



Defect
↑
Detect →



Rust

Windows Memory Dump Analysis
Accelerated

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Exercise RW2

Goal: Learn how to analyze stack traces from debug versions.

Patterns: Technology-Specific Subtrace (Rust).

1. Launch WinDbg.
2. Open `\ARWMDA-Dumps\Process\normal-debug.DMP`.
3. We get the dump file loaded:

```
Microsoft (R) Windows Debugger Version 10.0.27725.1000 AMD64
Copyright (c) Microsoft Corporation. All rights reserved.

Loading Dump File [C:\ARWMDA-Dumps\Process\normal-debug.DMP]
User Mini Dump File with Full Memory: Only application data is available

***** Path validation summary *****
Response                               Time (ms)      Location
Deferred                                srv*
Symbol search path is: srv*
Executable search path is:
Windows 10 Version 22000 UP Free x64
Product: WinNt, suite: SingleUserTS
Edition build lab: 22000.1.amd64fre.co_release.210604-1628
Debug session time: Sun Oct 13 18:23:56.000 2024 (UTC + 1:00)
System Uptime: 0 days 0:08:57.906
Process Uptime: 0 days 0:00:12.000
.....
For analysis of this file, run !analyze -v
ntdll!NtDeviceIoControlFile+0x14:
00007fff`ea0a4164 ret
```

4. Open a log file to save all future output using the `.logopen` command:

```
0:000> .logopen C:\ARWMDA-Dumps\RW2.log
Opened log file 'C:\ARWMDA-Dumps\RW2.log'
```

5. Type the `k` command to verify the correctness of the stack trace:

```
0:000> k
# Child-SP      RetAddr          Call Site
00 00000059`41cfd3d8 00007fff`e7914da5 ntdll!NtDeviceIoControlFile+0x14
01 00000059`41cfd3e0 00007fff`e7994c5d KERNELBASE!ConsoleCallServerGeneric+0xe9
02 00000059`41cfd540 00007fff`e7994aba KERNELBASE!ReadConsoleInternal+0x18d
03 00000059`41cfd690 00007ff6`bb5343cb KERNELBASE!ReadConsoleW+0x1a
04 00000059`41cfd6d0 00007ff6`bb53419f normal+0x143cb
05 00000059`41cfd780 00007ff6`bb52ed57 normal+0x1419f
06 00000059`41cff820 00007ff6`bb52d3f5 normal+0xed57
07 00000059`41cff8c0 00007ff6`bb52936e normal+0xd3f5
08 00000059`41cff960 00007ff6`bb528dde normal+0x936e
09 00000059`41cffa20 00007ff6`bb5226f4 normal+0x8dde
```

```

0a 00000059`41cffa80 00007ff6`bb522fb4 normal+0x26f4
0b 00000059`41cffae0 00007ff6`bb526780 normal+0x2fb4
0c 00000059`41cffb40 00007ff6`bb5274db normal+0x6780
0d 00000059`41cffcb0 00007ff6`bb52184e normal+0xf74db
0e 00000059`41cffcf0 00007ff6`bb5263d1 normal+0x184e
0f 00000059`41cffd30 00007ff6`bb52b909 normal+0x63d1
10 00000059`41cffd70 00007ff6`bb5263aa normal+0xb909
11 00000059`41cffe30 00007ff6`bb526979 normal+0x63aa
12 00000059`41cffe80 00007ff6`bb541d8c normal+0x6979
13 00000059`41cffed0 00007fff`e89d53e0 normal+0x21d8c
14 00000059`41cfff10 00007fff`ea00485b kernel32!BaseThreadInitThunk+0x10
15 00000059`41cfff40 00000000`00000000 ntdll!RtlUserThreadStart+0x2b

```

6. We now specify a path to the symbol file for the *normal* module:

```

0:000> .sympath+ C:\ARWMDA-Dumps\Symbols\debug
Symbol search path is: srv*;C:\ARWMDA-Dumps\Symbols\debug
Expanded Symbol search path is:
cache*;SRV*https://msdl.microsoft.com/download/symbols;c:\arwmda-dumps\symbols\debug

```

```

***** Path validation summary *****
Response           Time (ms)      Location
Deferred          srv*
OK                C:\ARWMDA-Dumps\Symbols\debug

