

BUILDING TECHNOLOGY SMARTER

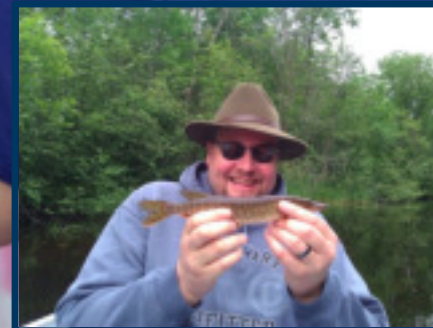
A **Summit Series** Event:
Understanding .NET 5.0

May 7th – 2020



About Davin...

- Developed Application Since 1995 – C/C++, C#, VB, F#
- Intertech Consultant/Instructor/Author – Since 2005
- Courses:
 - ❖ Complete Angular
 - ❖ Complete React
 - ❖ Complete ASP.NET Core 3.0 (5 days)
 - ❖ Programming in HTML5 with JavaScript and CSS3 (5 days)
 - ❖ Developing ASP.NET MVC 5 Web Applications (5 days)
 - ❖ Programming in C# (5 days)
 - ❖ Complete WPF 4.8
 - ❖ SQL Server Business Intelligence Courses
 - ❖ Custom Courses
- Intertech Blog – www.intertech.com/blog
- Loves To Fish...



Davin Mickelson
Featured Speaker

Seminar Agenda

1. Welcome!
2. A Brief History of .NET
3. What is .NET 5?
4. JIT vs AOT
5. .NET 5 Release Timeline
6. Setting up and Developing with 5
7. Migrating Existing Apps to 5

Presentation Length: 60 to 90 Minutes

1: Welcome!

Thank you for Attending!

- Want this to be Helpful

Slides/Recording Available Afterwards

- Send me an email and I'll respond with slides
- Davin Mickelson, davin@intertech.com

2: A Brief History of .NET

.NET Framework 1.0 Released - February 2002 (18 years old!)

- ECMA 334, C# - <https://www.ecma-international.org/publications/standards/Ecma-334.htm>
- ECMA 335, .NET CLI - <https://www.ecma-international.org/publications/standards/Ecma-335.htm>
- Fun fact: Generics are also registered with ECMA!



Microsoft has always struggled to version their software consistently

- .NET 1.0, 1.1, 2.0, 3.0, 3.5, 4.0, 4.5, 4.6, 4.7, 4.8
- Windows 1.0, 2.0, 3.0, 3.1, 95, 98, ME, XP, 2000, Vista, 7, 8, 8.1, 10, 10X
- Microsoft's love affair with the letter "X" (ActiveX, XNA, .aspx, .docx, DirectX, Surface Pro X, Xbox, etc.)

.NET Mono Released - 2004

- .NET for Linux, UNIX, Apple, Windows
- Xamarin for Mobile Apps
- <https://www.mono-project.com/>
- Ximian (1999), Novell (2003), Attachmate (2011), Xamarin (2011), Microsoft (2016)

2: A Brief History of .NET

.NET Standard for .NET Framework, Core, Mono, UWP, Xamarin, Unity

- Create portable libraries that are usable across .NET implementations
- .NET Standard 2.1+ Broke Compatibility with .NET Framework! ☹️
- Announcement: <https://docs.microsoft.com/en-us/dotnet/standard/net-standard>
- Docs: <https://docs.microsoft.com/en-us/dotnet/standard/net-standard>
- .NET Standard probably going away with .NET 5

Xamarin 2016+

- Use to create applications on mobile devices (iOS and Android) with C# and .NET
- After acquiring Xamarin, Microsoft made it free and OSS
- Compiled for native performance
- Develop in Windows and Mac
- <https://dotnet.microsoft.com/apps/xamarin>

2: A Brief History of .NET

.NET Core 1, 2, 3 (2016+)

- Intended to run on multiple platforms (Linux, macOS, Windows)
- Initially only included Console, EF, and Web APIs
- Each new version added APIs ported from .NET Framework.
- .NET Core 3.x included desktop APIs WinForms and WPF
- “Microsoft is done porting APIs to .NET Core with 3.x”
<https://docs.microsoft.com/en-us/dotnet/core/>

3: What is .NET 5?

