

Managing SQL Server Performance

with Extended Events



Performance



OUCH!

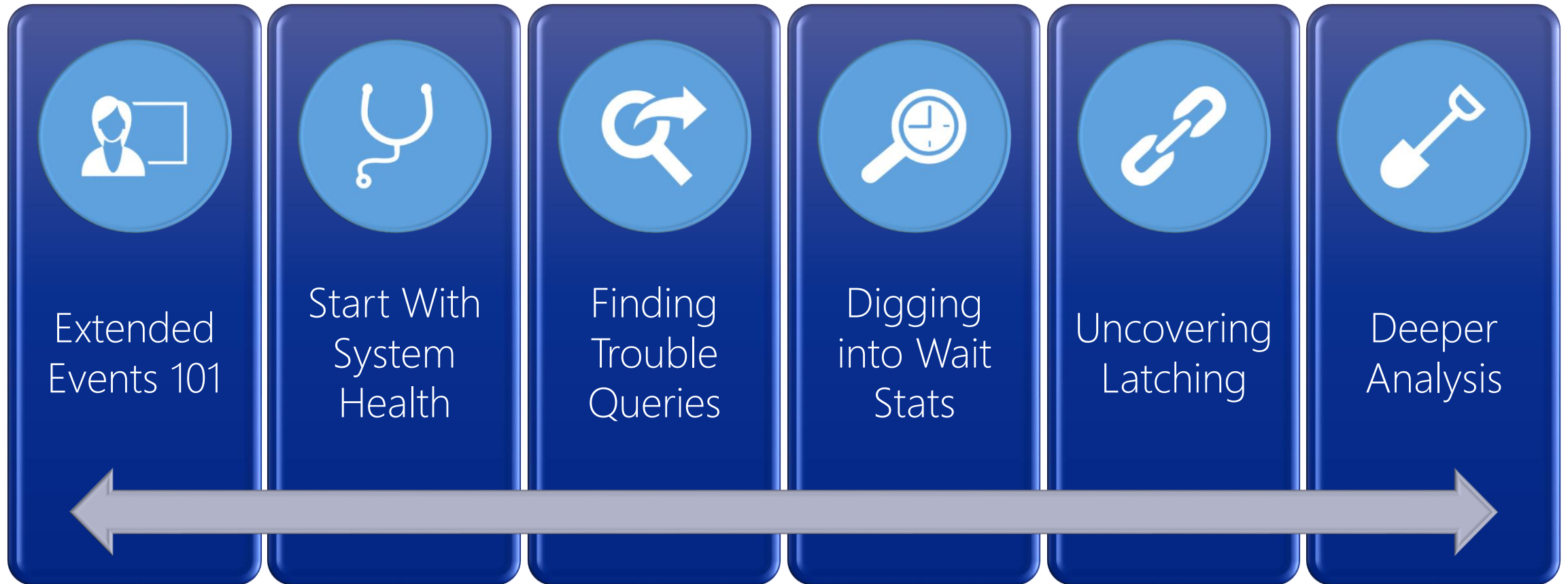
Impact



WINNING!



