.NET APPLICATIONS PRODUCTION PROFILING

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HOW WE ARE PROFILING ON DEV ENVIROMENT?

1. run some cool profiler!
2. make some load
3. analyze results in beautiful profiler UI

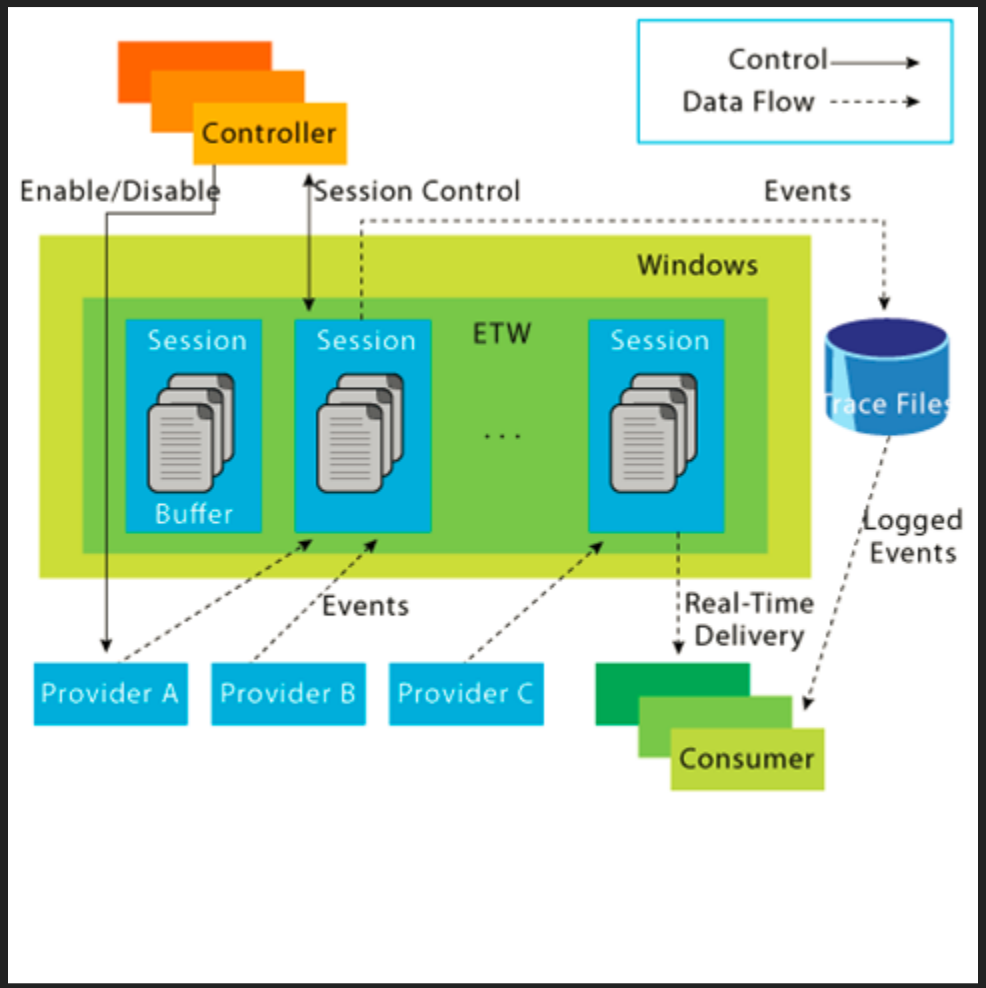
WHY PRODUCTION PROFILING HARDER?

- we can not reproduce prod issue on dev environment
- we should not affect running instance (stop or slow down)
- we have to collect environmental information (cpu, memory, disk io, hard faults, network io...)
- we can not install profiler

EVENT TRACING FOR WINDOWS (ETW)

- Symantic logging (each event and source has schema)
- Fast if enabled
- Doesn't affects performance if disabled
- Can drop events if "performance not enough"
- Used internally in Windows
- Used in .NET CLR (provides detailed info about CLR, JIT, GC...)
- Introduced on Windows 2000 (Windows Vista)

ETW ARCHITECTURE OVERVIEW



ETW COMPONENTS

event provider

writes events to ETW sessions (it can be any user-mode application, managed application, driver etc)

event consumers

application that reads log files or listens to a session for real time events and processes them

controller

starts and stops ETW sessions and enables providers to them.

event trace session

actual logging and buffering on separate kernel thread per session

DEMO 0

PERFVIEW TOOL OVERVIEW

HOW TO CREATE EVENTS SOURCE?

