Progress® OpenEdge®

ABL Memory Profiler: Are You Leaking Memory?

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All roadmaps are for informational purposes only, and the reader is hereby cautioned that actual product development may vary significantly from roadmaps.

These roadmaps may not be interpreted as any commitment on behalf of Progress, and future development, timing and release of any features or functionality described in the roadmaps remains at our sole discretion.

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Agenda

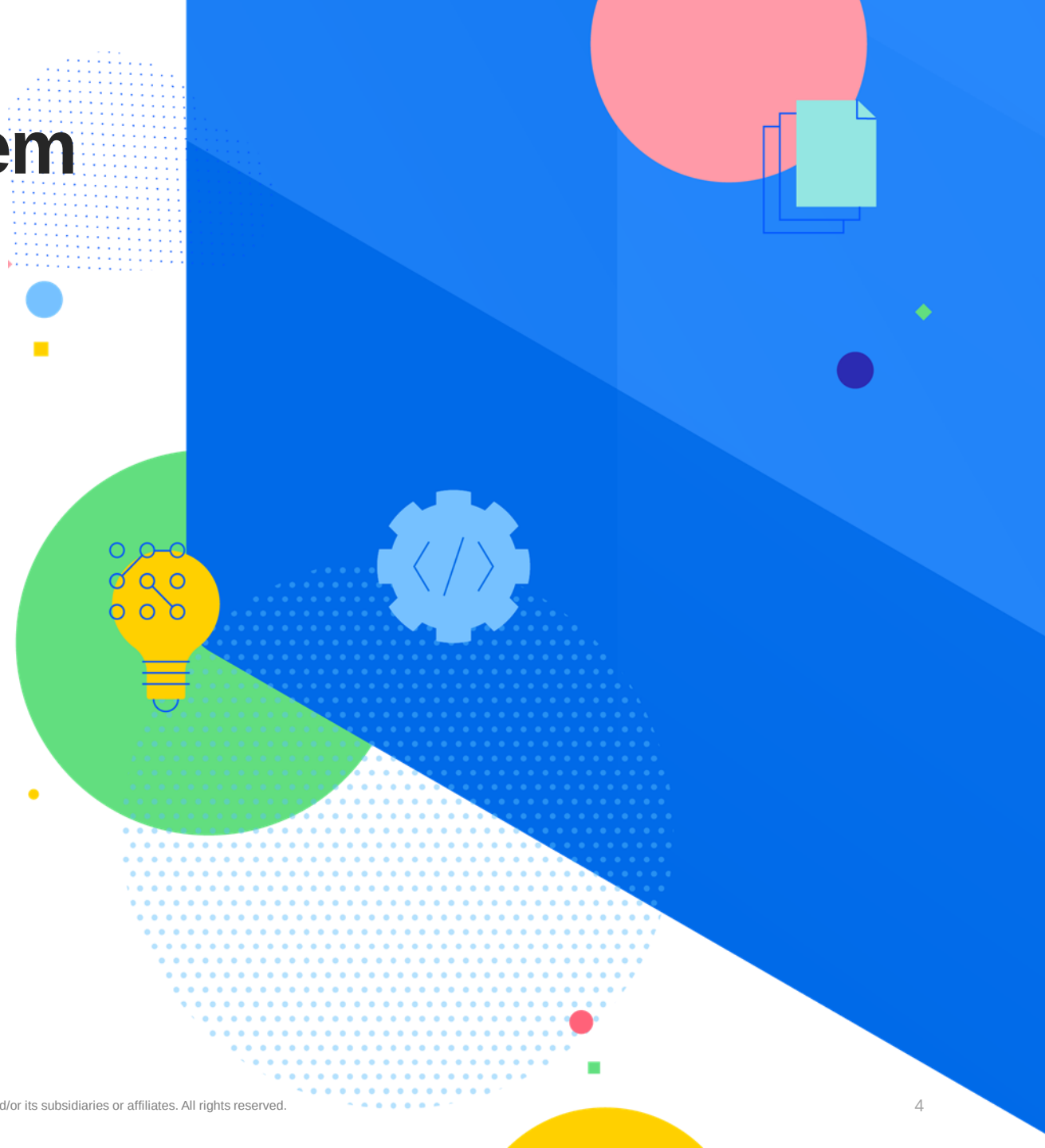
- Understanding ABL Memory Use
- Memory Profiler Overview
- Demo
- Architecture and Configuration
- Memory Profiler Product Vision
- Next Steps
- Questions

Understanding the Problem

- “Resolving performance-related problems in ABL applications is very difficult, especially when it comes to memory consumption.”

