SQL Server: Introduction to Extended Events

Module 2: Extended Events Architecture

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Introduction

- **Extended Events is a complete change in architecture for collecting diagnostic, troubleshooting data in SQL Server**
- **Understanding the Extended Events architecture is fundamental for understanding how to best leverage Extended Events for diagnostic data collection in SQL Server**

- **In this module we'll cover:**
  - Architecture overview
  - Event execution lifecycle
  - Dispatching
  - Extended Event objects

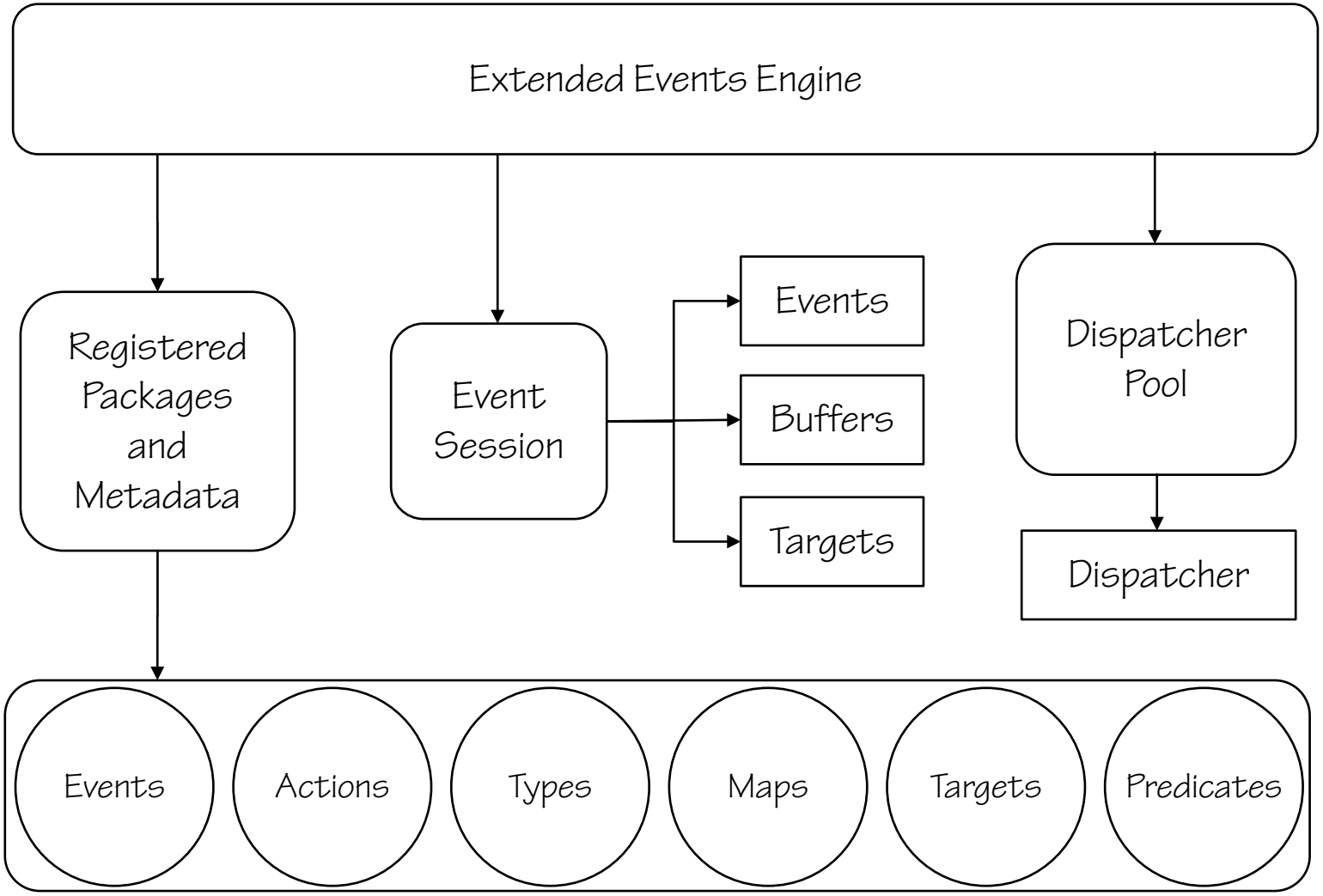
Event Sessions

- **Event sessions are a functional boundary for configuration of events, their configured actions and predicates, and targets to consume the event data**
  - Multiple event sessions can have the same event with different predicates to control when they fire, actions to perform when the event fires, and targets to consume the data generated by the event
- **When started, event sessions have buffers in memory assigned to them to store data generated by events before being dispatched to the targets by the dispatchers**
- **Each session has a defined set of options that control how the session functions inside of the Extended Events engine**
  - Tracking how events relate to each other
  - Memory buffer configuration for the session
  - Event dispatch latency, retention, and loss
  - Whether the session starts automatically when SQL Server starts

