

Martin Zikmund

(<https://blog.mzikmund.com/>)

Enthusiastic developer, learning addict, Insaniac and Microsoftie

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Injecting input in UWP apps

By Martin Zikmund (<https://blog.mzikmund.com/author/admin/>) 🕒 7 Jan, 2018 💬 11
Comments (<https://blog.mzikmund.com/2018/01/injecting-input-in-uwp-apps/#comments>)

One of the less known capabilities of UWP apps is the ability to **inject input**. This is especially useful if you want to give the user a guided tour through the app, offer immediate feedback to users with assistive technologies or implement a remote help functionality into your app. In this article we will explore what the `Windows.UI.Input.Preview.Injection` namespace has to offer and how can you use it in your app.

Supported input types

Windows 10 supports several input types so does the [input injector](https://docs.microsoft.com/en-us/uwp/api/Windows.UI.Input.Preview.Injection) (<https://docs.microsoft.com/en-us/uwp/api/Windows.UI.Input.Preview.Injection>). Currently the list includes:

- Gamepad
- Keyboard
- Mouse

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- Pen
- Touch

We will show an example of keyboard and mouse input injection in this article.

Input injection capability

Before we utilize input injection, we have to declare this capability in the application manifest, as it is a non-standard functionality. It is a restricted capability (<https://docs.microsoft.com/en-us/windows/uwp/packaging/app-capability-declarations#special-and-restricted-capabilities>), which means you can safely publish your app into the app store with it, but require approval for store submission.

Adding the capability is simple. Open the `Package.appxmanifest` as XML file and add the following namespace declaration to the `Package` element:

```
1 <Package
2   ...
3   xmlns:rescap="http://schemas.microsoft.com/appx/manifest/foundation/windows10/restricted-capabilities"
4   IgnorableNamespaces="uap mp rescap">
```

The `rescap` namespace is home to the restricted capabilities. You can now declare the `inputInjectionBrokered` capability in the `Capabilities` section:

```
1 <Capabilities>
2   <Capability Name="internetClient" />
3   <rescap:Capability Name="inputInjectionBrokered" />
4 </Capabilities>
```

Basics

The main class in the `Windows.UI.Input.Preview.Injection` is the `InputInjector`. We can create it's instance by calling the static `TryCreate` method. Afterwards, we can call respective methods for each input type:

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```
2 ...
3 InputInjector inputInjector = InputInjector.TryCreate(new InputInjectorOptions {
4   inputInjector.InjectMouseInput(new[] { inputInfo });
```

As we can see, the methods accept a list of input infos, so we can perform multiple input operations in succession.

Mouse input

We can prepare mouse input info using the `InjectedInputMouseInfo` class. To move the mouse we use the `DeltaX` and `DeltaY` properties:

```
1 var info = new InjectedInputMouseInfo();
2 info.MouseOptions = InjectedInputMouseOptions.Move;
3 info.DeltaY = 100; //move down 100 points
```

The `MouseOptions` property allows us to specify flags that affect what action should be performed. Among those are `LeftDown` and `LeftUp`, which we can use to simulate simple mouse click:

```
1 var down = new InjectedInputMouseInfo();
2 down.MouseOptions = InjectedInputMouseOptions.LeftDown;
3
4 var up = new InjectedInputMouseInfo();
5 up.MouseOptions = InjectedInputMouseOptions.LeftUp;
6
7 InputInjector inputInjector = InputInjector.TryCreate();
8 inputInjector.InjectMouseInput(new[] { down, up });
```

Mouse also has scrolling wheels and we can simulate both vertical and horizontal one using the `Wheel` and `HWheel` respectively. You can supply the scroll distance using the `MouseData` property:

```
1 var info = new InjectedInputMouseInfo();
2 info.MouseOptions = InjectedInputMouseOptions.Wheel;
3 info.MouseData = 500; //scroll up
4
5 InputInjector inputInjector = InputInjector.TryCreate();
6 inputInjector.InjectMouseInput(new[] { info });
```

Scrolling up is easy. But what about scrolling down?

```
1 info.MouseData = -500; //compile time error!
```

Surprisingly, `MouseData` property is a `uint` which makes it impossible to assign negative values to it. We can use overflowing to circumvent this however:

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```
1 unchecked
2 {
3     info.MouseData = (uint)-500; //scroll down
4 }
```

We have to use an unchecked block (<https://docs.microsoft.com/en-us/dotnet/csharp/language-reference/keywords/unchecked>) in this case, because we set the value as a constant and the compiler complains that the cast will cause numeric overflow. If we used a temporary local variable, we could avoid having to use unchecked.

Mouse input also includes a `TimeOffsetInMilliseconds` property, which we can set to delay individual actions. This proves useful to properly simulate operations like a double-click.

Keyboard input

The `InjectedInputKeyboardInfo` class will be the base for keyboard input injection. The most important property is the `VirtualKey`, which specifies which key is the input related to. Using `KeyOptions` we can specify further options like simulating key up event.