.NET – A unified platform



3: What is .NET 5?

It is the gathering and culmination of all the popular frameworks into one

- .NET Core, Xamarin, ported .NET Framework APIs, Mono, Unity, ML.NET, and more
- It will be officially released in November 2020
- Early preview version are being released now!

Parts of .NET Framework were left behind

- ASP.NET Web Forms (consider Web Pages as a possible port)
- WCF (consider CoreWCF OSS project. Also consider Web API or gRPC)
- WF (consider CoreWF OSS solution)
- Parts of EF, Miscellaneous (small) other stuff
- Remember, though, .NET Framework will remain!

“.NET Framework 4.8 will be the last major version of .NET Framework.”

- <https://devblogs.microsoft.com/dotnet/net-core-is-the-future-of-net/>

4: JIT vs. AOT

The .NET Framework has always used Just In Time (JIT) compilation

- Compiles .NET Intermediate Language (IL) code to machine code
- The .NET runtime would JIT-compile the IL code loaded and used
- They were optimized for the OS, architecture (x86/x64), and other environment factors (memory, etc.)
- Required an initial cost of time at first startup
- Could be forced to be AOT compiled with ngen.exe, a .NET CLI compilation tool

.NET 5.0+ will support Ahead Of Time (AOT) compilation

- The Mono team used an AOT compiler for .NET, based on the industry-leading LLVM compiler project
- It enables .NET code to be built into a single native code executable that can run on a machine
- AOT-compiled apps can run efficiently in small places, and trades throughput for startup if needed
- AOT is already supported and used with Blazor.NET!

5: .NET 5 Release Timeline

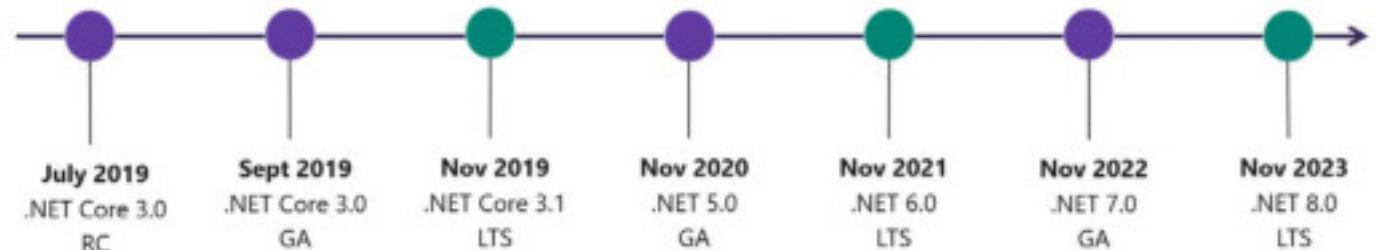
.NET 5 will be released in November 2020

- Note the General Availability (GA) and Long-Term Support (LTS) Dates
- Everything will be under the umbrella of .NET 5
- .NET 6.0/7.0/8.0 + will include new features added

Right now, we can download and install a preview version of .NET 5

- There have already been three releases as of today (05/07/2020)
- .NET Core 3+ applications can be upgraded to .NET 5

.NET Schedule



- .NET Core 3.0 release in September
- .NET Core 3.1 = Long Term Support (LTS)
- .NET 5.0 release in November 2020
- Major releases every year, LTS for even numbered releases
- Predictable schedule, minor releases if needed

6: Setting Up and Developing with 5

First, install Visual Studio 2019 Preview Edition (v16.6.0 (Preview 5))

<https://visualstudio.microsoft.com/vs/preview/>

- It can be safely installed side by side with your regular Visual Studio 2019 installation
- Choose Community (free!), Professional, or Enterprise edition
- All editions will work fine unless you need a feature specific to one of the edition
- Be sure to install all the features you need in Visual Studio Installer
- NOTE: You won't bother with this step if you work on Linux or MacOS

