

```
/* Medium devices (desktops, tablets, 992px and up) */  
@media (min-width:992px) {  
    << device specific CSS >>  
}  
}
```

```
/* Large devices (Large desktops 1200px and up) */  
@media (min-width:1200px) {  
    << device specific CSS >>  
}  
}
```



# We Chose Bootstrap.

---



You could do all this from scratch, but why would you want to? We have, and it's *time consuming*.

With so many options on the market,  
***we chose bootstrap.***

# What is Bootstrap?

---

**Bootstrap**, originally named *Twitter Blueprint*, was developed by Mark Otto and Jacob Thornton at Twitter as a framework to encourage consistency across internal tools. Before Bootstrap, various libraries were used for interface development, which led to inconsistencies and a high maintenance burden.



Bootstrap is a free and open-source collection of tools for creating websites and web applications. It contains HTML- and CSS-based design templates for typography, forms, buttons, navigation and other interface components, as well as optional JavaScript extensions. It aims to ease the development of dynamic websites and web applications. It is a front end framework, that is, an interface for the user, unlike the server-side code which resides on the "back end" or server.

*Bootstrap is the most-starred project on GitHub, with over 85,000 stars and more than 34,000 forks.*

via WikiPedia

# What is Bootstrap?



## CSS

Global CSS settings, fundamental HTML elements styled and enhanced with extensible classes, and an advanced grid system.

Grid System  
Typography  
Code  
Tables  
Forms  
Buttons  
Images  
Helper Classes  
Responsive Utilities

## Components

Over a dozen reusable components built to provide iconography, dropdowns, input groups, navigation, alerts, and much more.

Glyphicons  
Dropdowns  
Button groups  
dropdowns  
Input groups  
Navs  
Navbar  
Breadcrumbs  
Pagination  
Labels  
Badges  
Jumbotron  
Page header  
Thumbnails  
Alerts  
Progress bars  
Media object

List Group  
Panels  
Button  
Responsive  
Wells

## Javascript

Bring Bootstrap's components to life with over a dozen custom jQuery plugins. Easily include them all, or one by one.

Transitions  
Modal  
Dropdown  
Scrollspy  
Tab  
Tooltip  
Popover  
Alert  
Button  
Collapse  
Carousel  
Affix

# Bootstrap's Benefits

---

## Consistency

Bootstrap was created on the principle of consistency. It was meant to encourage consistency across internal tools at Twitter before creators later realized it had potential for much more. The tools in bootstrap pair designers with developers and ensures consistency regardless of who's working on the project. The end results is uniform across platforms so regardless whether you're using Firefox, Chrome or Internet Explorer, everything looks the same.



## Speed

One of the most obvious benefits to using Bootstrap is speed. If you need to develop a new website or application quickly, nothing beats having everything pre-built and ready to customize to your needs.



## Responsiveness

We've already seen that mobile traffic is responsible for more bandwidth than desktop computers. Responsiveness is no longer an option, but rather a necessity to keep up with the ever mobile heart beat of the world. By placing an emphasis on responsiveness out of the gate, you cater to current trends without losing site of legacy and varying platforms.



# Bootstrap's Benefits

---

## Customizable

Whether you choose to customize bootstrap yourself or use the bootstrap customize page online, any project can be customized to your needs, and the rest you can just toss. Using the online customize tool you can just select the checkboxes you want and download your customized version.



## Support

Currently Bootstrap is hosted, developed and maintained on GitHub and has **nearly 10,000 commits and over 500 contributors**. As you can image there is a huge support community behind it and answers to issues can easily be found in support documentation or by simply searching for your problem online. There is no single source of support because of how widely accepted and implemented Bootstrap is.

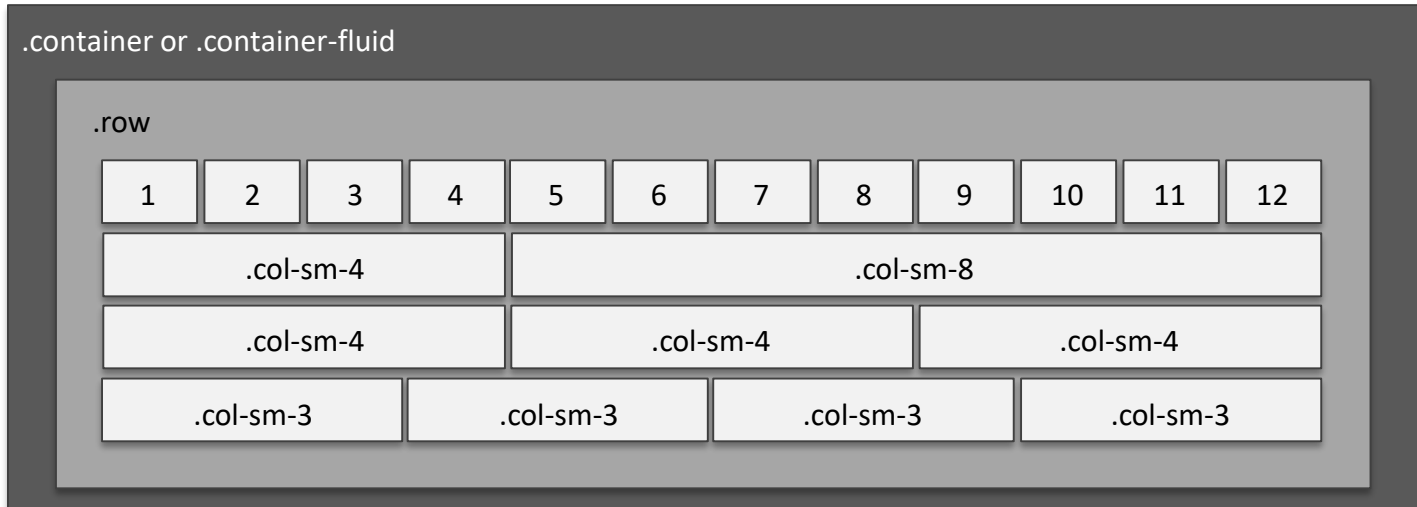


# Bootstrap: **12** is the magic number



Bootstrap includes a responsive, mobile first fluid grid system that appropriately scales up to 12 columns as the device or viewport size increases. 12 is the magic number.