```

```

0:000> k
# Child-SP          RetAddr           Call Site
00 00000059`41cfd3d8 00007fff`e7914da5 ntdll!NtDeviceIoControlFile+0x14
01 00000059`41cfd3e0 00007fff`e7994c5d KERNELBASE!ConsoleCallServerGeneric+0xe9
02 00000059`41cfd540 00007fff`e7994aba KERNELBASE!ReadConsoleInternal+0x18d
03 00000059`41cfd690 00007fff`bb5343cb KERNELBASE!ReadConsoleW+0x1a
04 (Inline Function) -----
35]
05 00000059`41cfd6d0 00007fff`bb53419f normal!std::sys::pal::windows::std::read_u16s_fixup_surrogates+0xc
[/rustc/eeb90cda1969383f56a2637cbd3037bdf598841c/library/std/src/sys/pal/windows/std.io.rs @ 318]
06 00000059`41cfd780 00007fff`bb52ed57 normal!std::sys::pal::windows::std::impl$2::read+0x19f [/rustc/eeb90cda1969383f56a2637cbd3037bdf598841c/library/std/src/sys/pal/windows/std.io.rs @ 284]
07 (Inline Function) -----
08 (Inline Function) -----
09 (Inline Function) -----
0a (Inline Function) -----
0b (Inline Function) -----
0c (Inline Function) -----
[/rustc/eeb90cda1969383f56a2637cbd3037bdf598841c/library/std/src/io/buffered/bufreader/buffer.rs @ 115]
0d (Inline Function) -----
normal!std::io::buffered::bufreader::impl$5::fill_buf+0x3b
[/rustc/eeb90cda1969383f56a2637cbd3037bdf598841c/library/std/src/io/buffered/bufreader.rs @ 396]
0e 00000059`41cfd820 00007fff`bb52d3f5 normal!std::io::read_until+0x24 [C:\ARWMDA-Dumps\normal\src\mod_aa.rs @ 6]
[/rustc/eeb90cda1969383f56a2637cbd3037bdf598841c/library/std/src/io/mod.rs @ 2091]
0f (Inline Function) -----
normal!std::io::std::io::impl$9::read_line+0x1a [C:\ARWMDA-Dumps\normal\src\io\stdio.rs @ 555]
10 00000059`41cfd8c0 00007fff`bb52936e normal!std::io::std::Stdin::read_line+0x65 [C:\ARWMDA-Dumps\normal\src\io\stdio.rs @ 399]
11 00000059`41cfd960 00007fff`bb528dde normal!crate::mod_cb::func+0x5e [C:\ARWMDA-Dumps\normal\crate_c\src\mod_cb.rs @ 6]
12 00000059`41cfd980 00007fff`bb5226f4 normal!crate_b::mod_b::func+0x2e [C:\ARWMDA-Dumps\normal\crate_b\src\mod_b\mod.rs @ 11]
13 00000059`41cfd9a0 00007fff`bb5226f4 normal!normal::mod_aa::func+0x24 [C:\ARWMDA-Dumps\normal\normal\src\mod_aa.rs @ 6]
14 00000059`41cfd9c0 00007fff`bb5226f4 normal!normal::mod_ab::func+0x24 [C:\ARWMDA-Dumps\normal\normal\src\mod_ab.rs @ 6]
15 00000059`41cfd9e0 00007fff`bb5274db normal!normal::main+0x90 [C:\ARWMDA-Dumps\normal\normal\src\main.rs @ 20]
16 00000059`41cfd9f0 00007fff`bb52184e normal!core::ops::function::FnOnce::call_once_void+0x1b
[/rustc/eeb90cda1969383f56a2637cbd3037bdf598841c/library/core/src/ops/function.rs @ 250]
17 (Inline Function) -----
normal!core::hint::black_box+0xa [C:\rustc/eeb90cda1969383f56a2637cbd3037bdf598841c/library/core/src/hint.rs @ 389]
18 00000059`41cfd9f0 00007fff`bb5263d1 normal!std::sys::backtrace::__rust_begin_short_backtrace+0x1e
[/rustc/eeb90cda1969383f56a2637cbd3037bdf598841c/library/std/src/sys/backtrace.rs @ 155]
19 00000059`41cfd9f0 00007fff`bb52b909 normal!std::rt::lang_start::closure$0+0x11 [C:\rustc/eeb90cda1969383f56a2637cbd3037bdf598841c/library/std/src/rt.rs @ 162]
1a (Inline Function) -----
normal!std::rt::lang_start_internal::closure$2+0x6 [C:\rustc/eeb90cda1969383f56a2637cbd3037bdf598841c/library/std/src/rt.rs @ 141]
1b (Inline Function) -----
normal!std::panicking::try::do_call+0x6 [C:\rustc/eeb90cda1969383f56a2637cbd3037bdf598841c/library/std/src/panicking.rs @ 557]
1c (Inline Function) -----
normal!std::panicking::try+0x6 [C:\rustc/eeb90cda1969383f56a2637cbd3037bdf598841c/library/std/src/panicking.rs @ 521]
1d (Inline Function) -----
normal!std::panic::catch_unwind+0x6 [C:\rustc/eeb90cda1969383f56a2637cbd3037bdf598841c/library/std/src/panic.rs @ 350]
1e 00000059`41cfd70 00007fff`bb5263aa normal!std::rt::lang_start_internal+0x79 [C:\rustc/eeb90cda1969383f56a2637cbd3037bdf598841c/library/std/src/rt.rs @ 141]
1f 00000059`41cfd70 00007fff`bb526979 normal!std::rt::lang_start+0x3a [C:\rustc/eeb90cda1969383f56a2637cbd3037bdf598841c/library/std/src/rt.rs @ 161]
20 00000059`41cfd70 00007fff`bb541d8c normal!main+0x19
21 (Inline Function) -----
normal!invoke_main+0x22 [D:\a_work\1\src\vc\tools\crt\vcstartup\src\startup\exe_common.inl @ 78]
22 00000059`41cfd60 00007fff`e89d53e0 normal!_scrt_common_main_seh+0x10 [D:\a_work\1\src\vc\tools\crt\vcstartup\src\startup\exe_common.inl @ 288]
23 00000059`41cfd60 00007fff`e89d53e0 kernel32!BaseThreadInitThunk+0x10
24 00000059`41cfd60 00000000`00000000 ntdll!RtlUserThreadStart+0x2b

```

Note: We can make the stack trace output less cluttered by omitting source code references:

```

0:000> kL
# Child-SP          RetAddr           Call Site
00 00000059`41cfd3d8 00007fff`e7914da5 ntdll!NtDeviceIoControlFile+0x14
01 00000059`41cfd3e0 00007fff`e7994c5d KERNELBASE!ConsoleCallServerGeneric+0xe9
02 00000059`41cfd540 00007fff`e7994aba KERNELBASE!ReadConsoleInternal+0x18d
03 00000059`41cfd690 00007fff`bb5343cb KERNELBASE!ReadConsoleW+0x1a
04 (Inline Function) -----
05 00000059`41cfd6d0 00007fff`bb53419f normal!std::sys::pal::windows::std::read_u16s_fixup_surrogates+0xc
06 00000059`41cfd780 00007fff`bb52ed57 normal!std::sys::pal::windows::std::impl$2::read+0x19f
07 (Inline Function) -----
normal!std::io::Read::read_buf::closure$0+0xb

```

```

08 (Inline Function) -----`----- normal!std::io::default_read_buf+0x1f
09 (Inline Function) -----`----- normal!std::io::Read::read_buf+0x1f
0a (Inline Function) -----`----- normal!std::io::stdio::impl$0::read_buf+0x1f
0b (Inline Function) -----`----- normal!std::io::impls::impl$0::read_buf+0x1f
0c (Inline Function) -----`----- normal!std::io::buffered::bufreader::buffer::Buffer::fill_buf+0x3b
0d (Inline Function) -----`----- normal!std::io::buffered::bufreader::impl$5::fill_buf+0x3b
0e 00000059`41cff820 00007ff6`bb52d3f5 normal!std::io::read_until<std::io::buffered::bufreader::BufReader<std::io::stdio::StdinRaw> >+0x67
0f (Inline Function) -----`----- normal!std::io::stdio::impl$9::read_line+0x1a
10 00000059`41cff8c0 00007ff6`bb52936e normal!std::io::stdio::Stdin::read_line+0x65
11 00000059`41cff960 00007ff6`bb528dde normal!crate_c::mod_cb::func+0x5e
12 00000059`41cffa20 00007ff6`bb5226f4 normal!crate_b::mod_b::func+0x2e
13 00000059`41cffa80 00007ff6`bb522fb4 normal!normal::mod_aa::func+0x24
14 00000059`41cffae0 00007ff6`bb526780 normal!normal::mod_ab::func+0x24
15 00000059`41cffb40 00007ff6`bb5274db normal!normal::main+0x90
16 00000059`41cffcb0 00007ff6`bb52184e normal!core::ops::function::FnOnce::call_once<void (*)(),tuple$<> >+0xb
17 (Inline Function) -----`----- normal!core::hint::black_box+0xa
18 00000059`41cffcf0 00007ff6`bb5263d1 normal!std::sys::backtrace::__rust_begin_short_backtrace<void (*)(),tuple$<> >+0xe
19 00000059`41cffd30 00007ff6`bb52b909 normal!std::rt::lang_start::closure$0<tuple$<> >+0x11
1a (Inline Function) -----`----- normal!std::rt::lang_start_internal::closure$2+0x6
1b (Inline Function) -----`----- normal!std::panicking::try::do_call+0x6
1c (Inline Function) -----`----- normal!std::panicking::try+0x6
1d (Inline Function) -----`----- normal!std::panic::catch_unwind+0x6
1e 00000059`41cffd70 00007ff6`bb5263aa normal!std::rt::lang_start_internal+0x79
1f 00000059`41cffe30 00007ff6`bb526979 normal!std::rt::lang_start<tuple$<> >+0x3a
20 00000059`41cffe80 00007ff6`bb541d8c normal!main+0x19
21 (Inline Function) -----`----- normal!invoke_main+0x22
22 00000059`41cfff00 00007fff`e89d53e0 normal!_scrt_common_main_seh+0x10c
23 00000059`41cfff10 00007fff`ea00485b kernel32!BaseThreadInitThunk+0x10
24 00000059`41cfff40 00000000`00000000 ntdll!RtlUserThreadStart+0x2b

```

Note: The Rust source code *main* function differs from the C runtime *main* function: *normal!normal::main* vs. *normal!main*.