Session Agenda

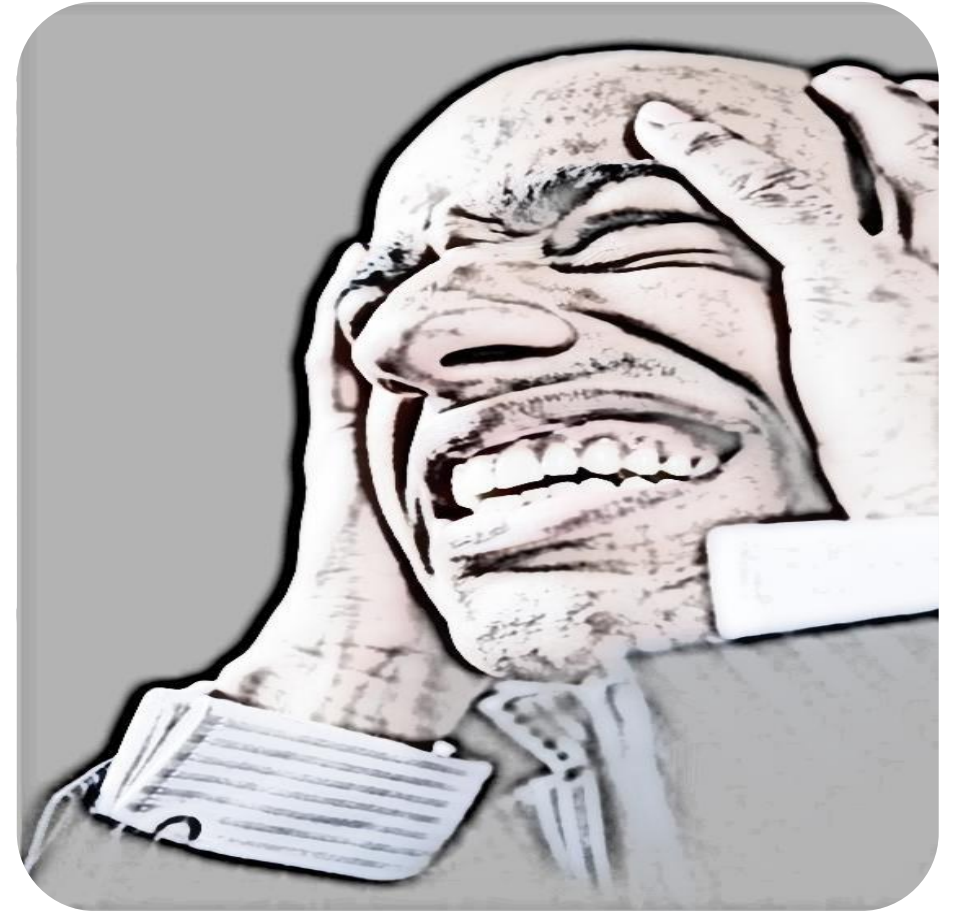


Disclaimer

Demos are all
SQL Server 2014...

Almost everything
works back to
SQL Server 2008...

Both versions are available

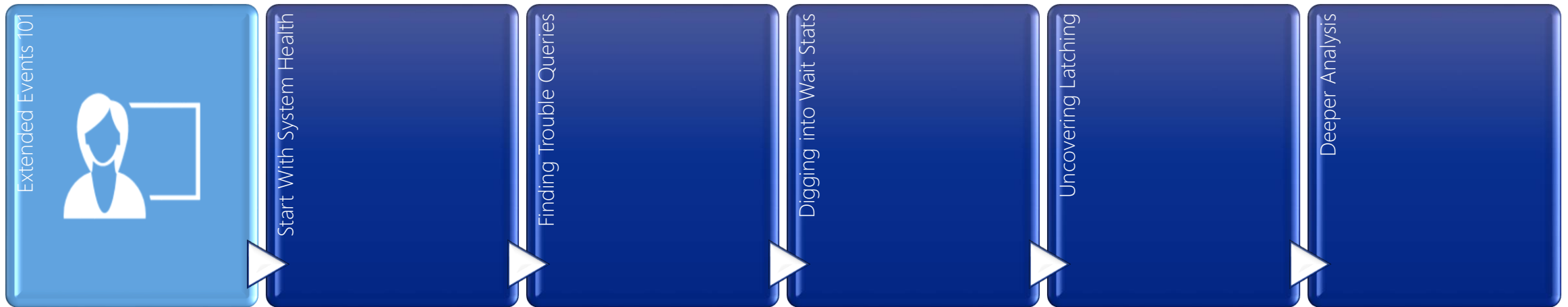


Disclaimer #2

SQL Profiler
and
Trace Deprecated



Extended Events 101



Extended Events

General event handling

- Synchronous events

- Asynchronous collection

Any event to any target

Focus on the issue

Lightweight**

DDL driven



More Basics

Any event to any target

Use event short-circuiting

Events are synch

2 μ CPU/event on 2 GHz

Targets synch/asynch

Scope to needs

Retention

Event loss



Monitoring Resource Cost

CPU

2 microseconds –or – 0.000002 seconds

Memory

Default 4MB (ringbuffer)