Second, install the appropriate .NET 5 Software Development Kit (SDK) here:

- <https://dotnet.microsoft.com/download/dotnet/5.0>
- You can download the Linux, macOS, or Windows versions
- The SDK includes the runtime libraries too!
- All three preview versions are available here
- Typically a new version is released every 2-4 weeks
- Using the command line, install the project templates you will use

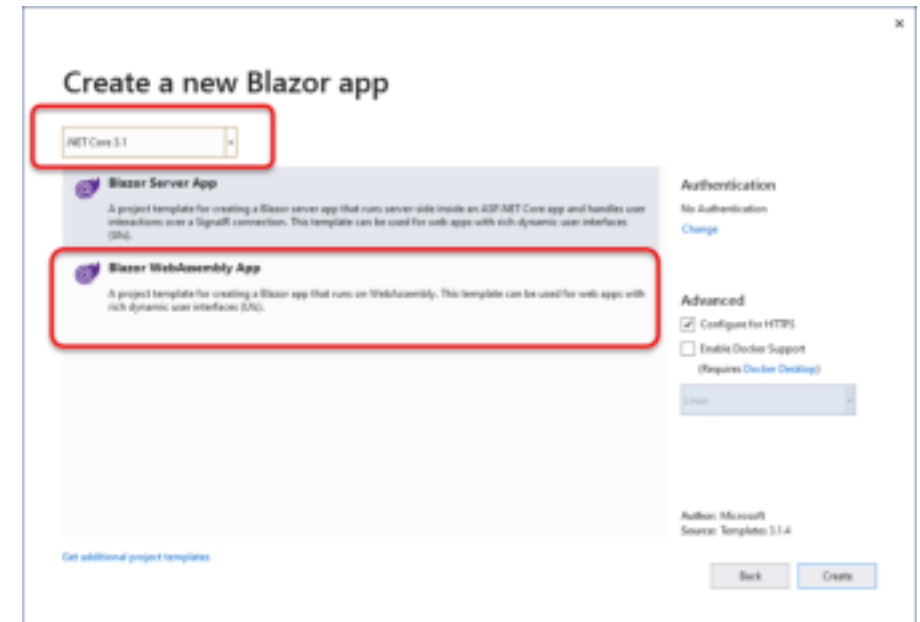
6: Setting Up and Developing with 5

Want to check out Blazor?

- <https://blazor.net>
- By default, you will only be able to create server-side WebAssembly (wasm) applications
- Wasm is the exciting new 4th API support (besides HTML, CSS, and ES6) by all of today's web browsers!
<https://www.caniuse.com/#feat=wasm>
- Remember that was applications are compile AOT for higher performance

If you want to check out the upcoming Blazor Client-Side Web projects, you'll need to install the project template, here:

- Notice that I have two project templates appearing!
- <https://www.nuget.org/packages/Microsoft.AspNetCore.Components.WebAssembly.Templates/>
- Just use the CLI command
- Note that this is for .NET Core 3.1 – not .NET 5!



7: Migrating Existing Apps to 5

First, make sure your application is upgraded to .NET Core 3.1

- Test it thoroughly to make sure the upgrade went fine
- Simply upgrading a .NET Framework app to .NET Core should demonstrate a performance increase!

Existing .NET Core 3 applications can be upgraded to .NET 5 (if installed)

- To be clear, don't upgrade production apps yet!
- To upgrade a project to >NET 5, modify the .csproj file to `netcoreapp5.0`
- Steve Gordon has a great blog post and video showing how simple it is.
<https://www.stevejgordon.co.uk/upgrading-from-asp-net-core-3-1-to-5-0-preview-1>

Remember that this is all experimental

- You are just seeing how well it will work and what upgrade pains lie ahead
- Also remember that it's not fully baked. Report bugs that you discover

Seminar Resources

Website: The .NET Blog: <https://devblogs.microsoft.com/dotnet/>

This is the best source on what is happening with .NET 5

Be careful what other blogs you read

Specifically, their age in relation to the latest release

Other links throughout the slide deck

Thank You!