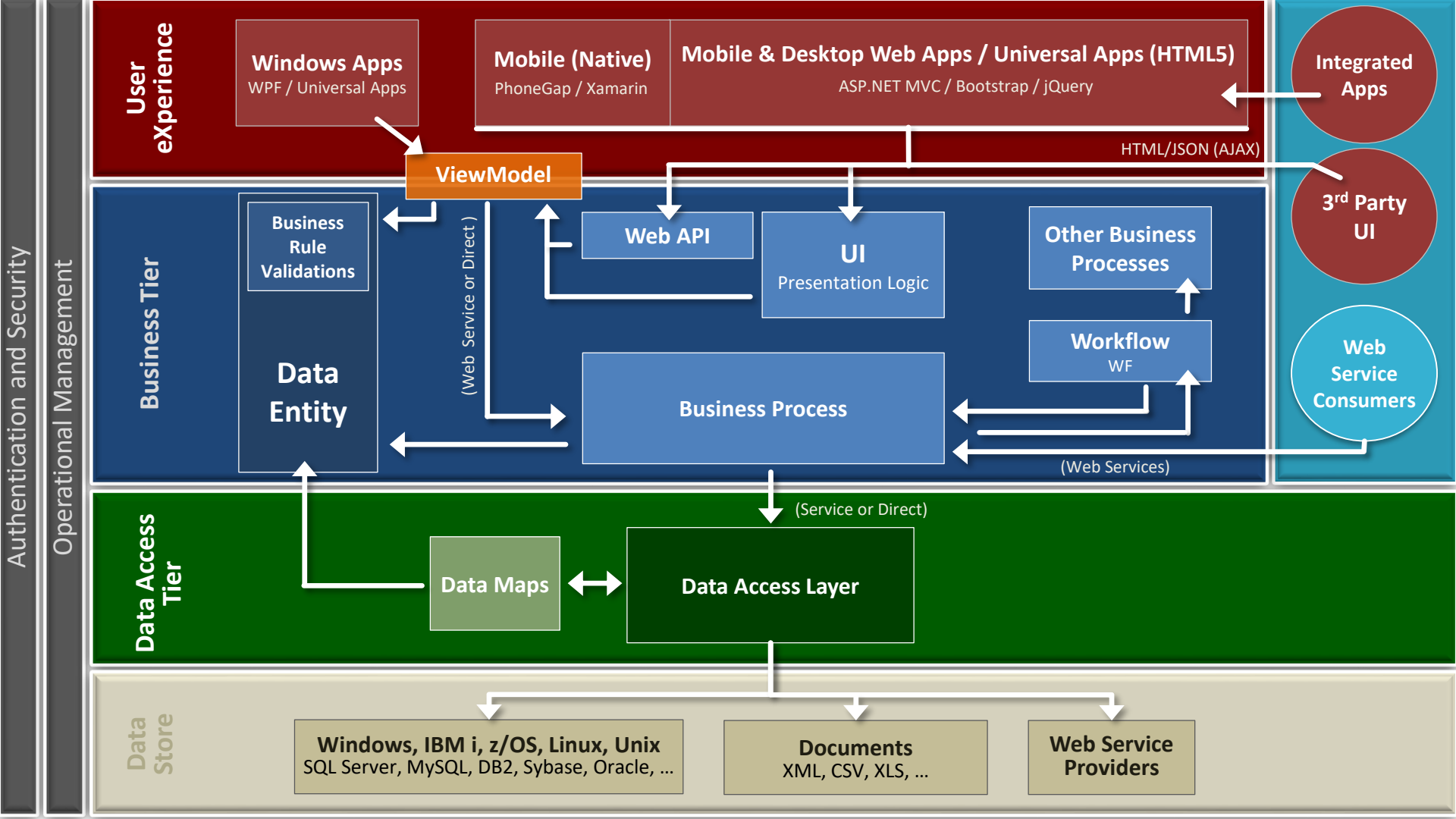
`.col-xs-xx: <768px` | `.col-sm-xx: >=768px` | `.col-md-xx: >=992px` | `.col-lg-xx: >=1200px` (xx=1 to 12)  
Extra small                      Small                      Medium                      Large



---

# Architecture, Technologies and Best Practices

We've figured it out so you don't have to.





---

# Accessing the data and programs on your IBM i

Because that's where all the good stuff is.

# BEST PERFORMANCE

## ADO.NET

DataTable

# DataSet

### DB2 for IBM i .NET Provider *[ IBM.Data.DB2.iSeries ]*

iDB2Connection

iDB2DataAdapter

iDB2Command

iDB2DataReader

### ODBC .NET Data Provider *[ System.Data.Odbc ]*

OdbcConnection

OdbcDataAdapter

OdbcCommand

OdbcDataReader

### OLEDB .NET Data Provider *[ System.Data.OleDb ]*

OleDbConnection

OleDbDataAdapter

OleDbCommand

OleDbDataReader

### DB2 for .NET Provider *[ IBM.Data.DB2 ]*

DB2Connection

DB2DataAdapter

DB2Command

DB2DataReader

UNMANAGED CODE

ODBC Driver

IBMDA400 | IBM DASQL

DB2 Connect

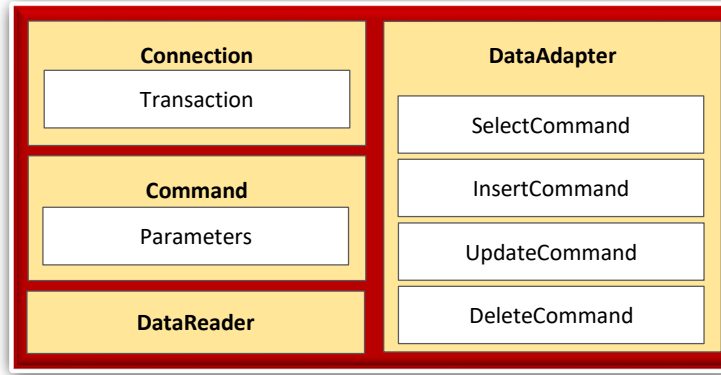
Target DB2 Database



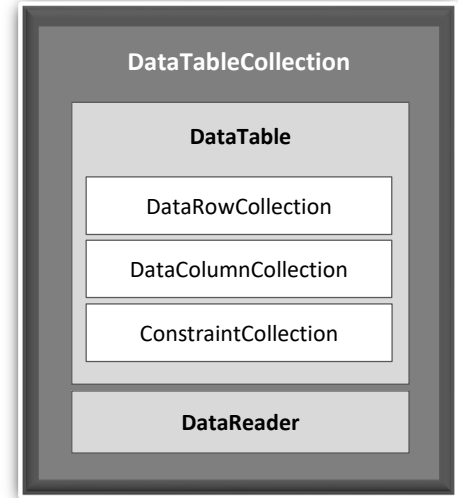
## Database



## .NET Framework Data Provider



## DataSet



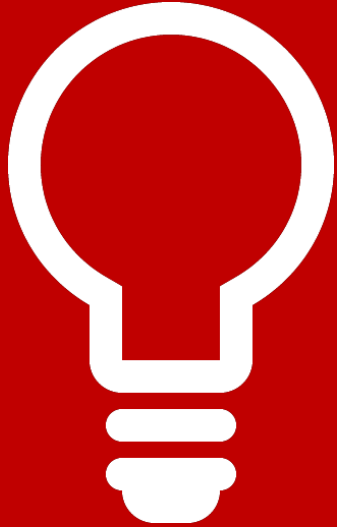
# ADO.NET Benefits

---

- **Performance**
  - No need for COM marshalling or data type conversion to transmit a recordset among tiers
- **Scalability**
  - No database locks or active database connections for long durations
- **Interoperability**
  - Datasets are transmitted across network using XML Format
- **Maintainability**
  - Can easily increase the # of tiers after the application is deployed because of XML format
- **Programmability**
  - Encapsulation of data access functionality

# Good to Know

- Available as part of IBM i Access for Windows starting with V5R3M0
- Not a default install option,
  - Must use Selective install with IBM i Access for Windows
  - Optional Windows Application Package that is part of IBM i Access Client Solutions
- Can connect to down-level OS/400 versions to V5R1
- Need TCP/IP connection from PC to IBM i
- Uses Optimized host database server job (QZDASOINIT) on the IBM i
- .NET class needs to reference IBM.Data.DB2.iSeries
- 5.4 version supports .NET Framework 1.0 and 1.1
- 6.1 and 7.1 versions targets .NET Framework 2.0 and will run on newer .NET Framework versions without modification
- Always check and update to current Service Pack



---

# Bootstrap framework customizations

Pimping out the ride.