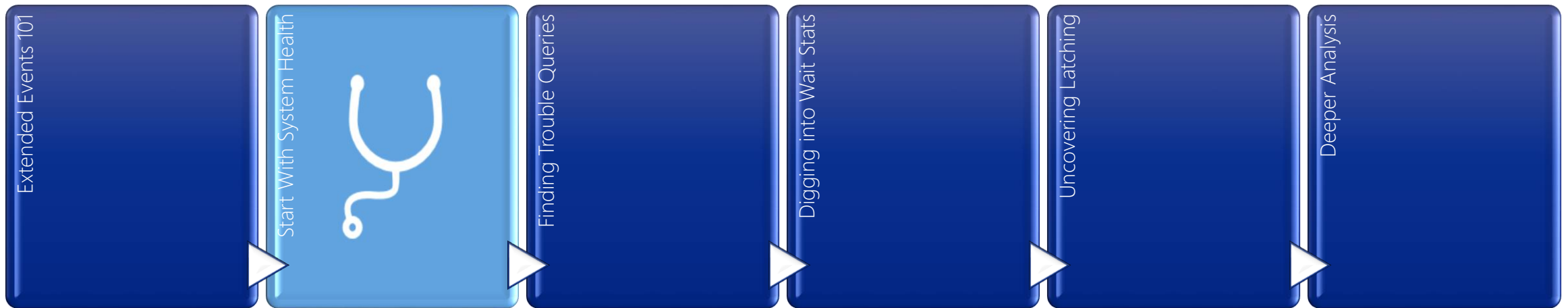
Disk

It depends

- Where are you writing?
- How much data?