7. We can switch to any stack trace frame of interest:

```

0:000> .frame 15
15 00000059`41cffb40 00007ff6`bb5274db normal!normal::main+0x90 [C:\ARWMDA-Dumps\normal\normal\src\main.rs @ 20]

```

Note: To see the source code, we need to set the source code path if it is different from the source code path specified in symbol files:

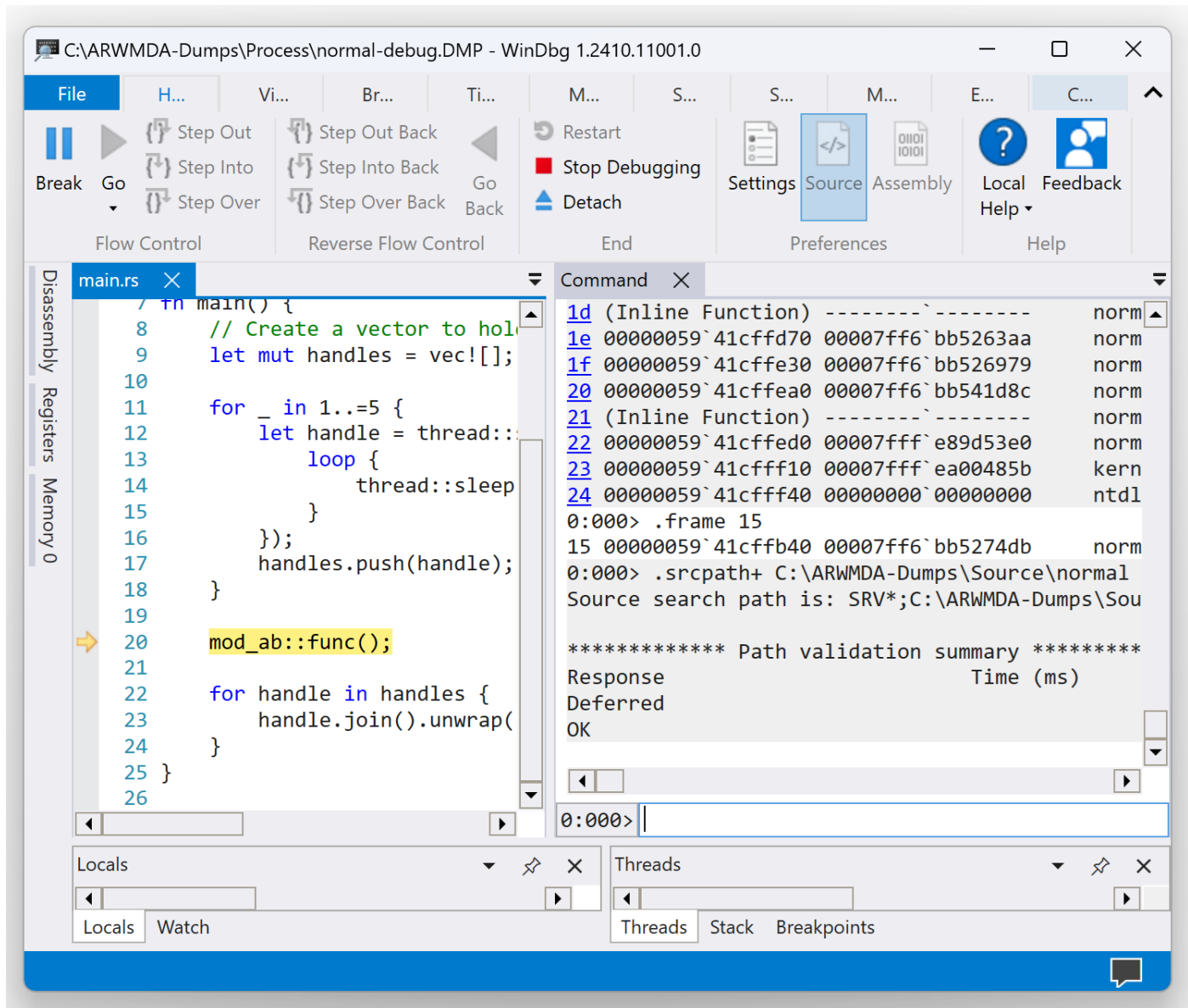
```

0:000> .scrpath+ C:\ARWMDA-Dumps\Source\normal
Source search path is: SRV*;C:\ARWMDA-Dumps\Source\normal

***** Path validation summary *****
Response                               Time (ms)      Location
Deferred                                SRV*
OK                                       C:\ARWMDA-Dumps\Source\normal

```

We now see the source code window:



8. It is also possible to check local variables in the current context:

```

0:000> dv /i /V
prv local  00000059`41cffb80 @rbp-0x0040          handles = { len=0x5 }
prv local  <unavailable>      <unavailable>      iter = <value unavailable>
prv local  <unavailable>      <unavailable>      iter = <value unavailable>
prv local  <unavailable>      <unavailable>      handle = <value unavailable>

0:000> dt handles
Local var @ 0x5941cffb80 Type alloc::vec::Vec<std::thread::JoinHandle<tuple$<> >,alloc::alloc::Global>
+0x000 buf          : alloc::raw_vec::RawVec<std::thread::JoinHandle<tuple$<> >,alloc::alloc::Global>
+0x010 len          : 5

0:000> dt -r handles
Local var @ 0x5941cffb80 Type alloc::vec::Vec<std::thread::JoinHandle<tuple$<> >,alloc::alloc::Global>
+0x000 buf          : alloc::raw_vec::RawVec<std::thread::JoinHandle<tuple$<> >,alloc::alloc::Global>
+0x008 ptr          : core::ptr::unique::Unique<std::thread::JoinHandle<tuple$<> > >
+0x000 pointer      : core::ptr::non_null::NonNull<std::thread::JoinHandle<tuple$<> > >
+0x008 _marker      : core::marker::PhantomData<std::thread::JoinHandle<tuple$<> > >
+0x000 cap          : alloc::raw_vec::Cap