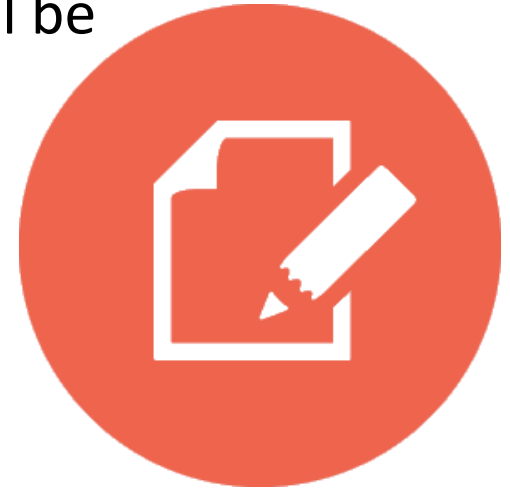
# Bootstrap Framework Customizations

---

Bootstrap makes customizing your themes as simple as visiting a website and choosing what components work best for your project. A few clicks and you'll be able to compile and use a system, designed for you, by you.

Visit:

**[getbootstrap.com/customize](https://getbootstrap.com/customize)**



---

# Bootstrap themes & templates

We've figured it out so you don't have to.



# Bootstrap Themes & Templates

---

Many sites exist for customizing your bootstrap site. These plug and play customizations make styling your bootstrap driven site a breeze.

We recommend:

- [www.bootswatch.com](http://www.bootswatch.com)
- [www.wrapbootstrap.com](http://www.wrapbootstrap.com)





# Hands On Coding

Let's see it in action.

# { } Demo Assumptions

- I am using Bootstrap with ASP.NET MVC, but it can be used with any backend framework.
- ASP.NET project templates automatically link in and use Bootstrap
- All data is coming from DB2 on an IBM i.
- I have already done the following:
  - Generated entities using our own Object Relational Mapping (ORM) tool for the following files:
    - Customers and Orders (Customers have 1:M Orders)
  - Created an ASP.NET MVC project using Razor Syntax for Views
    - Referenced the entities generated above
    - Ran MVC Scaffolding against the Customer and Order Models to generate the CRUD
    - Used for demonstration of Bootstrap and not a recommendation for full featured LOB websites
    - Created a PagingModel.cs Model Class
    - Created 2 shared partial views, \_PagingControls.cshml and \_ModuleTabs.cshml
    - Created a Customer Editor template Partial View called CustomerEntity.cshml



# Examples from the field

## Putting it all together

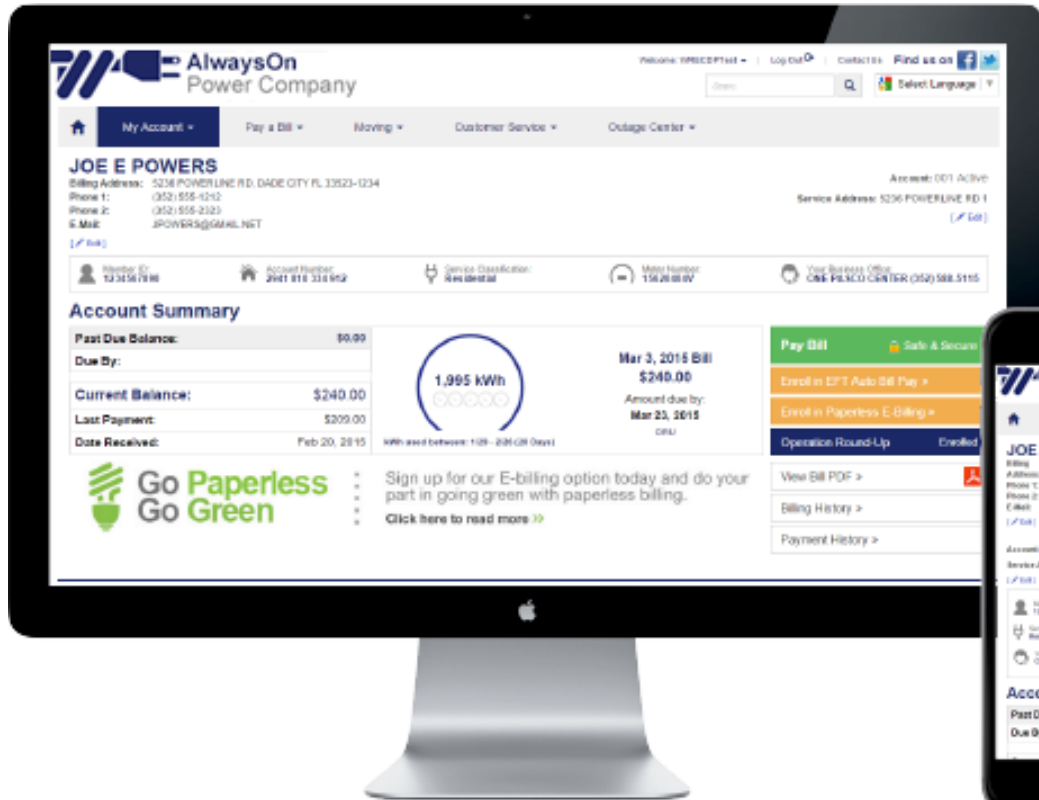
# Large Electric Coop



## *Bootstrap in the field:*

This large electric cooperative allows their customers to access and update their account information through a customer portal pulling information from their backend COBOL based system running on their IBM i