Start With System Health



System Health

Errors with severity ≥ 20

Memory errors

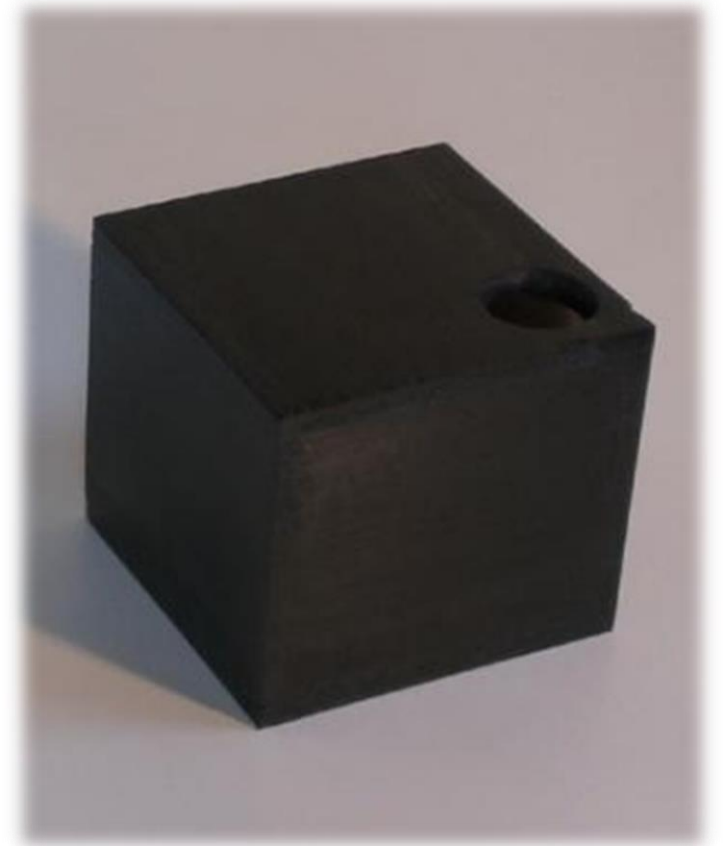
17803, 701, 802, 8645, 8651, 8657, 8902

Non-yielding issues

Deadlocks

Lock wait types held for 15 seconds

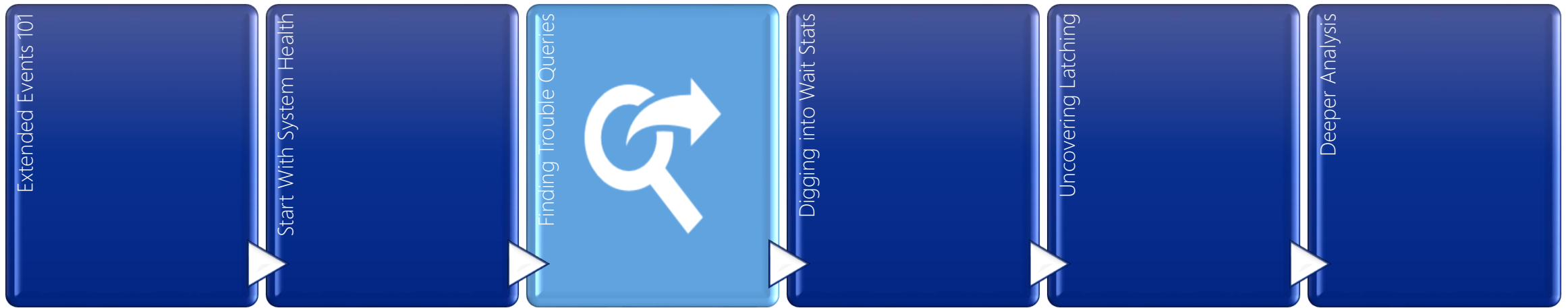
Preemptive OS wait types held for a specified period



System Health

Demo

Finding Trouble Queries



Common Scenario

What queries are over XX seconds?

What are the high CPU items?

Which application has the highest IO?

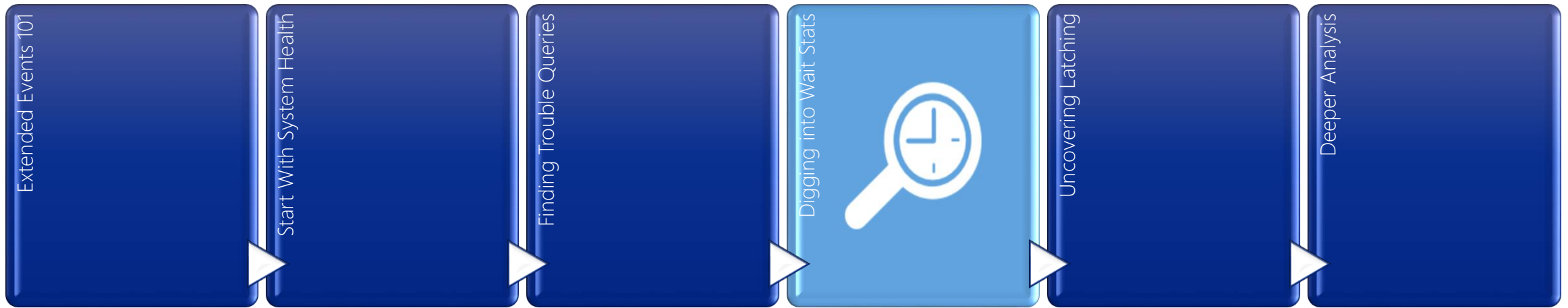
Use Cases Closely Match Profile Use



Finding Trouble Queries

Demo

Digging into Wait Stats



Waits and Queue Methodology

All queries required resources

Pauses in processing collected as “waits”

Waits identify needed resources

Resolving waits improves performance

How do you tie waits to queries?

Understanding Wait Stats

What do the 'ticks' for wait stats mean?