```

```

+0x000 _0 : 8
+0x010 alloc : alloc::alloc::Global
+0x010 len : 5

```

0:000> dx handles

```

handles : { len=0x5 } [Type: alloc::vec::Vec<std::thread::JoinHandle<tuple$> >,alloc::alloc::Global>]
[<Raw View>] [Type: alloc::vec::Vec<std::thread::JoinHandle<tuple$> >,alloc::alloc::Global>]
[ len ] : 0x5 [Type: unsigned __int64]
[ capacity ] : 0x8 [Type: unsigned __int64]
[ 0 ] [Type: std::thread::JoinHandle<tuple$> >]
[ 1 ] [Type: std::thread::JoinHandle<tuple$> >]
[ 2 ] [Type: std::thread::JoinHandle<tuple$> >]
[ 3 ] [Type: std::thread::JoinHandle<tuple$> >]
[ 4 ] [Type: std::thread::JoinHandle<tuple$> >]

```

9. Let's now look at all thread stack traces:

0:000> ~*kL

```

. 0 Id: afc.2830 Suspend: 0 Teb: 00000059`41aa5000 Unfrozen "main"
# Child-SP RetAddr Call Site
00 00000059`41cfd3d8 00007fff`e7914da5 ntdll!NtDeviceIoControlFile+0x14
01 00000059`41cfd3e0 00007fff`e7994c5d KERNELBASE!ConsoleCallServerGeneric+0xe9
02 00000059`41cfd540 00007fff`e7994aba KERNELBASE!ReadConsoleInternal+0x18d
03 00000059`41cfd690 00007fff`bb5343cb KERNELBASE!ReadConsoleW+0x1a
04 (Inline Function) -----
05 00000059`41cfd6d0 00007fff`bb53419f normal!std::sys::pal::windows::stdio::read_u16s+0x4e
06 00000059`41cfd780 00007fff`bb52ed57 normal!std::sys::pal::windows::stdio::read_u16s_fixup_surrogates+0xc8
07 (Inline Function) -----
08 (Inline Function) -----
09 (Inline Function) -----
0a (Inline Function) -----
0b (Inline Function) -----
0c (Inline Function) -----
0d (Inline Function) -----
0e 00000059`41cfd820 00007fff`bb52d3f5 normal!std::io::read_until<std::io::buffered::buffer::Buffer::fill_buf+0x3b>
0f (Inline Function) -----
10 00000059`41cfd8c0 00007fff`bb52936e normal!std::io::read_until<std::io::buffered::buffer::Buffer::fill_buf+0x3b>
11 00000059`41cfd960 00007fff`bb528dde normal!std::io::read_until<std::io::buffered::buffer::Buffer::fill_buf+0x3b>
12 00000059`41cfa20 00007fff`bb5226f4 normal!std::io::read_until<std::io::buffered::buffer::Buffer::fill_buf+0x3b>
13 00000059`41cfa80 00007fff`bb5227b4 normal!std::io::read_until<std::io::buffered::buffer::Buffer::fill_buf+0x3b>
14 00000059`41cfae0 00007fff`bb526780 normal!std::io::read_until<std::io::buffered::buffer::Buffer::fill_buf+0x3b>
15 00000059`41cfd40 00007fff`bb5274db normal!std::io::read_until<std::io::buffered::buffer::Buffer::fill_buf+0x3b>
16 00000059`41cfdcb0 00007fff`bb52184e normal!std::io::read_until<std::io::buffered::buffer::Buffer::fill_buf+0x3b>
17 (Inline Function) -----
18 00000059`41cfff0 00007fff`bb5263d1 normal!std::io::read_until<std::io::buffered::buffer::Buffer::fill_buf+0x3b>
19 00000059`41cfd3d0 00007fff`bb52b909 normal!std::io::read_until<std::io::buffered::buffer::Buffer::fill_buf+0x3b>
1a (Inline Function) -----
1b (Inline Function) -----
1c (Inline Function) -----
1d (Inline Function) -----
1e 00000059`41cfd70 00007fff`bb5263aa normal!std::io::read_until<std::io::buffered::buffer::Buffer::fill_buf+0x3b>
1f 00000059`41cffe30 00007fff`bb526979 normal!std::io::read_until<std::io::buffered::buffer::Buffer::fill_buf+0x3b>
20 00000059`41cfea0 00007fff`bb541d8c normal!std::io::read_until<std::io::buffered::buffer::Buffer::fill_buf+0x3b>
21 (Inline Function) -----
22 00000059`41cffe0 00007fff`e89d53e0 normal!std::io::read_until<std::io::buffered::buffer::Buffer::fill_buf+0x3b>
23 00000059`41cfff10 00007fff`ea00485b kernel32!BaseThreadInitThunk+0x10
24 00000059`41cfff40 00000000`00000000 ntdll!RtlUserThreadStart+0x2b

1 Id: afc.1d60 Suspend: 0 Teb: 00000059`41aa7000 Unfrozen
# Child-SP RetAddr Call Site
00 00000059`41dff948 00007fff`ea016cdf ntdll!NtWaitForWorkViaWorkerFactory+0x14
01 00000059`41dff950 00007fff`e89d53e0 ntdll!TppWorkerThread+0x2df
02 00000059`41dff40 00007fff`ea00485b kernel32!BaseThreadInitThunk+0x10
03 00000059`41dff70 00000000`00000000 ntdll!RtlUserThreadStart+0x2b

2 Id: afc.2820 Suspend: 0 Teb: 00000059`41aa9000 Unfrozen
# Child-SP RetAddr Call Site
00 00000059`41fff978 00007fff`e79310ee ntdll!NtWaitForSingleObject+0x14
01 00000059`41fff980 00007fff`bb52bf2d KERNELBASE!WaitForSingleObjectEx+0x8e
02 (Inline Function) -----
03 (Inline Function) -----
04 (Inline Function) -----
05 00000059`41ffa20 00007fff`bb526036 normal!std::thread::sleep+0x9d
06 00000059`41ffa90 00007fff`bb521869 normal!normal::main::closure$0+0x16
07 (Inline Function) -----
08 00000059`41ffa0 00007fff`bb524f69 normal!std::sys::backtrace::__rust_begin_short_backtrace+0x9
09 00000059`41ffa0 00007fff`bb521759 normal!std::thread::sleep+0x9d
0a 00000059`41ffb20 00007fff`bb52285d normal!std::thread::sleep+0x9d
normal!core::panic::unwind_safe::impl$25::call_once<tuple$>,std::thread::impl$0::spawn_unchecked::closure$1::closure_env$0normal::main::closure_env$0,tuple$> > +0x9
0b 00000059`41ffb50 00007fff`bb525153 normal!std::panic::try::do_call+0x6
normal!std::panic::try::do_call+0x6
normal!std::panic::try::do_call+0x6
0c 00000059`41ffb80 00007fff`bb524dc4 normal!std::thread::sleep+0x9d
0d (Inline Function) -----
0e (Inline Function) -----
0f 00000059`41ffb0 00007fff`bb52743e normal!std::thread::sleep+0x9d
10 00000059`41ffd40 00007fff`bb5346dd normal!core::ops::function::FnOnce::call_once<std::thread::impl$0::spawn_unchecked::closure_env$1normal::main::closure_env$0,tuple$> >,tuple$> +0xc
11 (Inline Function) -----
12 (Inline Function) -----
13 00000059`41ffd80 00007fff`e89d53e0 normal!std::sys::pal::windows::thread::impl$0::new::thread_start+0x3d
14 00000059`41ffde0 00007fff`ea00485b kernel32!BaseThreadInitThunk+0x10
15 00000059`41ffe10 00000000`00000000 ntdll!RtlUserThreadStart+0x2b

3 Id: afc.287c Suspend: 0 Teb: 00000059`41aab000 Unfrozen
# Child-SP RetAddr Call Site
00 00000059`421ffa78 00007fff`e79310ee ntdll!NtWaitForSingleObject+0x14
01 00000059`421ffa80 00007fff`bb52bf2d KERNELBASE!WaitForSingleObjectEx+0x8e
02 (Inline Function) -----
03 (Inline Function) -----
04 (Inline Function) -----
05 00000059`421fb20 00007fff`bb526036 normal!std::thread::sleep+0x9d
06 00000059`421fb90 00007fff`bb521869 normal!normal::main::closure$0+0x16
07 (Inline Function) -----
08 00000059`421fb0 00007fff`bb524f69 normal!std::sys::backtrace::__rust_begin_short_backtrace+0x9