Thank You **For Joining Us Today!**

If you would like more information on how we bring [Live Education](#) to your organization...

- ❖ **James Gibbs** jgibbs@intertech.com
- ❖ **Wynne Wilfahrt** wwilfahrt@intertech.com

If you would like information on how our [Consulting Services](#) can assist your organization...

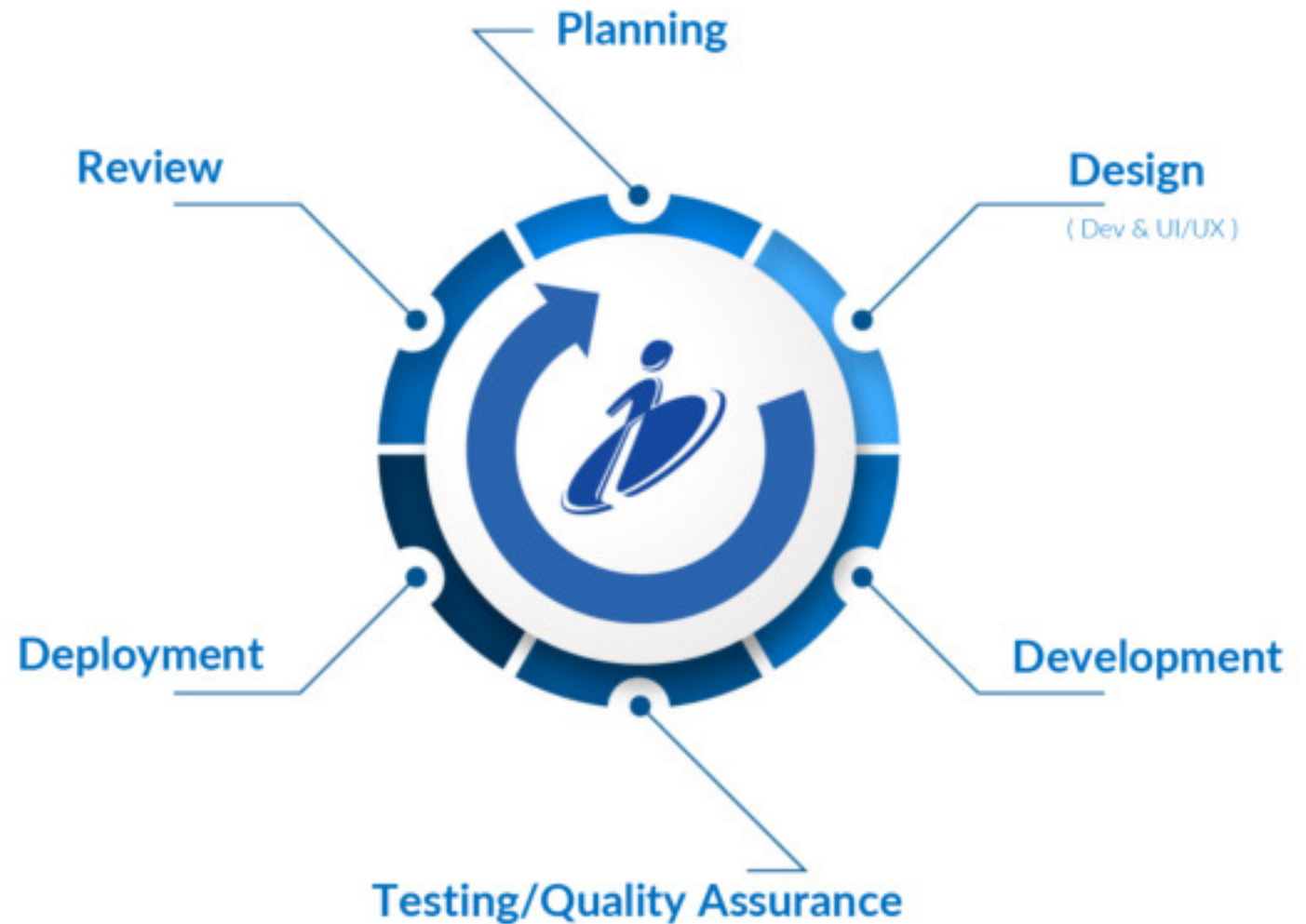
- ❖ **Brady Barthold** bbarthold@intertech.com

Questions about today's topics...