OLEDB

Parallelism

Network

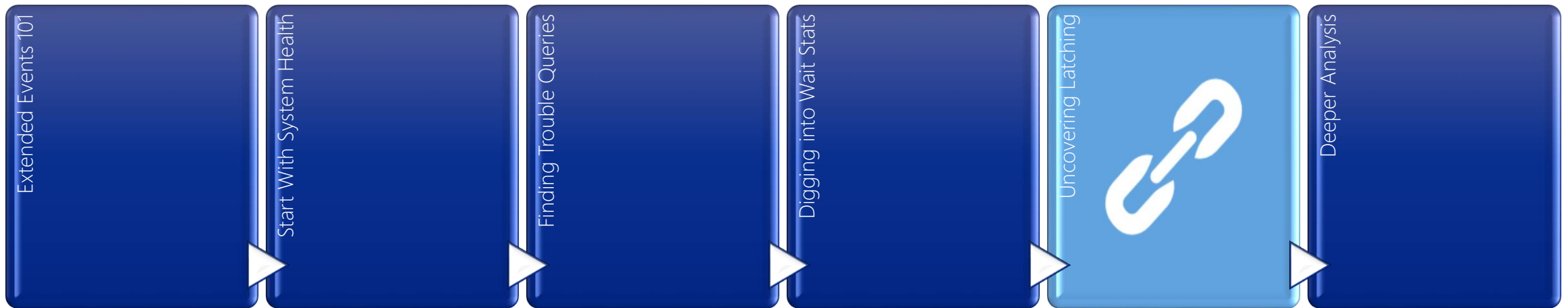
"One door leads to the source"
-The Keymaker



Wait Stats

Demo

Uncovering Latching



Latching In SQL Server

Protect in-memory structures

Guarantee consistency

Assist in synchronization

NOT locking

Latching In SQL Server

Buffer Latch

- PAGELATCH_*
- Index and data pages
- SQL Server system objects
- Allocations from PFS, GAM, SGAM, IAM

IO Latch

- PAGEIOLATCH_*
- Subset of buffer latches
- Transfer of buffer data from storage to memory
- Prevent loading pages multiple times