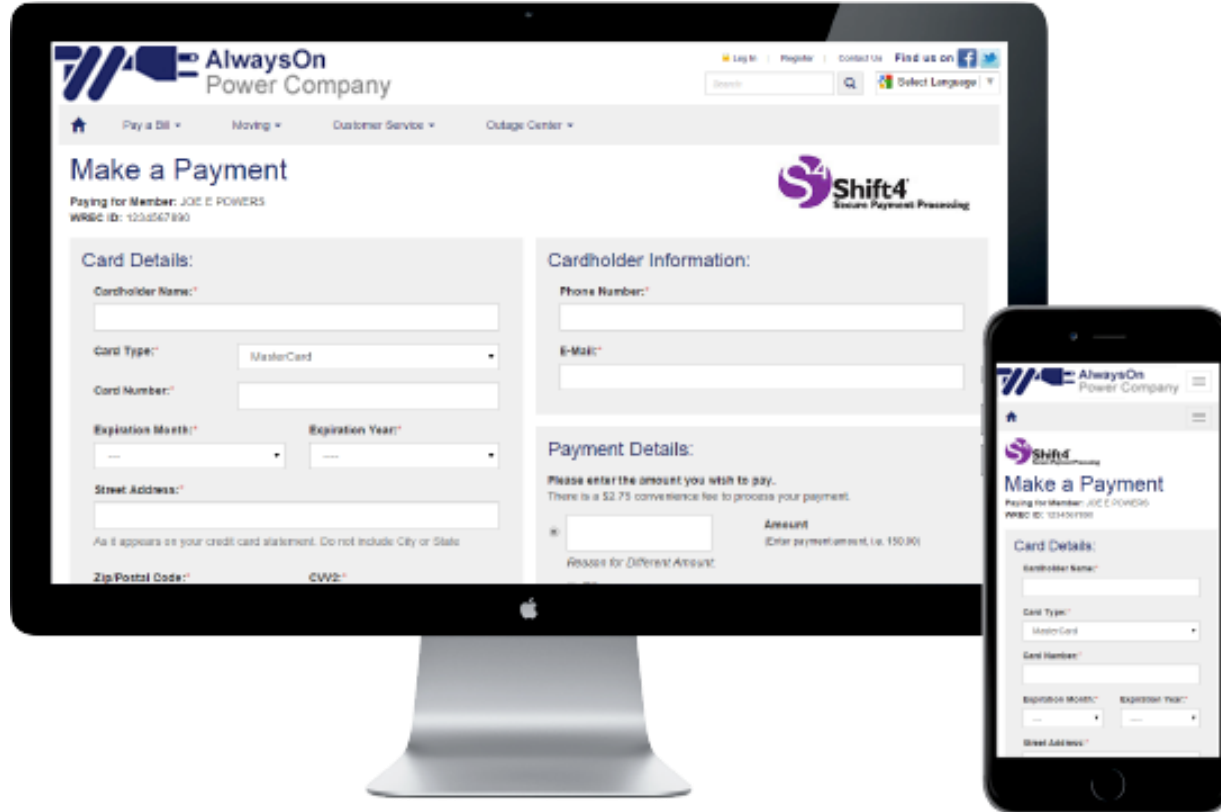
# Large Electric Coop



## *Bootstrap in the field:*

Viewing electric usage and current as well as previous bills are simple from any device. New services such as paperless billing and fund raising for charities like operation round up have seen huge increases in online subscriptions.

# Large Electric Coop



## *Bootstrap in the field:*

Customers now have more choices of how to pay their bill online. Automated payment services and bill history means customers will never have to worry about being away and a bill being due.

# Large Electric Coop

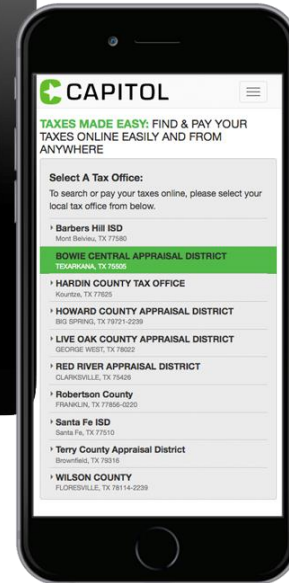
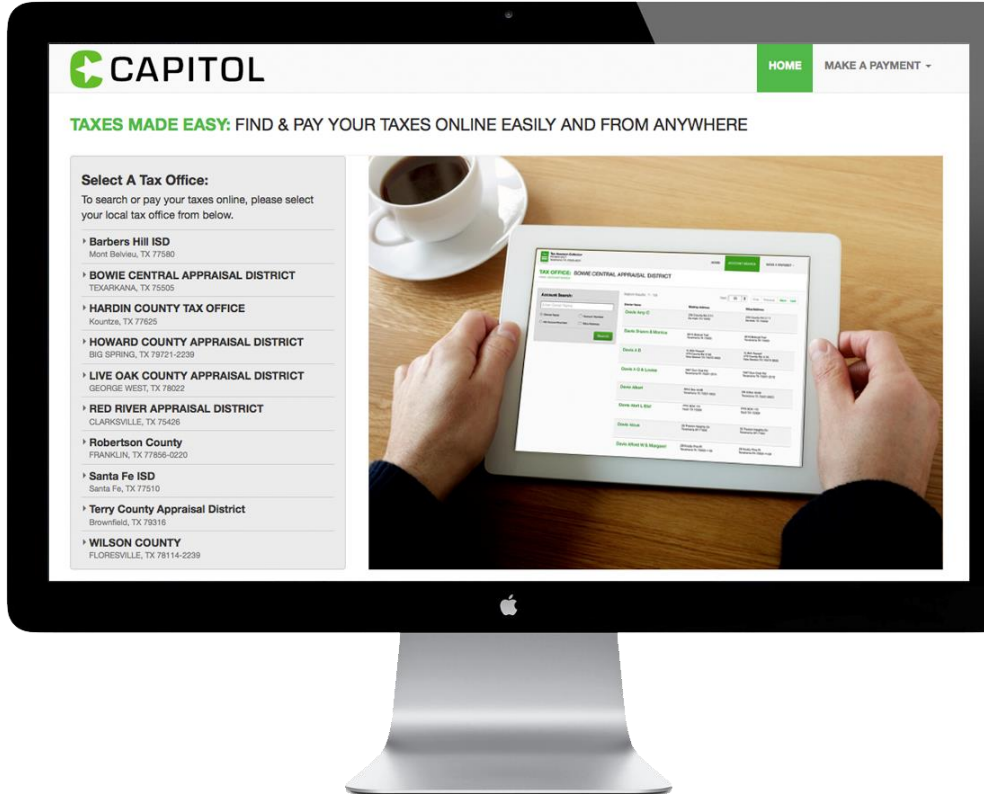


## ***Bootstrap in the field:***

Reporting street light outages or other problems within the utilities zone is as easy as 1-2-3.