- ❖ **Davin Mickelson** davin@intertech.com

Intertech Considers Each Phase Of Your Project Equally Important...

As a trusted resource, Intertech brings the expertise needed to implement every facet of your project, from planning to deployment. It's the difference between success and having to extend the deadline.



...And Our Full-Stack Consultants **Back This Up!**



Full-Stack Development

Intertech consultants bring more to the project than just development. Being a full-stack consultant means an ability to lead technically while balancing the soft skills required to mentor, engage, and leave your team healthier.

Strategic Consulting

Intertech ensures a proven business analyst (BA) and project manager (PM) are assigned to make sure your end product meets the requirements dictated by the stakeholders.

Compliance & Accessibility

Compliance can include good practices, ADA accessibility, regulations specific to your industry, and others that make all the difference to your customers ...and lawyers.

User Interface / Experience

Combining design and psychology, our UI/UX designers outline the application's interface using proven and creative techniques that make your vision come alive and satisfy your client base, so they press "submit."

Quality Assurance

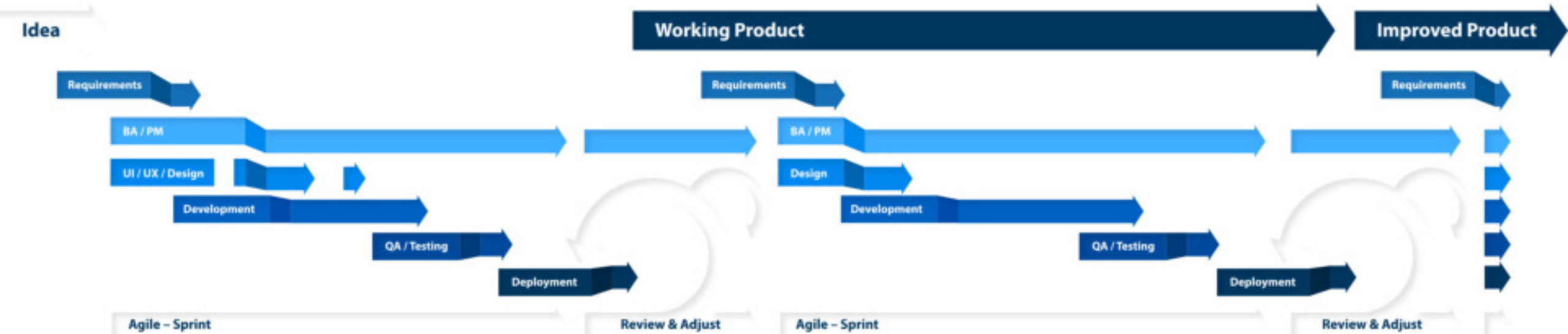
Intertech quality assurance (QA) consultants bring a full suite of tests, from automation testing to unit testing, ad-hoc testing, acceptance testing, and so many others.

Agile / Scrum Leadership

Through collaboration between cross-functional teams, Intertech consultants, and ScrumMasters, bring your vision to life quicker through an iterative development process.



First, We Structure A Team Around Your Requirements!