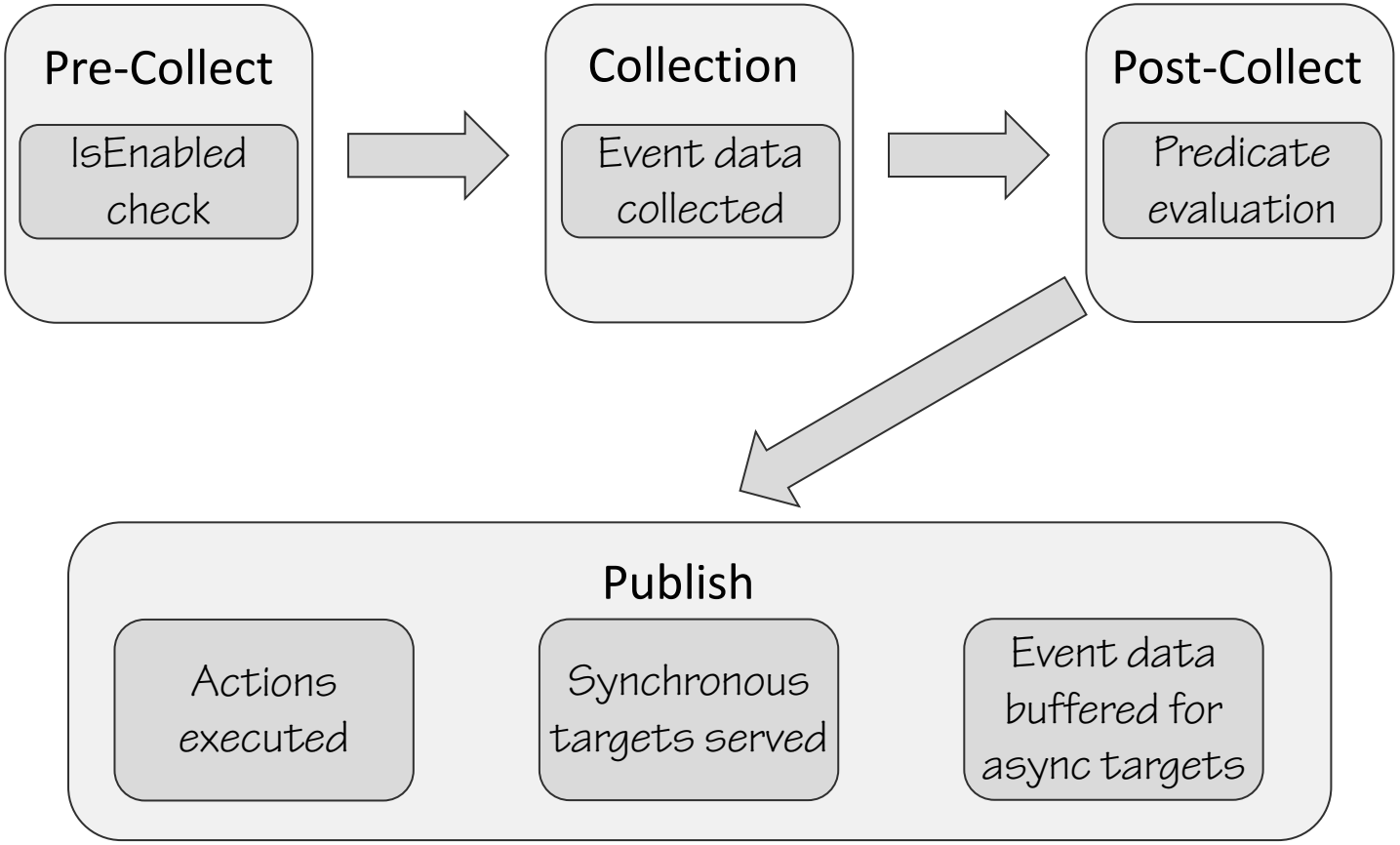
Extended Events Engine

- **The Extended Events engine provides an operational environment and functions as a service internally to the rest of SQL Server**
  - Maintains a list of event sessions that exist in the server and controls access to those event sessions
  - Manages the memory buffers for active event sessions
  - Manages a pool of worker threads for dispatching events from the memory buffers to the event session targets
- **The Extended Events engine is metadata agnostic and does not provide any events**
  - Individual modules within SQL Server interact with the engine and provide metadata about the Extended Events objects the module exposes