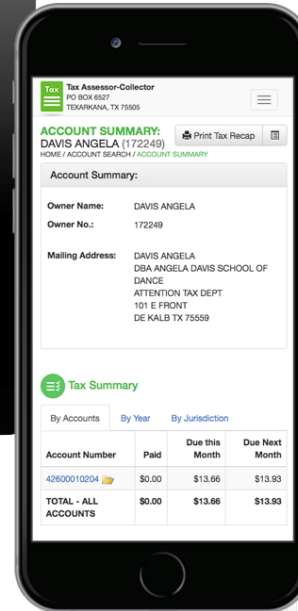
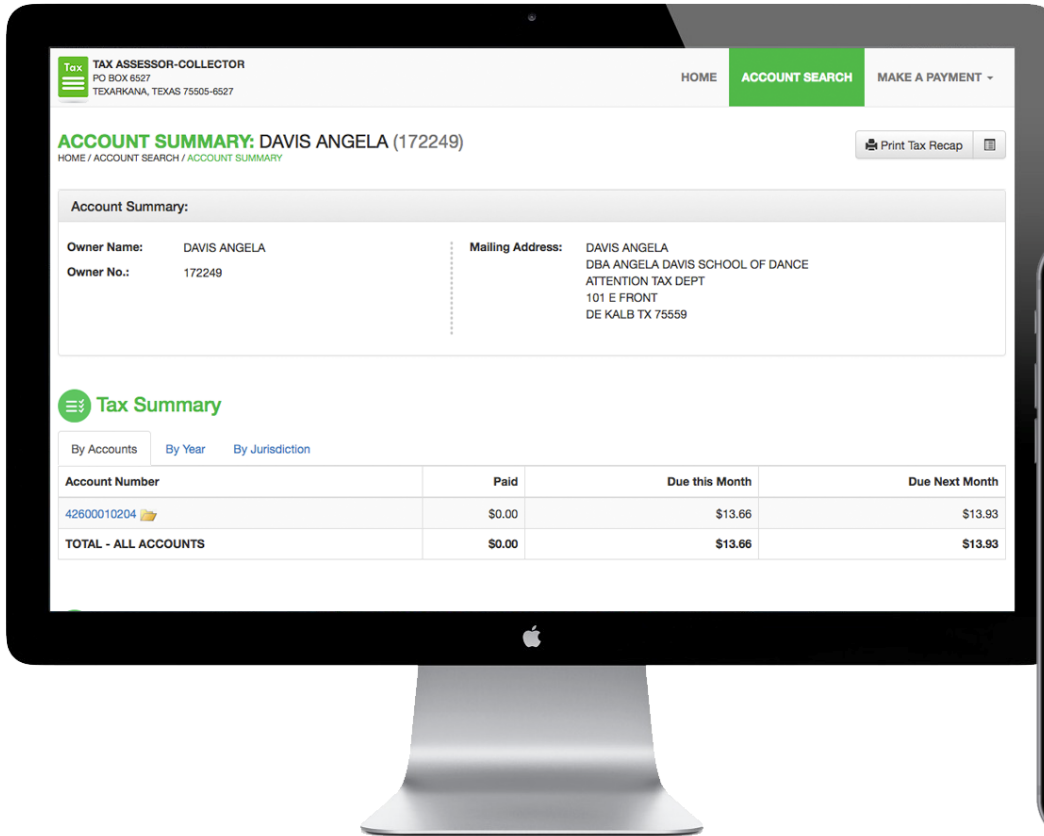
# Capital Appraisal Group



## *Bootstrap in the field:*

No one likes paying taxes, but since we all have to, it might as well be easy and look good. If you live in Texas, you know what we're saying.

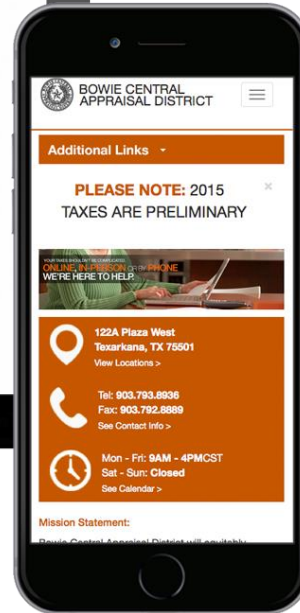
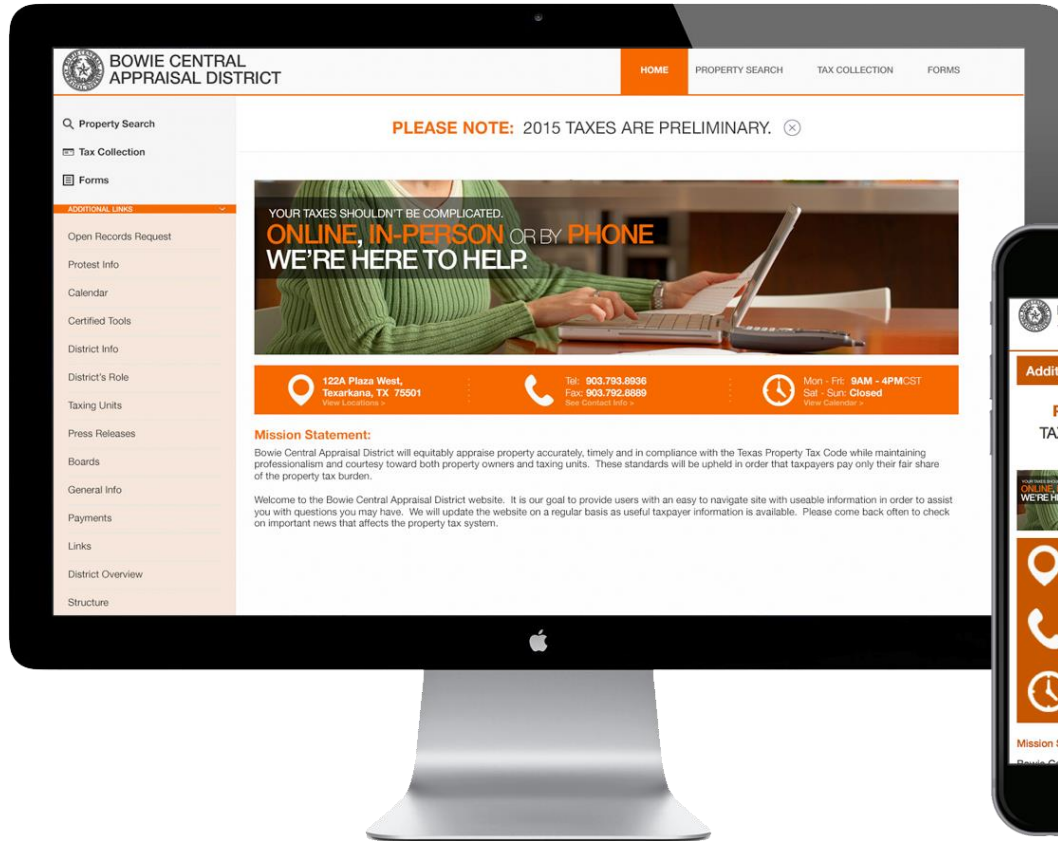
# Capital Appraisal Group



***Bootstrap in the field:***

Taxes explained. FINALLY.  
User friendly screens explain  
current and past due taxes  
and any linked accounts all  
in an easy to read design.