```



```

09 00000059`421ffb0f 00007ff6`bb521759 normal!std::thread::impl$0::spawn_unchecked_::closure$1::closure$0<normal::main::closure_env$0,tuple$<> >+0x9
0a 00000059`421ffc20 00007ff6`bb52285d normal!core::panic::unwind_safe::impl$25::call_once<tuple$<>,std::thread::impl$0::spawn_unchecked_::closure$1::closure_env$0<normal::main::closure_env$0,tuple$<> > >+0x9
0b 00000059`421ffc50 00007ff6`bb525153 normal!std::panicking::try::do_call<core::panic::unwind_safe::AssertUnwindSafe<std::thread::impl$0::spawn_unchecked_::closure$1::closure_env$0<normal::main::closure_env$0,tuple$<> > >,tuple$<> >+0x1d
0c 00000059`421ffca0 00007ff6`bb524dc4 normal!std::thread::impl$7::drop::closure$0<tuple$<> >+0xb3
0d (Inline Function) ----- normal!std::panicking::try+0x1f
0e (Inline Function) ----- normal!std::panic::catch_unwind+0x1f
0f 00000059`421ffc00 00007ff6`bb52743e normal!std::thread::impl$0::spawn_unchecked_::closure$1<normal::main::closure_env$0,tuple$<> >+0x114
10 00000059`421ffe40 00007ff6`bb5346dd normal!core::ops::function::FnOnce::call_once<std::thread::impl$0::spawn_unchecked_::closure_env$1<normal::main::closure_env$0,tuple$<> >,tuple$<> >+0xe
11 (Inline Function) ----- normal!alloc::boxed::impl$48::call_once+0xb
12 (Inline Function) ----- normal!alloc::boxed::impl$48::call_once+0x16
13 00000059`421ffe00 00007fff`e89d53e0 normal!std::sys::pal::windows::thread::impl$0::new::thread_start+0x3d
14 00000059`421ffec0 00007fff`ea00485b kernel32!BaseThreadInitThunk+0x10
15 00000059`421fff10 00000000`00000000 ntdll!RtlUserThreadStart+0x2b

 4 Id: afc.282c Suspend: 0 Teb: 00000059`41aad000 Unfrozen
# Child-SP RetAddr Call Site
00 00000059`423ff338 00007fff`e79310ee ntdll!NtWaitForSingleObject+0x14
01 00000059`423ff340 00007ff6`bb52bf2d KERNELBASE!WaitForSingleObjectEx+0x8e
02 (Inline Function) ----- normal!std::sys::pal::windows::time::WaitableTimer::wait+0xe
03 (Inline Function) ----- normal!std::sys::pal::windows::thread::impl$0::sleep::high_precision_sleep+0x7c
04 (Inline Function) ----- normal!std::sys::pal::windows::thread::Thread::sleep+0x89
05 00000059`423ff3e0 00007ff6`bb526036 normal!std::thread::sleep+0x9d
06 00000059`423ff450 00007ff6`bb521869 normal!normal::main::closure$0+0x16
07 (Inline Function) ----- normal!core::hint::black_box
08 00000059`423ff480 00007ff6`bb524f69 normal!std::sys::backtrace::__rust_begin_short_backtrace<normal::main::closure_env$0,tuple$<> >+0x9
09 00000059`423ff4b0 00007ff6`bb521759 normal!std::thread::impl$0::spawn_unchecked_::closure$1::closure$0<normal::main::closure_env$0,tuple$<> >+0x9
0a 00000059`423ff4e0 00007ff6`bb52285d normal!core::panic::unwind_safe::impl$25::call_once<tuple$<>,std::thread::impl$0::spawn_unchecked_::closure$1::closure_env$0<normal::main::closure_env$0,tuple$<> > >+0x9
0b 00000059`423ff510 00007ff6`bb525153 normal!std::panicking::try::do_call<core::panic::unwind_safe::AssertUnwindSafe<std::thread::impl$0::spawn_unchecked_::closure$1::closure_env$0<normal::main::closure_env$0,tuple$<> > >,tuple$<> >+0x1d
0c 00000059`423ff560 00007ff6`bb524dc4 normal!std::thread::impl$7::drop::closure$0<tuple$<> >+0xb3
0d (Inline Function) ----- normal!std::panicking::try+0x1f
0e (Inline Function) ----- normal!std::panic::catch_unwind+0x1f
0f 00000059`423ff5b0 00007ff6`bb52743e normal!std::thread::impl$0::spawn_unchecked_::closure$1<normal::main::closure_env$0,tuple$<> >+0x114
10 00000059`423ff700 00007ff6`bb5346dd normal!core::ops::function::FnOnce::call_once<std::thread::impl$0::spawn_unchecked_::closure_env$1<normal::main::closure_env$0,tuple$<> >,tuple$<> >+0xe
11 (Inline Function) ----- normal!alloc::boxed::impl$48::call_once+0xb
12 (Inline Function) ----- normal!alloc::boxed::impl$48::call_once+0x16
13 00000059`423ff740 00007fff`e89d53e0 normal!std::sys::pal::windows::thread::impl$0::new::thread_start+0x3d
14 00000059`423ff7a0 00007fff`ea00485b kernel32!BaseThreadInitThunk+0x10
15 00000059`423ff7d0 00000000`00000000 ntdll!RtlUserThreadStart+0x2b

 5 Id: afc.13d0 Suspend: 0 Teb: 00000059`41aaf000 Unfrozen
# Child-SP RetAddr Call Site
00 00000059`425ff428 00007fff`e79310ee ntdll!NtWaitForSingleObject+0x14
01 00000059`425ff430 00007ff6`bb52bf2d KERNELBASE!WaitForSingleObjectEx+0x8e
02 (Inline Function) ----- normal!std::sys::pal::windows::time::WaitableTimer::wait+0xe
03 (Inline Function) ----- normal!std::sys::pal::windows::thread::impl$0::sleep::high_precision_sleep+0x7c