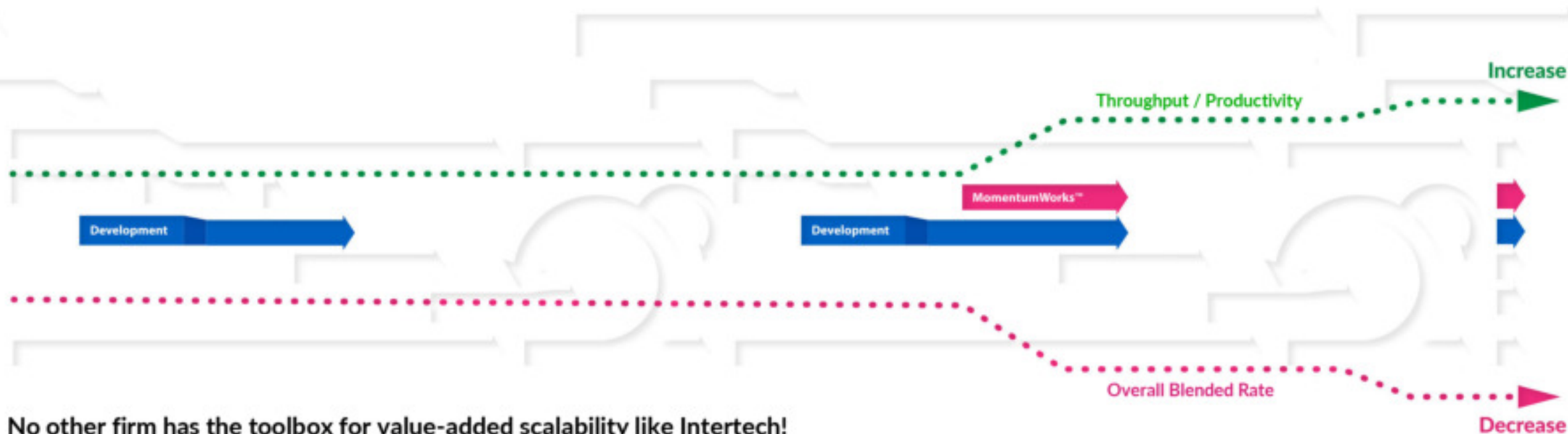
We know what it takes to be successful! Through experience, Intertech has outlined a core team of crucial roles to ensure that together we meet your business objectives the first time.

Already Have A Role Covered? **No Problem,** We Build Each Team **To Your Exact** **Specifications...** And Scale As Needed!



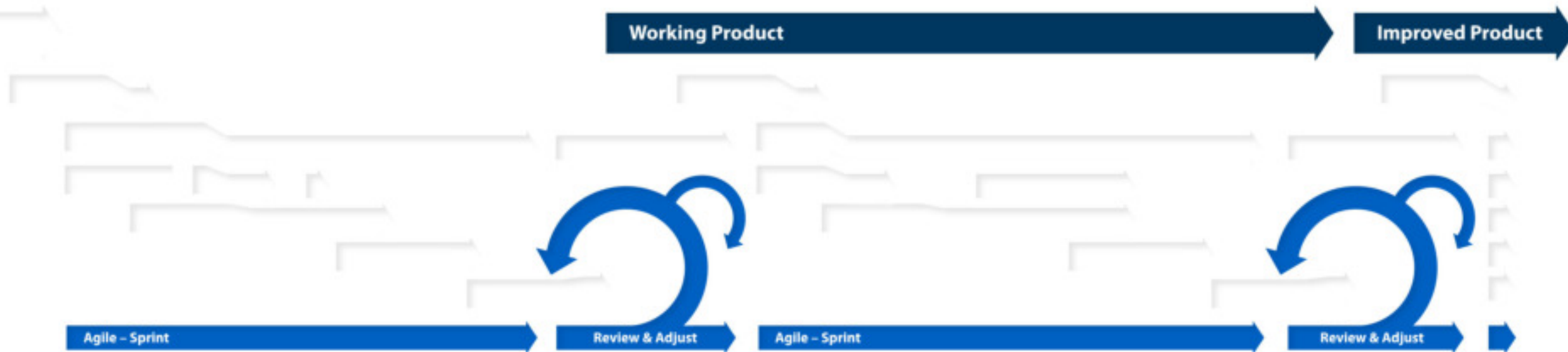
Intertech full-stack consultants can take on multiple roles, or work with your in-house resources already on the job. Either way, we structure each project team to fit your requirements.