just create 100 line xml schema

```
<instrumentationManifest
    xmlns="http://schemas.microsoft.com/win/2004/08/events"
    xmlns:win="http://manifests.microsoft.com/win/2004/08/windows/events"
    xmlns:xs="http://www.w3.org/2001/XMLSchema"
    >

    <instrumentation>
        <events>
            <provider ...>
                <channels>
                    <importChannel .../>
                    <channel .../>
                </channels>
                <levels>
                    <level .../>
                </levels>
                <tasks>
                    <task .../>
                </tasks>
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                    <opcode .../>
                </opcodes>
                <keywords>
                    <keyword .../>
                </keywords>
                <filters>
                    <filter .../>
                </filters>
                <maps>
                    <valueMap ...>
                        <map .../>
                    </valueMap>
                    <bitMap ...>
```

EASIER WAY FOR CREATING EVENTS SOURCE

```
class MyEventSource : EventSource
{
    public void Message(string message)
    {
        WriteEvent(1, message);
    }

    public void OrderAccepted(int orderId)
    {
        WriteEvent(2, orderId);
    }
}
```

DEMO 1, 2, ...

BEST PRACTICES

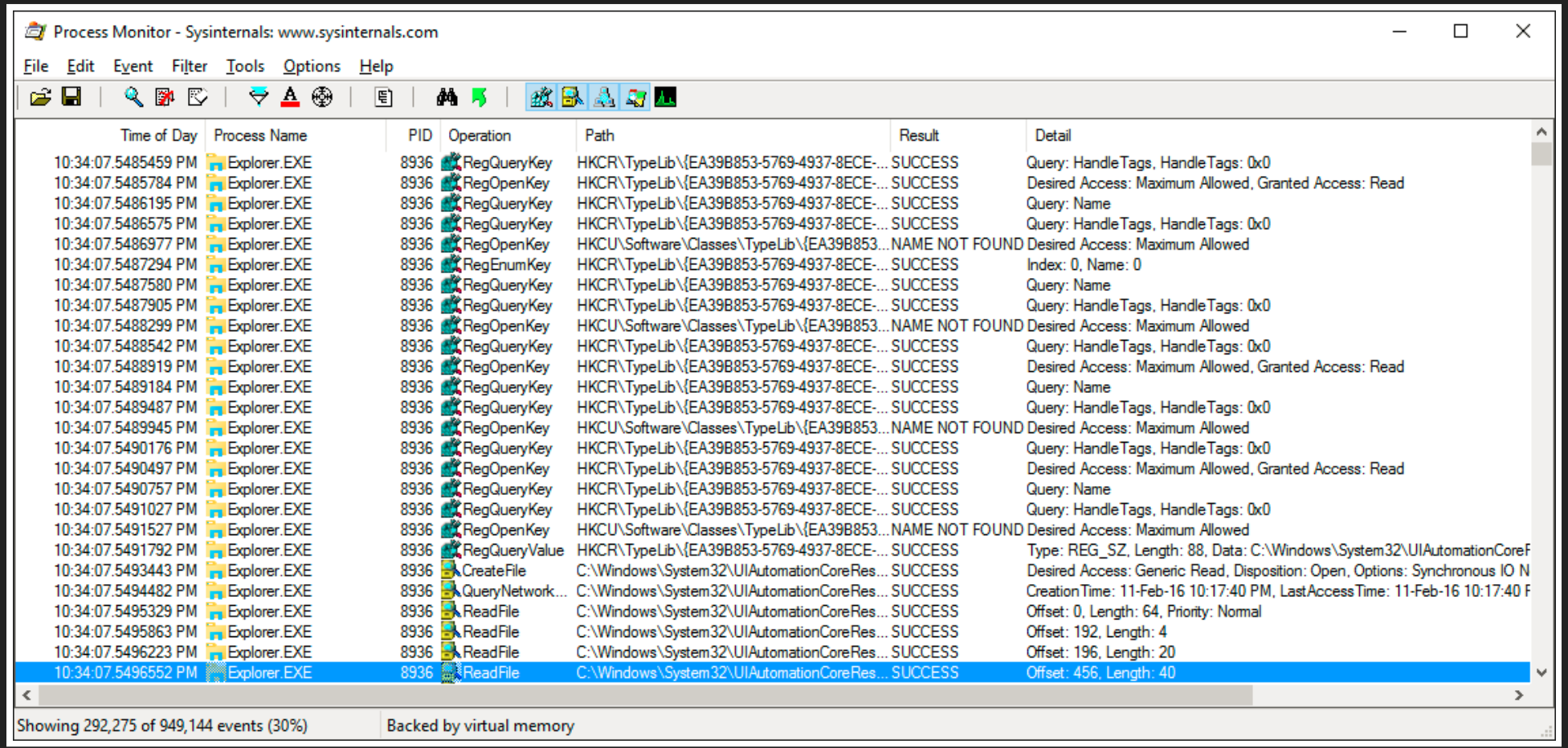
- Use primitive types if possible
- Use IsEnabled function if calculation of values for event takes memory/cpu
- Create separate EventSource for highly detailed logging

BEST PRACTICES

Check ConstructionException at least on Debug configuration

```
#if DEBUG
    if (MinimalEventSource.Log.ConstructionException != null)
        throw MinimalEventSource.Log.ConstructionException;
#endif
```

WHO ELSE USES ETW?