The following sample will print out string “hello” in the active input field:

```
1 InputInjector inputInjector = InputInjector.TryCreate();
2 foreach (var letter in "hello")
3 {
4     var info = new InjectedInputKeyboardInfo();
5     info.VirtualKey = (ushort)((VirtualKey)Enum.Parse(typeof(VirtualKey),
6         letter.ToString(), true));
7     inputInjector.InjectKeyboardInput(new[] { info });
8     await Task.Delay(100);
9 }
```

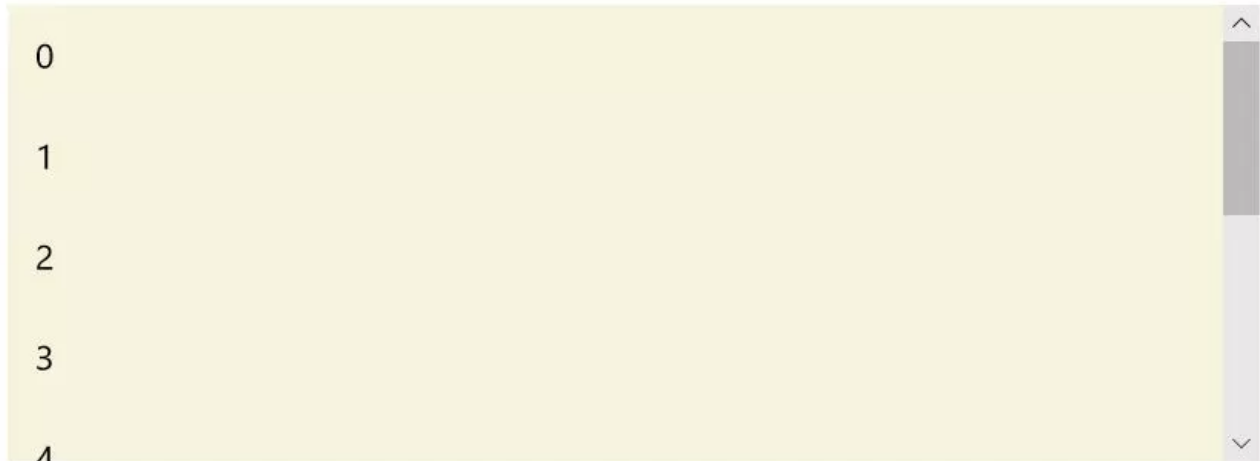
There is a `Task.Delay` call at the end of the `foreach` loop which is not there just for the cool factor 😊. This ensures that repeated key presses are not registered as a single press, which would prevent the second letter L to be registered.

Sample code

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The sample source code for this article is [available on my GitHub](https://github.com/MartinZikmund/blog-2018/tree/master/InjectedMouse) (<https://github.com/MartinZikmund/blog-2018/tree/master/InjectedMouse>).

Move mouse Scroll mouse Type text Press C key to simulate mouse click



Input injection sample app

Summary

We have explored the `Windows.UI.Input.Preview.Injection` namespace and seen how we can use it to simulate input from different types of input devices. Although not too commonly utilized, it is very nice to see this capability in the UWP API.

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Use all uppercase letters when I double-tap Shift

On

Add the standard keyboard layout as a touch keyboard option

On

Show the touch keyboard or handwriting panel when not in tablet mode and there's no keyboard attached

Off

<https://blog.mzikmund.com/2015/09/how-to-show-touch-keyboard-on-touch-interaction-with-wpf-textboxes/>

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11 thoughts on “Injecting input in UWP apps”



MARIJN DONDERS says:

February 20, 2018 At 4:32 Pm ([Https://Blog.Mzikmund.Com/2018/01/Injecting-Input-In-Uwp-Apps/#Comment-6296](https://Blog.Mzikmund.Com/2018/01/Injecting-Input-In-Uwp-Apps/#Comment-6296))

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Wow Martin, this really helped me out, thanks! However, when i use keys like Shift, Alt or Windows, they seem to get “stuck” if you know what i mean. I have to press them manually to deactivate them. Do you have a solution for this?

Reply (<https://blog.mzikmund.com/2018/01/injecting-input-in-uwp-apps/?replytocom=6296#respond>)



MARIJN DONDEERS says:

February 21, 2018 At 2:04 Pm (<https://Blog.Mzikmund.Com/2018/01/Injecting-Input-In-Uwp-Apps/#Comment-6303>)

In the meantime i figured it out! I made an extra “key” so to say. So one of them is “shiftKey” with VirtualKey LeftShift, the other one is “shiftKeyReleased” with the same virtual key, but with the keyoption “keyup” as well. They are called after each other, so first shiftKey, after that shiftKeyReleased.