04 (Inline Function) ----- normal!std::sys::pal::windows::thread::Thread::sleep+0x89
05 00000059`425ff4d0 00007ff6`bb526036 normal!std::thread::sleep+0x9d
06 00000059`425ff540 00007ff6`bb521869 normal!normal::main::closure$0+0x16
07 (Inline Function) ----- normal!core::hint::black_box
08 00000059`425ff570 00007ff6`bb524f69 normal!std::sys::backtrace::__rust_begin_short_backtrace<normal::main::closure_env$0,tuple$<> >+0x9
09 00000059`425ff5a0 00007ff6`bb521759 normal!std::thread::impl$0::spawn_unchecked_::closure$1::closure$0<normal::main::closure_env$0,tuple$<> >+0x9
0a 00000059`425ff5d0 00007ff6`bb52285d normal!core::panic::unwind_safe::impl$25::call_once<tuple$<>,std::thread::impl$0::spawn_unchecked_::closure$1::closure_env$0<normal::main::closure_env$0,tuple$<> > >+0x9
0b 00000059`425ff600 00007ff6`bb525153 normal!std::panicking::try::do_call<core::panic::unwind_safe::AssertUnwindSafe<std::thread::impl$0::spawn_unchecked_::closure$1::closure_env$0<normal::main::closure_env$0,tuple$<> > >,tuple$<> >+0x1d
0c 00000059`425ff650 00007ff6`bb524dc4 normal!std::thread::impl$7::drop::closure$0<tuple$<> >+0xb3
0d (Inline Function) ----- normal!std::panicking::try+0x1f
0e (Inline Function) ----- normal!std::panic::catch_unwind+0x1f
0f 00000059`425ff6a0 00007ff6`bb52743e normal!std::thread::impl$0::spawn_unchecked_::closure$1<normal::main::closure_env$0,tuple$<> >+0x114
10 00000059`425ff7f0 00007ff6`bb5346dd normal!core::ops::function::FnOnce::call_once<std::thread::impl$0::spawn_unchecked_::closure_env$1<normal::main::closure_env$0,tuple$<> >,tuple$<> >+0xe
11 (Inline Function) ----- normal!alloc::boxed::impl$48::call_once+0xb
12 (Inline Function) ----- normal!alloc::boxed::impl$48::call_once+0x16
13 00000059`425ff830 00007fff`e89d53e0 normal!std::sys::pal::windows::thread::impl$0::new::thread_start+0x3d
14 00000059`425ff890 00007fff`ea00485b kernel32!BaseThreadInitThunk+0x10
15 00000059`425ff8c0 00000000`00000000 ntdll!RtlUserThreadStart+0x2b

 6 Id: afc.2890 Suspend: 0 Teb: 00000059`41ab1000 Unfrozen
# Child-SP RetAddr Call Site
00 00000059`427ff558 00007fff`e79310ee ntdll!NtWaitForSingleObject+0x14
01 00000059`427ff560 00007ff6`bb52bf2d KERNELBASE!WaitForSingleObjectEx+0x8e
02 (Inline Function) ----- normal!std::sys::pal::windows::time::WaitableTimer::wait+0xe
03 (Inline Function) ----- normal!std::sys::pal::windows::thread::impl$0::sleep::high_precision_sleep+0x7c
04 (Inline Function) ----- normal!std::sys::pal::windows::thread::Thread::sleep+0x89
05 00000059`427ff600 00007ff6`bb526036 normal!std::thread::sleep+0x9d
06 00000059`427ff670 00007ff6`bb521869 normal!normal::main::closure$0+0x16
07 (Inline Function) ----- normal!core::hint::black_box
08 00000059`427ff6a0 00007ff6`bb524f69 normal!std::sys::backtrace::__rust_begin_short_backtrace<normal::main::closure_env$0,tuple$<> >+0x9
09 00000059`427ff6d0 00007ff6`bb521759 normal!std::thread::impl$0::spawn_unchecked_::closure$1::closure$0<normal::main::closure_env$0,tuple$<> >+0x9
0a 00000059`427ff700 00007ff6`bb52285d normal!core::panic::unwind_safe::impl$25::call_once<tuple$<>,std::thread::impl$0::spawn_unchecked_::closure$1::closure_env$0<normal::main::closure_env$0,tuple$<> > >+0x9
0b 00000059`427ff730 00007ff6`bb525153 normal!std::panicking::try::do_call<core::panic::unwind_safe::AssertUnwindSafe<std::thread::impl$0::spawn_unchecked_::closure$1::closure_env$0<normal::main::closure_env$0,tuple$<> > >,tuple$<> >+0x1d
0c 00000059`427ff780 00007ff6`bb524dc4 normal!std::thread::impl$7::drop::closure$0<tuple$<> >+0xb3
0d (Inline Function) ----- normal!std::panicking::try+0x1f
0e (Inline Function) ----- normal!std::panic::catch_unwind+0x1f
0f 00000059`427ff7d0 00007ff6`bb52743e normal!std::thread::impl$0::spawn_unchecked_::closure$1<normal::main::closure_env$0,tuple$<> >+0x114
10 00000059`427ff920 00007ff6`bb5346dd normal!core::ops::function::FnOnce::call_once<std::thread::impl$0::spawn_unchecked_::closure_env$1<normal::main::closure_env$0,tuple$<> >,tuple$<> >+0xe
11 (Inline Function) ----- normal!alloc::boxed::impl$48::call_once+0xb
12 (Inline Function) ----- normal!alloc::boxed::impl$48::call_once+0x16
13 00000059`427ff960 00007fff`e89d53e0 normal!std::sys::pal::windows::thread::impl$0::new::thread_start+0x3d
14 00000059`427ff9c0 00007fff`ea00485b kernel32!BaseThreadInitThunk+0x10
15 00000059`427ff9f0 00000000`00000000 ntdll!RtlUserThreadStart+0x2b