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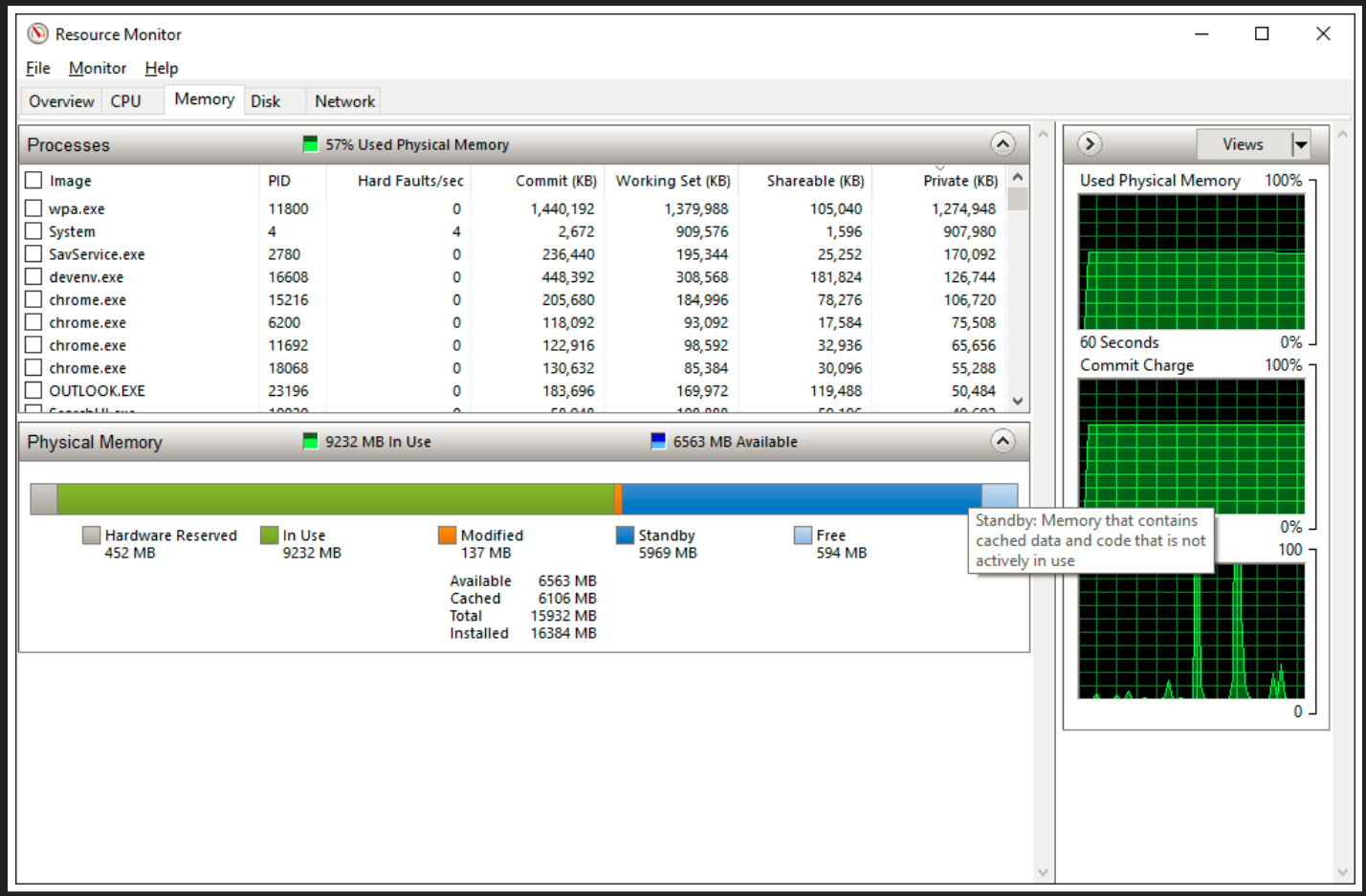