Reply (<https://blog.mzikmund.com/2018/01/injecting-input-in-uwp-apps/?replytocom=6303#respond>)



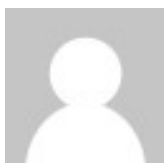
DAN NEELY says:

March 12, 2018 At 2:09 Pm (<https://Blog.Mzikmund.Com/2018/01/Injecting-Input-In-Uwp-Apps/#Comment-6418>)

You don’t need to do a delay between each keystroke if you raise both the key down and key up events for each character.

```
foreach (var letter in “hello”)
{
    var info = new InjectedInputKeyboardInfo();
    info.VirtualKey = (ushort)((VirtualKey)Enum.Parse(typeof(VirtualKey), letter.ToString(), true));
    inputInjector.InjectKeyboardInput(new[] { info });
    //if we send this event too, no need to insert a delay.
    info.KeyOptions = InjectedInputKeyOptions.KeyUp;
    inputInjector.InjectKeyboardInput(new[] { info });
}
```

Reply (<https://blog.mzikmund.com/2018/01/injecting-input-in-uwp-apps/?replytocom=6418#respond>)



HARRY BENNETT says:

May 3, 2018 At 8:08 Pm (<https://Blog.Mzikmund.Com/2018/01/Injecting-Input-In-Uwp-Apps/#Comment-7680>)

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I used this guidance to implement Input Injection and it worked great until today after the Windows system 1803 update. It seems to no longer work for injecting input to UWP apps. It does however continue to work for non-UWP applications like Notepad, Excel, Word etc.

Anyone have any ideas as to how I can get my UWP app to send keystrokes to another UWP app?

Reply (<https://blog.mzikmund.com/2018/01/injecting-input-in-uwp-apps/?replyto=7680#respond>)

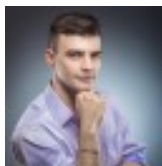


ASAF YURDAKUL ([HTTP://WWW.SUREYYASOFT.COM](http://www.sureyyasoft.com)) says:

May 8, 2018 At 6:47 Am ([Https://Blog.Mzikmund.Com/2018/01/Injecting-Input-In-Uwp-Apps/#Comment-7882](https://Blog.Mzikmund.Com/2018/01/Injecting-Input-In-Uwp-Apps/#Comment-7882))

Yes, after this update keyboard injection is not working.
Is there any solution.

Reply (<https://blog.mzikmund.com/2018/01/injecting-input-in-uwp-apps/?replyto=7882#respond>)

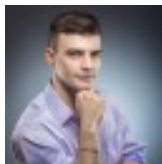


ADMIN says:

May 10, 2018 At 12:58 Am ([Https://Blog.Mzikmund.Com/2018/01/Injecting-Input-In-Uwp-Apps/#Comment-7967](https://Blog.Mzikmund.Com/2018/01/Injecting-Input-In-Uwp-Apps/#Comment-7967))

That is a very interesting finding, I will investigate and report it :-
O .

Reply (<https://blog.mzikmund.com/2018/01/injecting-input-in-uwp-apps/?replyto=7967#respond>)

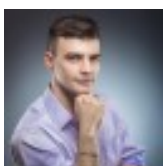


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May 10, 2018 At 1:10 Am ([Https://Blog.Mzikmund.Com/2018/01/Injecting-Input-In-Uwp-Apps/#Comment-7969](https://Blog.Mzikmund.Com/2018/01/Injecting-Input-In-Uwp-Apps/#Comment-7969))

I just tested the sample solution in my article and retargeted it to the April Update SDK and it still seems to work on my PC. Could you try cloning my project and running it on your PC?

Reply (<https://blog.mzikmund.com/2018/01/injecting-input-in-uwp-apps/?replyto=7969#respond>)



ADMIN says:

May 10, 2018 At 1:10 Am ([Https://Blog.Mzikmund.Com/2018/01/Injecting-Input-In-Uwp-Apps/#Comment-7970](https://Blog.Mzikmund.Com/2018/01/Injecting-Input-In-Uwp-Apps/#Comment-7970))

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I just tested the sample solution in my article and retargeted it to the April Update SDK and it still seems to work on my PC. Could you try cloning my project and running it on your PC?

Reply (<https://blog.mzikmund.com/2018/01/injecting-input-in-uwp-apps/?replytocom=7970#respond>)



HASAN says:

June 10, 2018 At 7:48 Am (<https://Blog.Mzikmund.Com/2018/01/Injecting-Input-In-Uwp-Apps/#Comment-8488>)

How about sending combination key like Ctrl+C on keyboard?

Reply (<https://blog.mzikmund.com/2018/01/injecting-input-in-uwp-apps/?replytocom=8488#respond>)



MARTIN ZIKMUND says:

June 14, 2018 At 8:16 Am (<https://Blog.Mzikmund.Com/2018/01/Injecting-Input-In-Uwp-Apps/#Comment-8541>)

@Hasan You should be able to do that by doing the sequence – Press down Ctrl, press down C, release C, release Ctrl

Reply (<https://blog.mzikmund.com/2018/01/injecting-input-in-uwp-apps/?replytocom=8541#respond>)



EDUARDO VALDEZATE says:

September 11, 2018 At 2:36 Pm (<https://Blog.Mzikmund.Com/2018/01/Injecting-Input-In-Uwp-Apps/#Comment-11109>)

Great post Martin!!!

Reply (<https://blog.mzikmund.com/2018/01/injecting-input-in-uwp-apps/?replytocom=11109#respond>)

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