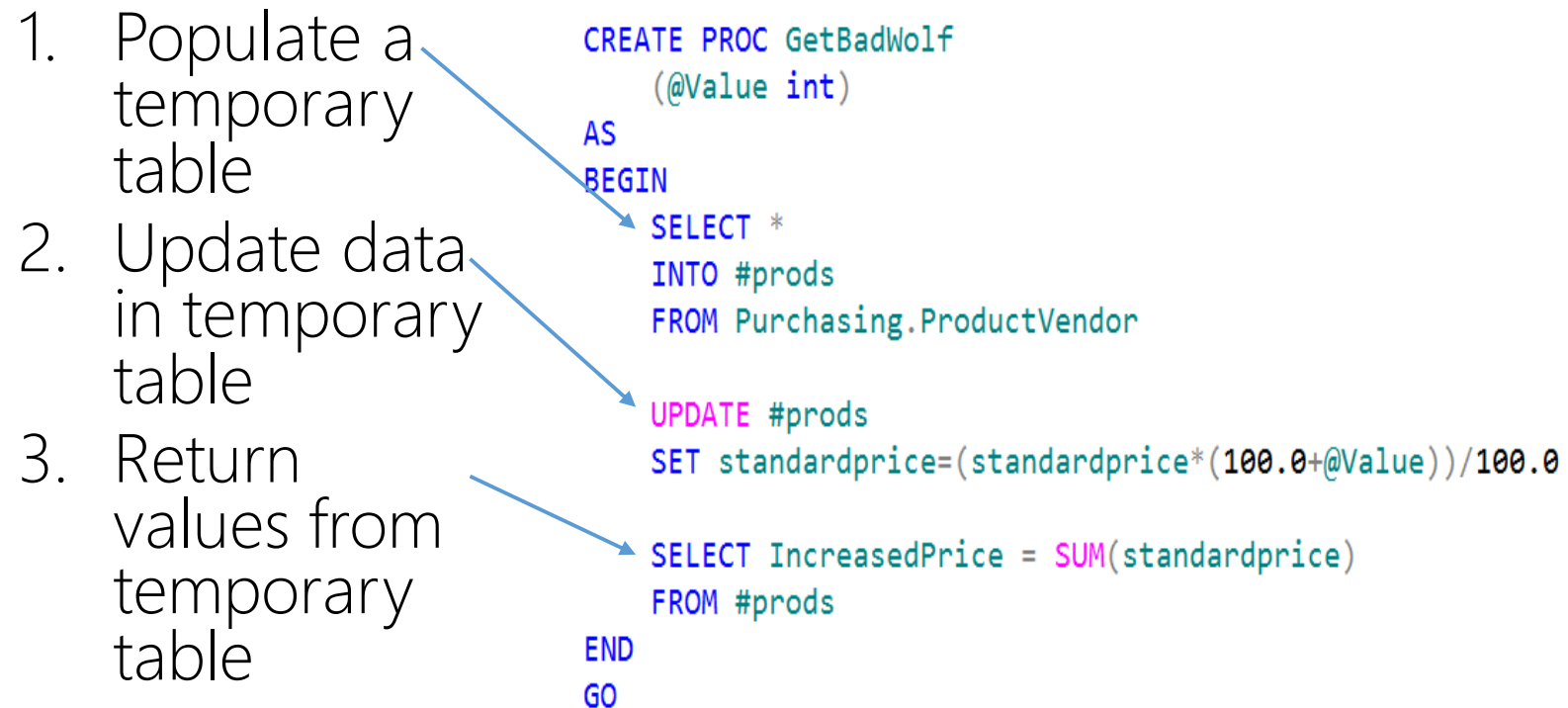
Non-buffer Latch

- LATCH_*
- Non-data in-memory structures
- Distributed transactions, file auto growth, partitioning, parallel queries

T-SQL Procedural Pattern

1. Populate a temporary table
 2. Update data in temporary table
 3. Return values from temporary table
- ```
CREATE PROC GetBadWolf
 (@Value int)
AS
BEGIN
 SELECT *
 INTO #prods
 FROM Purchasing.ProductVendor

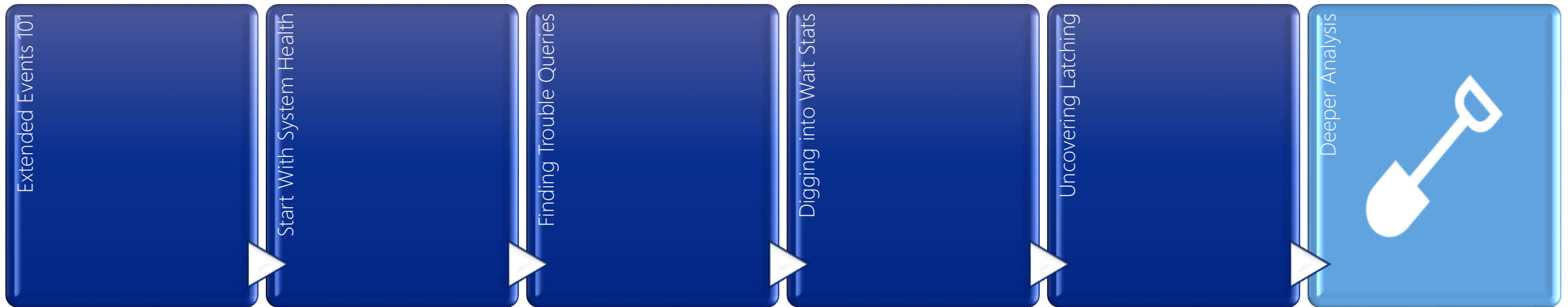
 UPDATE #prods
 SET standardprice=(standardprice*(100.0+@Value))/100.0

 SELECT IncreasedPrice = SUM(standardprice)
 FROM #prods
END
GO
```
- 