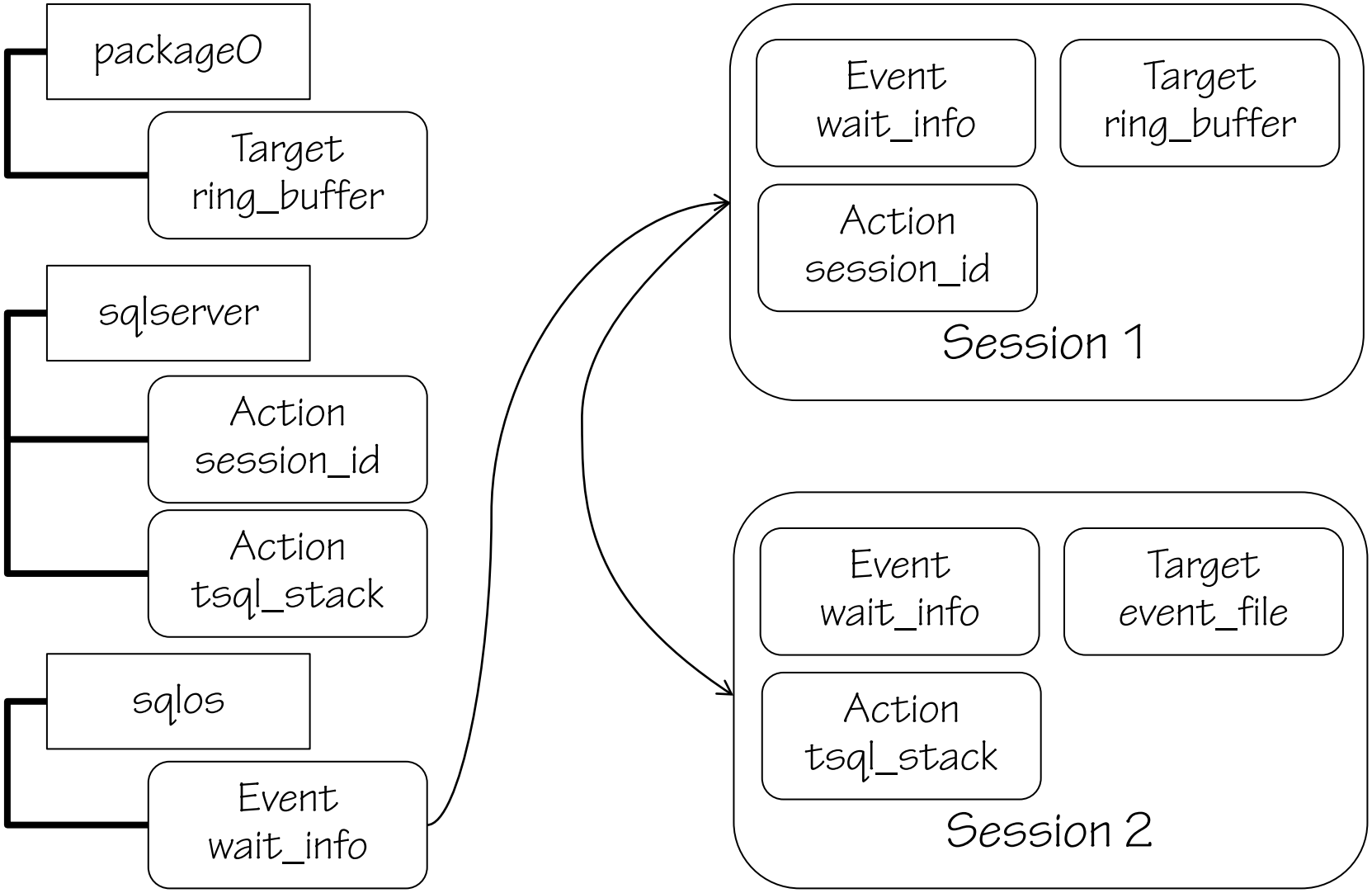
Extended Events Architecture



Event Execution Lifecycle



Event Session Isolation



Dispatching

- **Dispatching events to the asynchronous targets is handled by the dispatcher pool in the Extended Events engine**
- **Dispatch occurs under two conditions**
  - The memory buffer becomes full
  - The event data in the buffer exceeds the event session's MAX_DISPATCH_LATENCY configuration option

Summary

- **The Extended Events engine services diagnostic data collection from the modules loaded in the process**
- **Each module loads a package of metadata into the engine that provides information about the events provided by the module**
- **Event sessions provide a functional boundary for event collection**
- **Events only provide state information for the point in execution that the event was fired, additional information can be triggered through the use of actions**

- **The next module will look at:**
  - Extended Events objects