```

Note: Module names and functions can give us an idea of what every thread was doing. For example, thread #0 was waiting for user input. Other threads are blocked while sleeping. If we have a lot of similar thread stack traces, we can significantly reduce the output by executing the `!uniqstack` command:

0:00> !uniqustack

Processing 7 threads, please wait

```

. 0 Id: afc.2830 Suspend: 0 Teb: 00000059 41aa5000 Unfrozen "main"
  Start: normal!mainCRTStartup (00007fff6 bb541dfc)
  Priority: 0 Priority class: 32 Affinity: 1
  # Child-SP RetAddr Call Site
00 00000059 41cfd3d8 00007fff e7914da5 ntdll!NtDeviceIoControlFile+0x14
01 00000059 41cfd3e0 00007fff e7994c5d KERNELBASE!ConsoleCallServerGeneric+0xe9
02 00000059 41cfd540 00007fff e7994aba KERNELBASE!ReadConsoleInternal+0x18d
03 00000059 41cfd690 00007fff bb5343cb KERNELBASE!ReadConsoleW+0x1a
04 (Inline Function) ----- normal!std::sys::pal::windows::stdio::read_u16s+0x4e [/rustc/eeb90cda1969383f56a2637cbd3037bdf598841c/library/std/src/sys/pal/windows/stdio.rs @ 352]
05 00000059 41cfd6d0 00007fff bb53419f normal!std::sys::pal::windows::stdio::read_u16s_fixup_surrogates+0xc
  [/rustc/eeb90cda1969383f56a2637cbd3037bdf598841c/library/std/src/sys/pal/windows/stdio.rs @ 318]
06 00000059 41cfd780 00007fff bb52ed57 normal!std::sys::pal::windows::stdio::impl$2::read+0x19f [/rustc/eeb90cda1969383f56a2637cbd3037bdf598841c/library/std/src/sys/pal/windows/stdio.rs @ 284]
07 (Inline Function) ----- normal!std::io::Read::read_buf::closure$0+0xb [/rustc/eeb90cda1969383f56a2637cbd3037bdf598841c/library/std/src/io/mod.rs @ 973]
08 (Inline Function) ----- normal!std::io::default_read_buf+0x1f [/rustc/eeb90cda1969383f56a2637cbd3037bdf598841c/library/std/src/io/mod.rs @ 574]
09 (Inline Function) ----- normal!std::io::Read::read_buf+0x1f [/rustc/eeb90cda1969383f56a2637cbd3037bdf598841c/library/std/src/io/mod.rs @ 973]
0a (Inline Function) ----- normal!std::io::stdio::impl$0::read_buf+0x1f [/rustc/eeb90cda1969383f56a2637cbd3037bdf598841c/library/std/src/io/stdio.rs @ 105]
0b (Inline Function) ----- normal!std::io::impls::impl$0::read_buf+0x1f [/rustc/eeb90cda1969383f56a2637cbd3037bdf598841c/library/std/src/io/impls.rs @ 24]
0c (Inline Function) ----- normal!std::io::buffered::buffer::buffer::fill_buf+0x3b
  [/rustc/eeb90cda1969383f56a2637cbd3037bdf598841c/library/std/src/io/buffered/buffer.rs @ 115]
0d (Inline Function) ----- normal!std::io::buffered::buffer::impl$5::fill_buf+0x3b
  [/rustc/eeb90cda1969383f56a2637cbd3037bdf598841c/library/std/src/io/buffered/buffer.rs @ 396]
0e 00000059 41cfd820 00007fff bb52d3f5 normal!std::io::read_until::closure$0::buffered::buffer::BufReader::std::io::stdio::StdinRaw >+0x67
  [/rustc/eeb90cda1969383f56a2637cbd3037bdf598841c/library/std/src/io/mod.rs @ 2091]
0f (Inline Function) ----- normal!std::io::impl$9::read_line+0x1a [/rustc/eeb90cda1969383f56a2637cbd3037bdf598841c/library/std/src/io/stdio.rs @ 555]
10 00000059 41cfd8c0 00007fff bb52936e normal!std::io::stdio::read_line+0x65 [/rustc/eeb90cda1969383f56a2637cbd3037bdf598841c/library/std/src/io/stdio.rs @ 399]
11 00000059 41cfd960 00007fff bb528d8e normal!crate::c::mod::cb::func+0x5e [C:\ARWMDA-Dumps\normal\crate_c\src\mod.cb.rs @ 6]
12 00000059 41cfd9a0 00007fff bb5226f4 normal!crate::b::mod::b::func+0x2c [C:\ARWMDA-Dumps\normal\crate_b\src\mod.b\mod.rs @ 11]
13 00000059 41cfd9e0 00007fff bb522fb4 normal!normal::mod::aa::func+0x24 [C:\ARWMDA-Dumps\normal\normal\src\mod_aa.rs @ 6]
14 00000059 41cfd9f0 00007fff bb526780 normal!normal::mod::ab::func+0x24 [C:\ARWMDA-Dumps\normal\normal\src\mod_ab.rs @ 6]
15 00000059 41cfd9f0 00007fff bb5274db normal!normal::main+0x90 [C:\ARWMDA-Dumps\normal\normal\src\main.rs @ 20]
16 00000059 41cfd9f0 00007fff bb52184e normal!core::ops::function::FnOnce::call_once_void (*)::tuple$<> +0xb
  [/rustc/eeb90cda1969383f56a2637cbd3037bdf598841c/library/core/src/ops/function.rs @ 250]
17 (Inline Function) ----- normal!core::hint::black_box+0xa [/rustc/eeb90cda1969383f56a2637cbd3037bdf598841c/library/core/src/hint.rs @ 380]
18 00000059 41cfd9f0 00007fff bb5263d1 normal!std::sys::backtrace::_rust_begin_short_backtrace_void (*)::tuple$<> +0xe
  [/rustc/eeb90cda1969383f56a2637cbd3037bdf598841c/library/std/src/sys/backtrace.rs @ 155]
19 00000059 41cfd9f0 00007fff bb52b909 normal!std::rt::lang_start::closure$0<tuple$<> +0x11 [/rustc/eeb90cda1969383f56a2637cbd3037bdf598841c/library/std/src/rt.rs @ 162]
20 (Inline Function) ----- normal!std::rt::lang_start_internal::closure$2+0x6 [/rustc/eeb90cda1969383f56a2637cbd3037bdf598841c/library/std/src/rt.rs @ 141]
21 (Inline Function) ----- normal!std::panicking::try::do_call+0x6 [/rustc/eeb90cda1969383f56a2637cbd3037bdf598841c/library/std/src/panicking.rs @ 557]
22 (Inline Function) ----- normal!std::panicking::try+0x6 [/rustc/eeb90cda1969383f56a2637cbd3037bdf598841c/library/std/src/panicking.rs @ 521]
23 (Inline Function) ----- normal!std::panic::catch_unwind+0x6 [/rustc/eeb90cda1969383f56a2637cbd3037bdf598841c/library/std/src/panic.rs @ 350]
24 00000059 41cfd9f0 00007fff bb5263aa normal!std::rt::lang_start_internal+0x79 [/rustc/eeb90cda1969383f56a2637cbd3037bdf598841c/library/std/src/rt.rs @ 141]
25 00000059 41cfd9f0 00007fff bb526979 normal!std::rt::lang_start_tuple$<> +0x3a [/rustc/eeb90cda1969383f56a2637cbd3037bdf598841c/library/std/src/rt.rs @ 161]