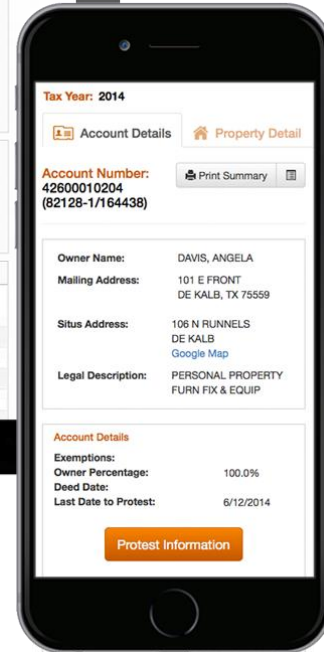
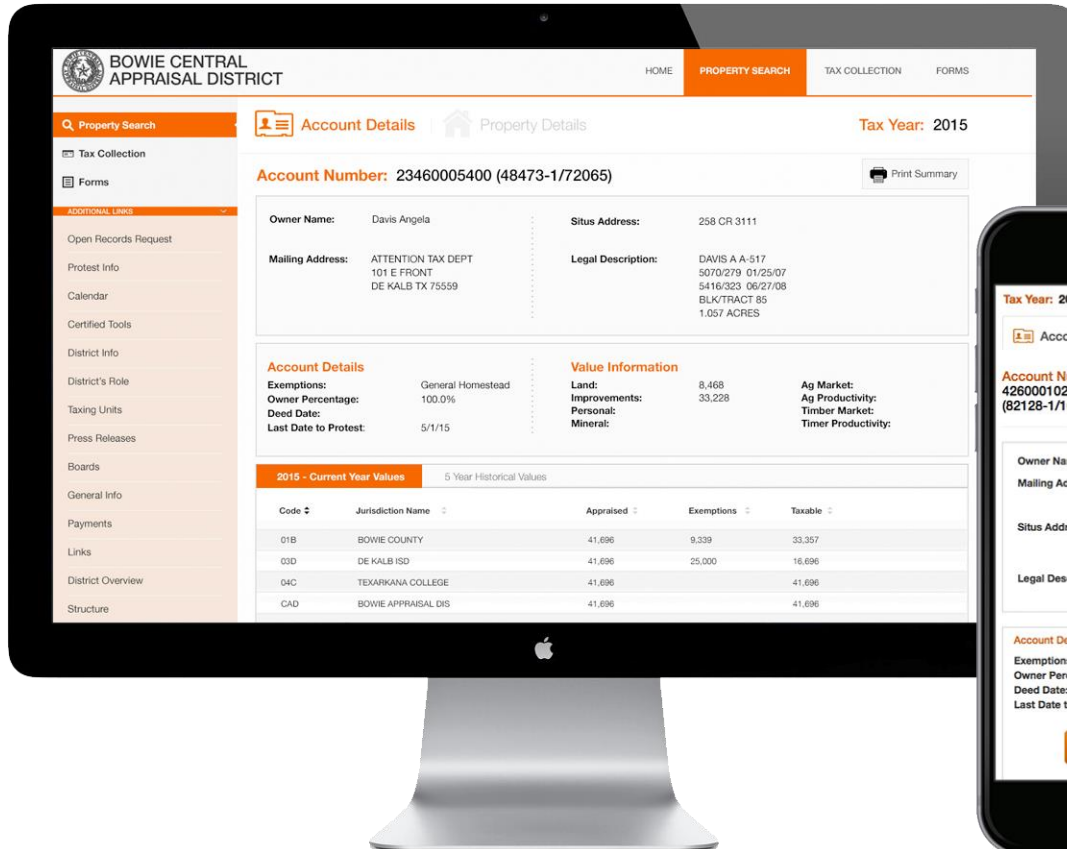
# Capital Appraisal Group



## *Bootstrap in the field:*

Local district offices can even control the look and feel of their own sites using Bootstrap and Accelerator's built-in CMS.

# Capital Appraisal Group

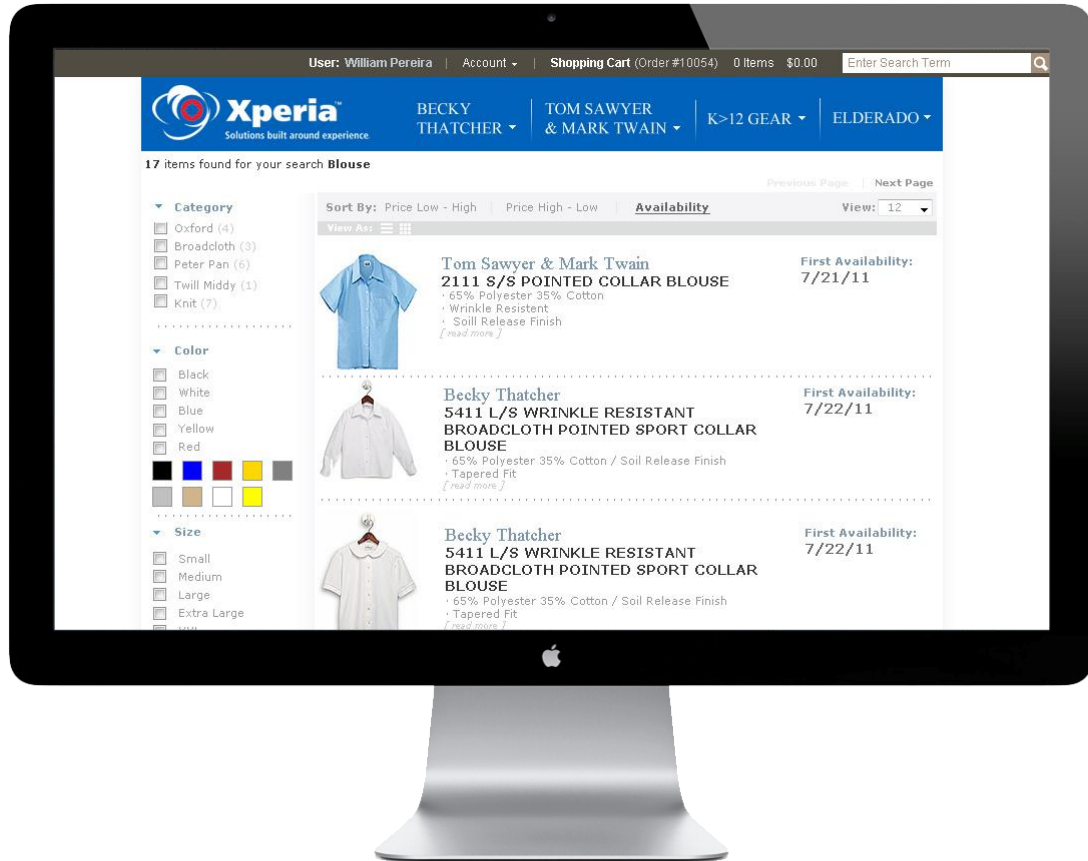


**Bootstrap in the field:**

Down to the finest details of pages each district controls their content without effecting the user friendly design.