Next, We Add Our **MomentumWorks™**
Development Team So Your Throughput Rises and
Blended Hourly Rate Decreases.



No other firm has the toolbox for value-added scalability like Intertech! By including our **MomentumWorks™** development team in your project, we can scale at just the right times, increase production, and lower the blended rate while maintaining the quality you expect.

Finally, We Tie It All Together With An Agile Development Process So You're Ready For Anything ...Even Changing Requirements Midstream!



Business moves fast! Your ability to adjust to the changes must coincide. With an Agile, iterative process, you are more nimble with more accountability and less waste. Intertech's continuous feedback loop assures successful software throughout the problem analysis, solution design, coding, testing, and product release phases, whether your requirements are locked in stone or changing.

We Also Come With A Recommendation!

...over 4000 of them to be more accurate!

When our consulting clients and students were asked these questions, “YES” was the overwhelming response.

Would you use Intertech again? 99.55% Answered Yes.

Are you happy with Intertech? 99.55% Answered Yes.

Would you refer Intertech to others? 99.70% Answered Yes.

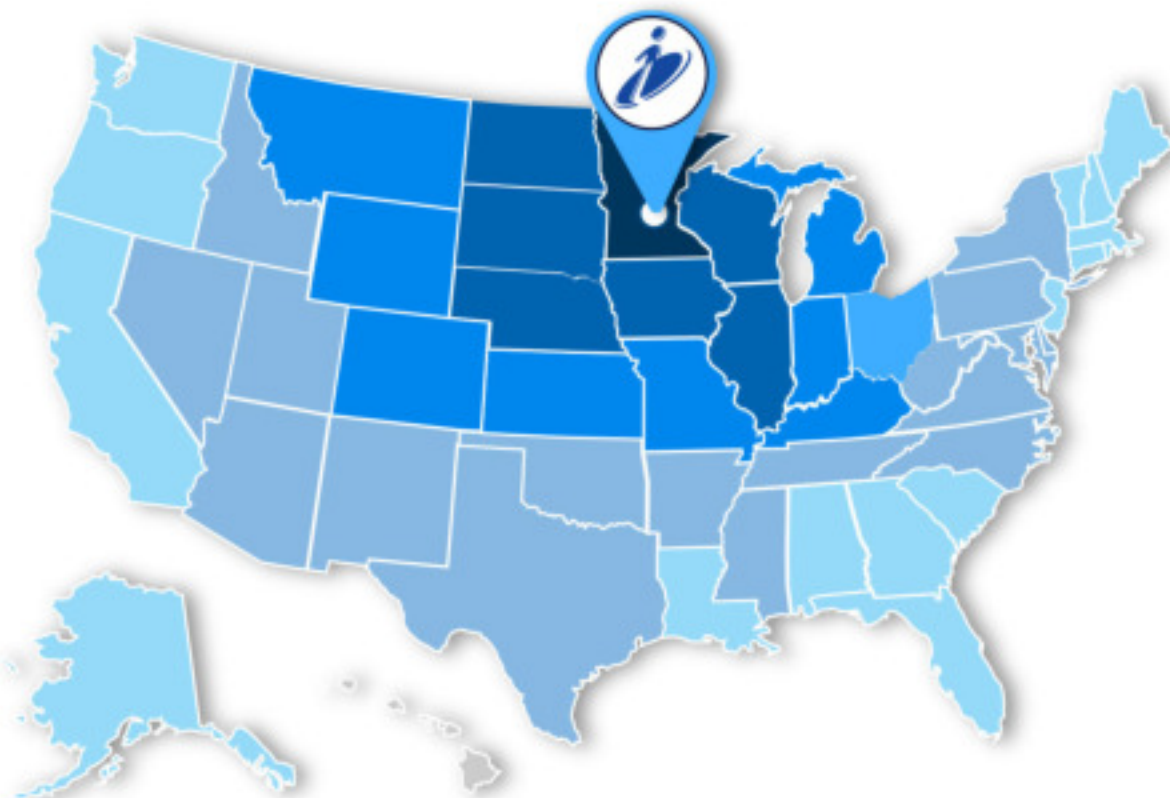


Tom Helvick
Director of Operations

Our Projects And Customers Are Headquartered Across The United States!