26 00000059 41cfd9f0 00007fff bb541d8c normal!main+0x19
27 (Inline Function) ----- normal!invoke_main+0x22 [D:\a_work\1\src\tools\src\start\start\exe_common.inl @ 78]
28 00000059 41cfd9f0 00007fff e8d53e0 normal!_srt_common_main_seh+0x10c [D:\a_work\1\src\tools\src\start\start\exe_common.inl @ 288]
29 00000059 41cfd9f0 00007fff ea00485b kernel32!BaseThreadInitThunk+0x10
24 00000059 41cfd9f0 00000000 00000000 ntdll!RtlUserThreadStart+0x2b

. 1 Id: afc.1d60 Suspend: 0 Teb: 00000059 41aa7000 Unfrozen
  Start: ntdll!TppWorkerThread (00007fff ea016a00)
  Priority: 0 Priority class: 32 Affinity: 1
  # Child-SP RetAddr Call Site
00 00000059 41dff948 00007fff ea016cdf ntdll!NtWaitForWorkViaWorkerFactory+0x14
01 00000059 41dff950 00007fff e8d53e0 ntdll!TppWorkerThread+0x2df
02 00000059 41dff950 00007fff ea00485b kernel32!BaseThreadInitThunk+0x10
03 00000059 41dff970 00000000 00000000 ntdll!RtlUserThreadStart+0x2b

. 2 Id: afc.2820 Suspend: 0 Teb: 00000059 41aa9000 Unfrozen
  Start: normal!std::sys::pal::windows::thread::impl$0::new::thread_start (00007fff6 bb5346a0)
  Priority: 0 Priority class: 32 Affinity: 1
  # Child-SP RetAddr Call Site
00 00000059 41fff978 00007fff e79310ee ntdll!NtWaitForSingleObject+0x14
01 00000059 41fff980 00007fff bb52bf2d KERNELBASE!WaitForSingleObjectEx+0x8e
02 (Inline Function) ----- normal!std::sys::pal::windows::time::WaitableTimer::wait+0xe
  [/rustc/eeb90cda1969383f56a2637cbd3037bdf598841c/library/std/src/sys/pal/windows/time.rs @ 254]
03 (Inline Function) ----- normal!std::sys::pal::windows::thread::impl$0::sleep::high_precision_sleep+0x7c
  [/rustc/eeb90cda1969383f56a2637cbd3037bdf598841c/library/std/src/sys/pal/windows/thread.rs @ 101]
04 (Inline Function) ----- normal!std::sys::pal::windows::thread::Thread::sleep+0x89
  [/rustc/eeb90cda1969383f56a2637cbd3037bdf598841c/library/std/src/sys/pal/windows/thread.rs @ 106]
05 00000059 41fff9a0 00007fff bb526036 normal!std::thread::sleep+0x9d [/rustc/eeb90cda1969383f56a2637cbd3037bdf598841c/library/std/src/thread/mod.rs @ 930]
06 00000059 41fff9a0 00007fff bb521869 normal!normal::main::closure$0+0x16 [C:\ARWMDA-Dumps\normal\normal\src\main.rs @ 14]
07 (Inline Function) ----- normal!core::hint::black_box [/rustc/eeb90cda1969383f56a2637cbd3037bdf598841c/library/core/src/hint.rs @ 389]
08 00000059 41fff9c0 00007fff bb524f69 normal!std::sys::backtrace::_rust_begin_short_backtrace::main::closure_env$0, tuple$<> +0x9
  [/rustc/eeb90cda1969383f56a2637cbd3037bdf598841c/library/std/src/sys/backtrace.rs @ 155]
09 00000059 41fff9c0 00007fff bb521759 normal!std::thread::impl$0::spawn_unchecked::closure$1::closure$0<normal::main::closure_env$0, tuple$<> +0x9
  [/rustc/eeb90cda1969383f56a2637cbd3037bdf598841c/library/std/src/thread/mod.rs @ 539]
0a 00000059 41fff9c0 00007fff bb52285d normal!core::panic::unwind_safe::impl$25::call_once<tuple$<>, std::thread::impl$0::spawn_unchecked::closure$1::closure_env$0<normal::main::closure_env$0, tuple$<> +0x9
  [/rustc/eeb90cda1969383f56a2637cbd3037bdf598841c/library/core/src/panic/unwind_safe.rs @ 273]
0b 00000059 41fff9c0 00007fff bb525153 normal!std::panicking::try::do_call::closure$0::panic::unwind_safe::AssertUnwindSafe::std::thread::impl$0::spawn_unchecked::closure$1::closure_env$0<normal::main::closure_env$0, tuple$<> +0x1d
  [/rustc/eeb90cda1969383f56a2637cbd3037bdf598841c/library/std/src/panicking.rs @ 559]
0c 00000059 41fff9c0 00007fff bb524dc4 normal!std::thread::impl$7::drop::closure$0<tuple$<> +0xb3
  [/rustc/eeb90cda1969383f56a2637cbd3037bdf598841c/library/std/src/panic.rs @ 521]
0d (Inline Function) ----- normal!std::panicking::try+0x1f [/rustc/eeb90cda1969383f56a2637cbd3037bdf598841c/library/std/src/panicking.rs @ 521]
0e (Inline Function) ----- normal!std::panic::catch_unwind+0x1f [/rustc/eeb90cda1969383f56a2637cbd3037bdf598841c/library/std/src/panic.rs @ 350]
0f 00000059 41fff9f0 00007fff bb52743e normal!std::thread::impl$0::spawn_unchecked::closure$1<normal::main::closure_env$0, tuple$<> +0x114
  [/rustc/eeb90cda1969383f56a2637cbd3037bdf598841c/library/std/src/thread/mod.rs @ 537]
10 00000059 41fff9f0 00007fff bb5346dd normal!core::ops::function::FnOnce::call_once<std::thread::impl$0::spawn_unchecked::closure_env$1<normal::main::closure_env$0, tuple$<> +0xe
  [/rustc/eeb90cda1969383f56a2637cbd3037bdf598841c/library/core/src/ops/function.rs @ 250]
11 (Inline Function) ----- normal!alloc::boxed::impl$48::call_once+0xb [/rustc/eeb90cda1969383f56a2637cbd3037bdf598841c/library/alloc/src/boxed.rs @ 2070]
12 (Inline Function) ----- normal!alloc::boxed::impl$48::call_once+0x16 [/rustc/eeb90cda1969383f56a2637cbd3037bdf598841c/library/alloc/src/boxed.rs @ 2070]
13 00000059 41fff9f0 00007fff e8d53e0 normal!std::sys::pal::windows::thread::impl$0::new::thread_start+0xd
  [/rustc/eeb90cda1969383f56a2637cbd3037bdf598841c/library/std/src/sys/pal/windows/thread.rs @ 58]
14 00000059 41fff9f0 00007fff ea00485b kernel32!BaseThreadInitThunk+0x10
15 00000059 41fff9f0 00000000 00000000 ntdll!RtlUserThreadStart+0x2b

Total threads: 7
Duplicate callstacks: 4 (windbg thread #s follow):
3, 4, 5, 6

```

10. We close logging before exiting WinDbg:

0:000> .logclose

Closing open log file C:\ARWMDA-Dumps\RW2.log