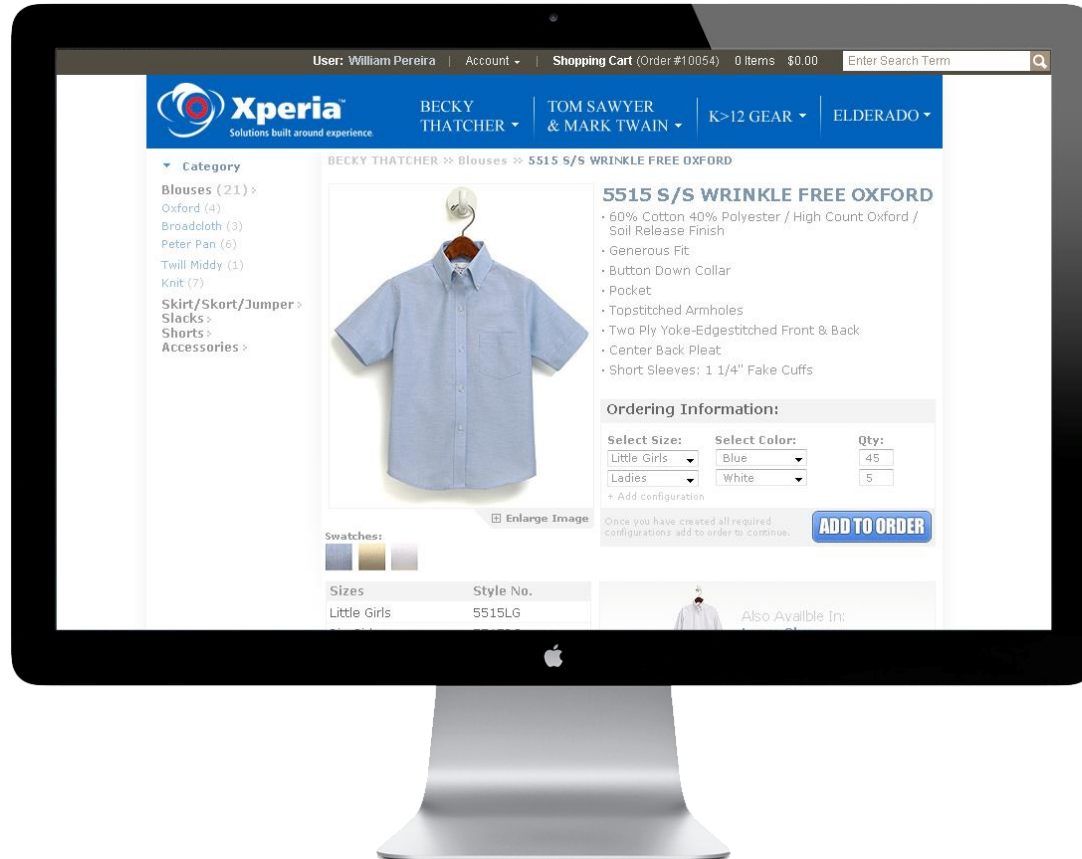
# Xperia

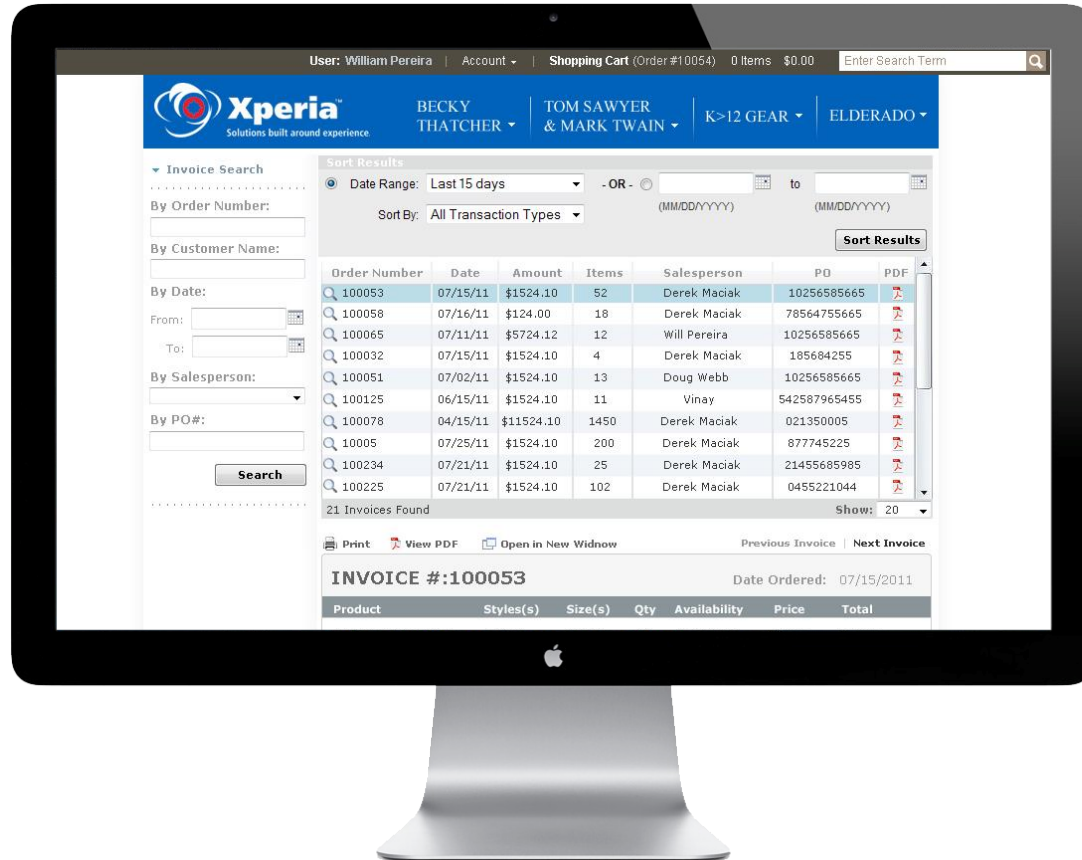




***Bootstrap in the field:***

E-comm? No problem.  
There's a theme for that.