Whether teaming up with you on-site or from a distance, our team members feel close to home. And when employees are working in their element, job satisfaction is higher, project results are better, client expenses are lower, and the values and principles we outlined for Intertech in 1991 hold true.

You can't demand that employees care deeply, but you can profoundly influence the workplace and create an atmosphere that encourages satisfaction and success. Intertech puts its stock in great people with proven technical expertise, so it doesn't matter if they are working remotely or sitting next to you in the office, Intertech's quality of people is contagious and makes your company that much better.



Intertech **Impacts Your Business** With More Services...

- ❖ Custom Software Development
- ❖ Business Process Automation
- ❖ Microservices Development & Architecture
- ❖ Internet-of-Things (IoT)
- ❖ Subscription/SaaS Migration (Take Back Control)
- ❖ Systems Integration
- ❖ Digital Transformation (DX)
- ❖ Legacy Software Modernization

- ❖ Agile | Scrum Leadership
- ❖ Mentoring / Education



...And We Specialize In More Areas!

Back-End Development

Constructing the logic that your applications rely on to collect and disseminate your essential data more efficiently is one of our specialties. Intertech will set you up for the data revolution. From .NET/C# to Java to Drools/KIE, C/C++, Scala, Spring Boot, Express, Python, JavaScript, and all the superset scripts and tools that create the entire working package.

Front-End Development

How you interact with the screen is the side of development that represents you to the world. No matter the technologies required to make your system user friendly, data responsive, and employees more efficient, we have you covered. JavaScript, Visual Studio, Angular, jQuery, Bootstrap, React, Foundation, EmberJS, TypeScript, Vue.js, and more - with Intertech you can create the applications your business needs.

Development Operations (DevOps)

We unite the people, processes, and products in a continuous loop of delivery, testing, and deployment. Together, we get your product up and running in a format that is fast, organized, and adjusts to fit the changing world.

Project Delivery Leadership

Intertech consultants bring more to the project than just development. Being an Intertech consultant is having the ability to lead a project, no matter the methodology, while balancing the soft skills to mentor, engage, and leave you stronger.

Release Management

Intertech consultants manage the entire process from planning and scheduling to every stage within the build process, including design, development, testing, and deployment. Stay on track with us.

Quality Assurance (QA)

In addition to rigorous automated developer testing, our QA consultants focus on ensuring application quality through a range of rigorous best practices tests that deliver end products that are ready to deploy and generate results.

Accessibility / Compliance

Depending on your needs, we adhere to requirements placed on your industry by law and incorporate features that make your product a better fit with your customer base.

If You Need To Pivot To A New Technology, Intertech's Education Division Will Support You With **Live Onsite** And **Live Online Instruction!**

When a Healthcare Company – ranked 6th on the 2019 Fortune 500 – needed a reliable source to instruct courses on an ongoing basis, they contacted Intertech. No matter the technology, Intertech places consultants with the soft-skills required to mentor your team and the industry's top instructors on your doorstep or screen, so your employees remain engaged, up-to-date, and an essential part of your team.



James Gibbs
Account Executive

Thank You

Since 1991 Intertech Has Focused On You And Your Satisfaction!

Thank you for taking the time to learn more about Intertech. As the largest combined software developer training company and research-supported consulting firm in Minnesota, I'm proud of the team we've built and clients we've served. When we began, I wanted to create a special place for the best people and work with exceptional customers – customers who share our values, see us as strategic, and whose businesses we can impact using practical technology. I believe we have achieved this goal.

If we can answer any questions about Intertech or help you with an upcoming project, please let us know!



Tom Salonek
Founder / CEO