# T-SQL Pattern

Demo

# Deeper Analysis



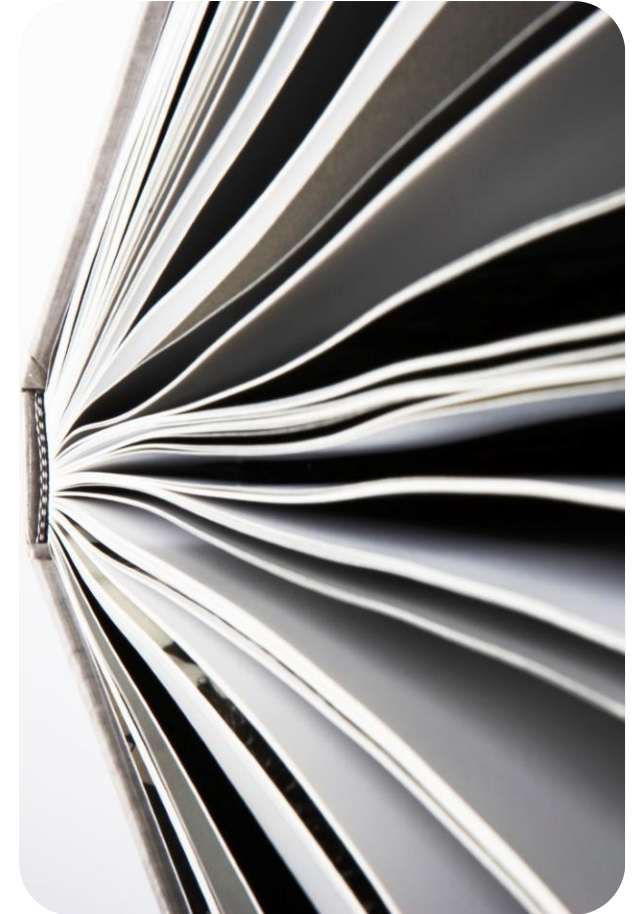
# Page Splits

## Scenario:

Your server is experiencing a high number of page splits. While it is easy to identify tables that are encountering page splits; which transactions are contributing to these page splits?

## Event:

page\_split, transaction\_log





# Connection Timeouts

## Scenario:

Your application is timing out on the queries it is sending. While this is an application side issue, the developers have convinced everyone that you need to fix the issue.

## Event:

Attention



# Warnings

## Scenario:

Execution plans are encountering warning messages, unbeknownst to you these messages are interfering with performance.

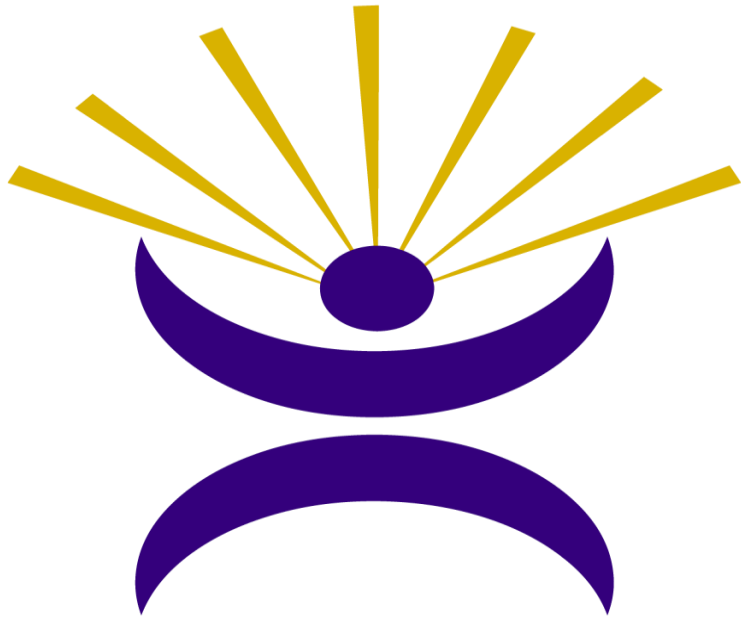
## Event:

- missing\_column\_statistics
- missing\_join\_predicate
- optimizer\_timeout
- spatial\_guess
- plan\_affecting\_convert
- unmatched\_filtered\_indexes
- full\_update\_instead\_of\_partial\_update



# Deeper Analysis

Demo



Name: Jason Strate

Email: [jasonstrate@gmail.com](mailto:jasonstrate@gmail.com)  
[jstrate@pragmaticworks.com](mailto:jstrate@pragmaticworks.com)

Blog: [www.jasonstrate.com](http://www.jasonstrate.com)

Resource: [jasonstrate.com/go/xevents](http://jasonstrate.com/go/xevents)



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