# Visit SurroundTech.com



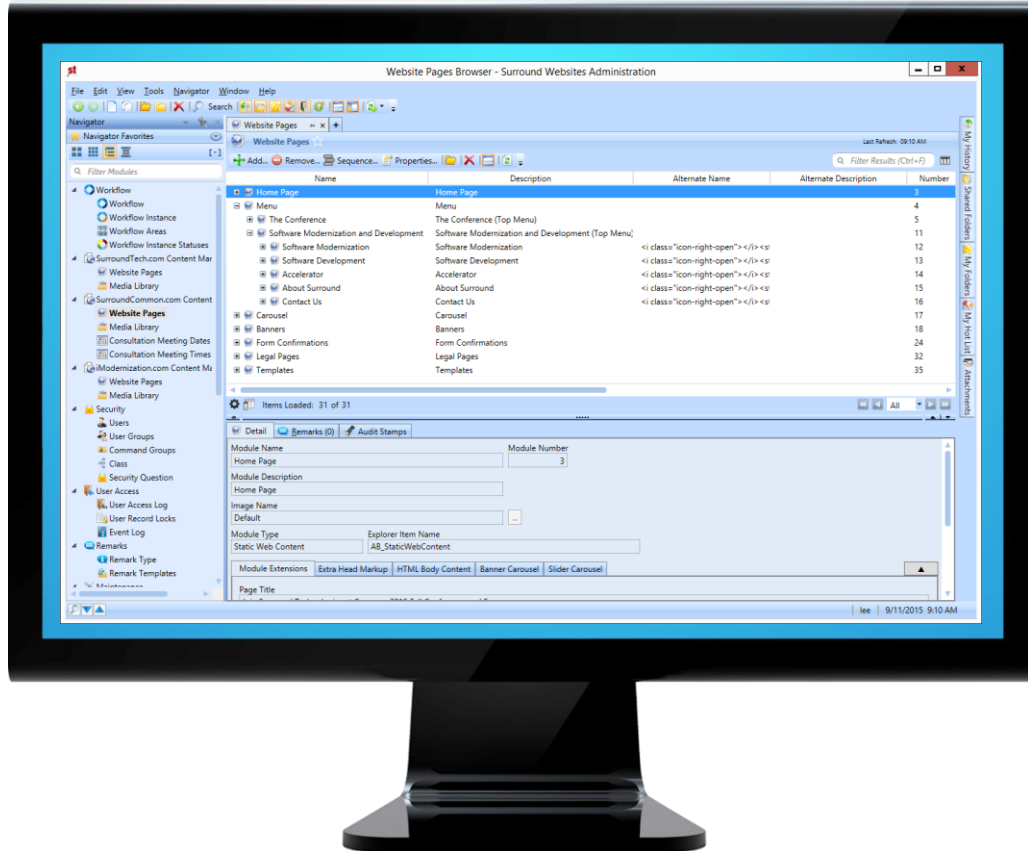
## ***Bootstrap in the field:***

Promotional Sites can be setup in no-time. Check out our own site [SurroundTech.com](http://SurroundTech.com) created with Bootstrap using Accelerator's CMS to see how we are using Bootstrap to promote ourselves at various trade shows.

## ***Dogfooding:***

*We use our own technology to understand what, if any, pitfalls our customers may encounter.*

# Accelerator CMS

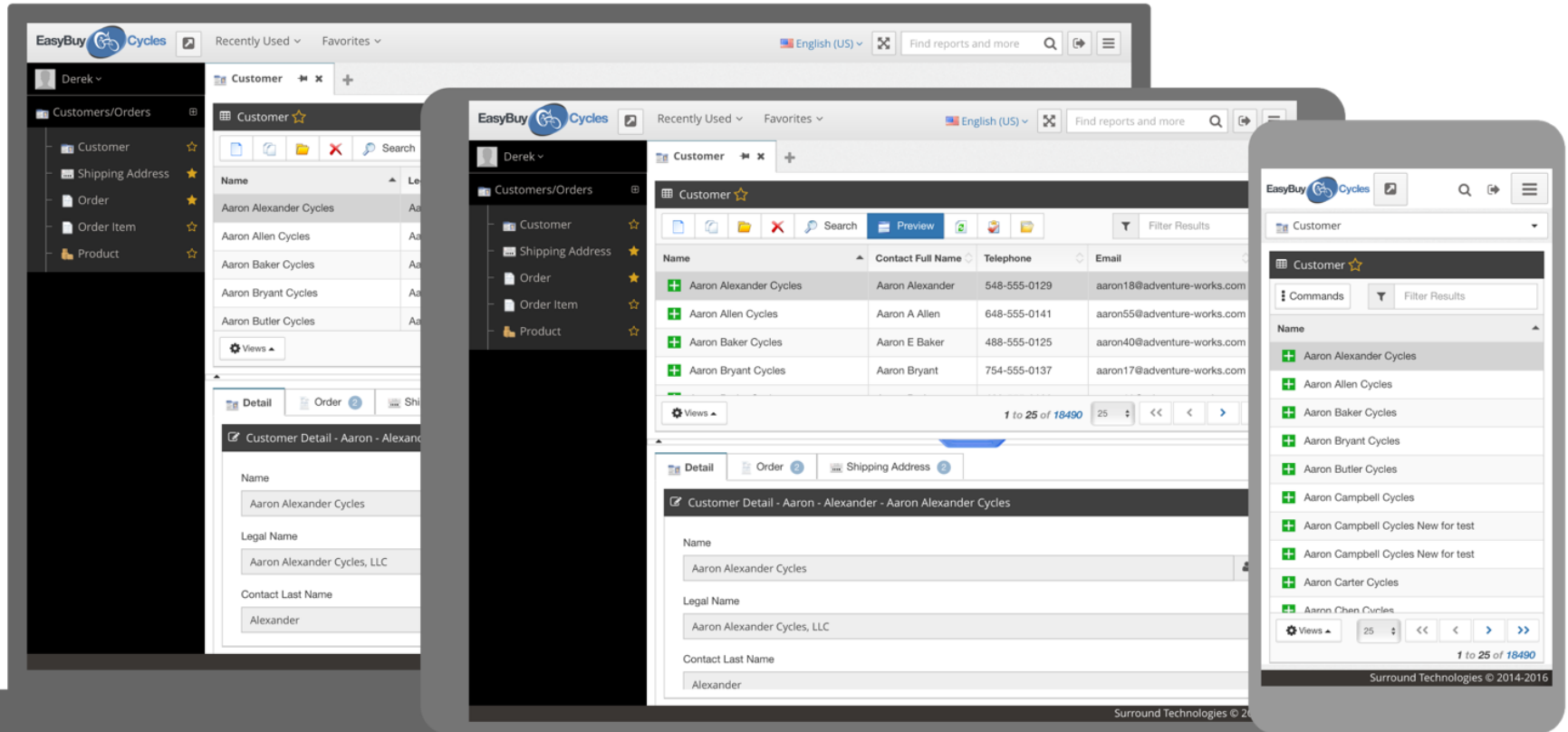


## Accelerator CMS

Easily manage static, dynamic and database driven content across multiple systems, sites and customers.

- Line of Business Apps
- Portals
- Forms
- Ecommerce

# New Accelerator Desktop Style UX



# IBM i for Power Systems





# Q&A

Thanks for watching!



Today's Speaker:

## Derek Maciak

[ CTO / Partner ]

dmaciak@surroundtech.com | [www.surroundtech.com](http://www.surroundtech.com)

### *Socialize:*



[linkedin.com/company/128638](https://www.linkedin.com/company/128638)



tweet me @SurroundTech



[facebook.com/surroundtech](https://www.facebook.com/surroundtech)