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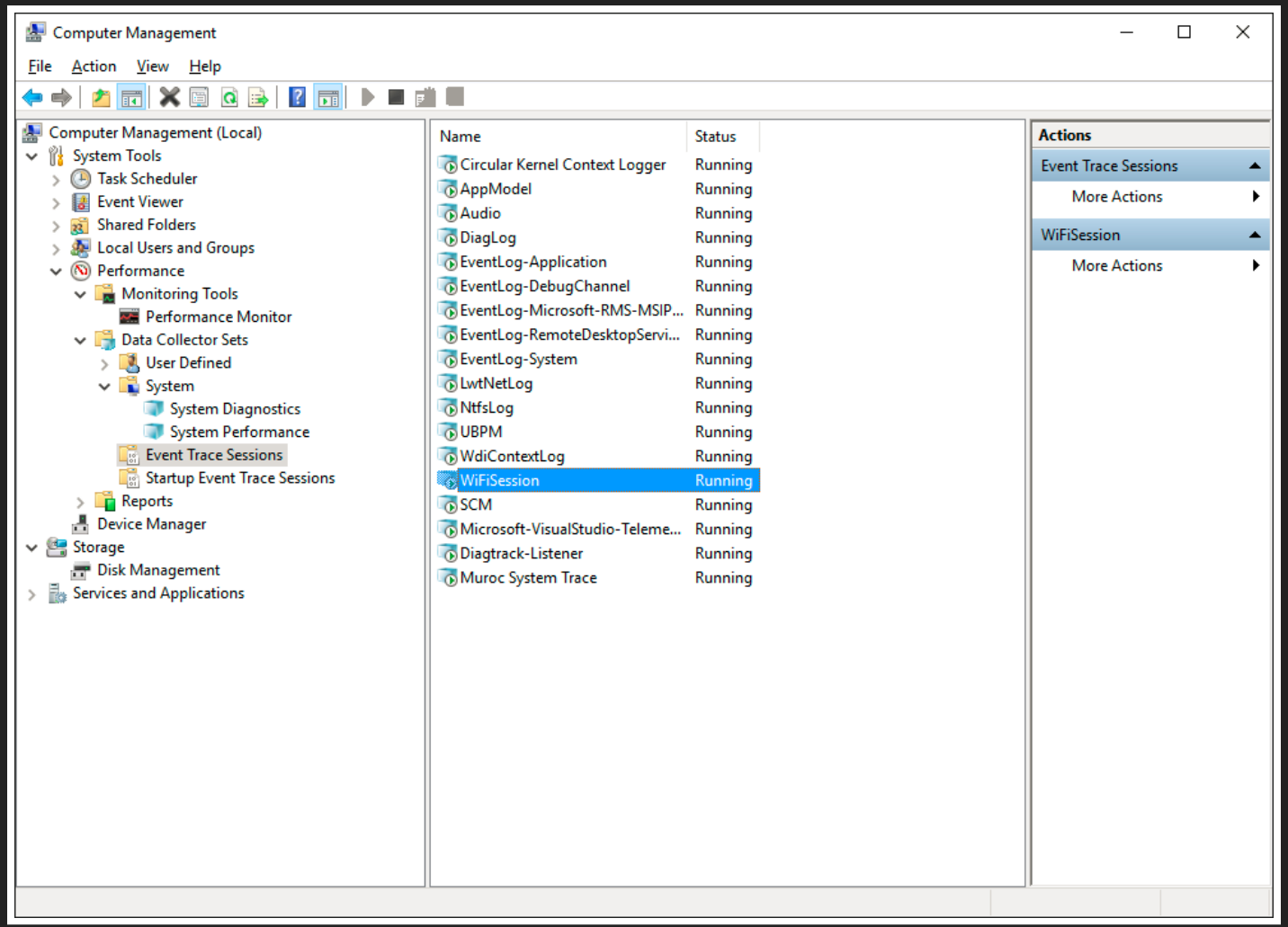

TOOLS

- PerfView (http://aka.ms/PerfView)
- Logman.exe - command-line controller (Technet article)
- tracerpt.exe - a general consumer tool (Technet article)
- Windows Performance Analyzer (WPA) is a tool that creates graphs and data tables of ETW
- Xperf actions are trace processing components that collate event information to produce text reports
- Even google has own ETW tool :)
  https://github.com/google/UIforETW

There are lot of tools around ETW. Collectors and event analyzers.

USEFULL LINKS

- Channel9 PerfView tutorial
- Blog posts about ETW
- Microsoft.Diagnostics.Tracing.Logging repo
- The TraceEvent Library Programmers Guide
- Summary of ETW support in .NET
- ETW Events in the Common Language Runtime

WHAT REMAINS OUT OF SCOPE OF THIS PRESENTATION?

- Memory profiling
- Controlling sessions using .NET
- Collecting events using .NET
- Cool tools around ETW

QUESTIONS?