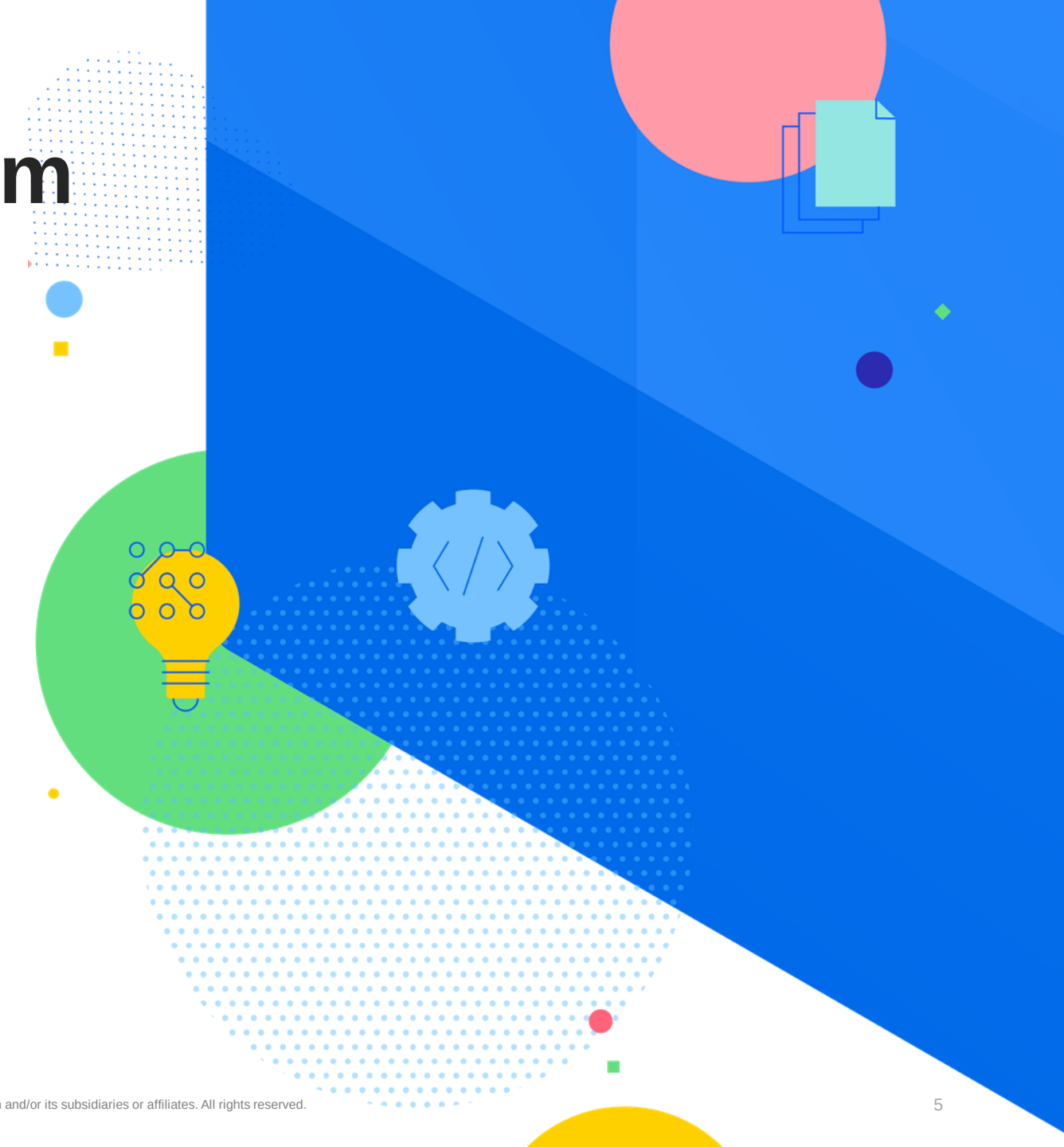
- **How do we know that?**

- Analysis of technical support tickets related to resource consumption
- Community interactions
- We have performance profiling capability, but the CPU is only part of the problem



To Address the Problem

- Historically, OpenEdge added tools for Memory Use analysis of OpenEdge Apps
  - Dynamic Object Logging
  - PAS for OpenEdge, OE JMX
  - Pulse Monitoring Tool



Memory Use in an ABL App

Memory Use In An ABL App

Platform Memory

- Examples:
  - -Bt – Temp-table Buffer Pool
  - -s – Runtime Stack
  - -mmax – R-Code Memory
  - -D – Directory Entries
  - -reusableObjects – OO Cache
- Some Control by Startup Parameters

Application Memory

- .p Procedures
- OOABL Objects & .NET
- Built-in OO Objects
- Database Connections
- Dynamic Temp-tables, Buffers, Datasets, Queries, etc.
- Dynamic UI Widgets
- Memptrs, Longchars
- Servers, Sockets, Async Objects,…

The Unanswered Questions About Memory

- **Where is my Application Leaking Memory?**
- **Where is all the Memory going? In other words,…**
  - What got allocated?
  - Where was it allocated?
  - When was it allocated?
  - How big is it?

For all of this, you need Data…Lots of Data

What Data Is Needed?

For *Every Single* Application Object your App Creates…

- .p Procedures
- OOABL Objects & .NET
- Database Connections
- Dynamic Temp-tables, Buffers, Datasets, Queries, etc.

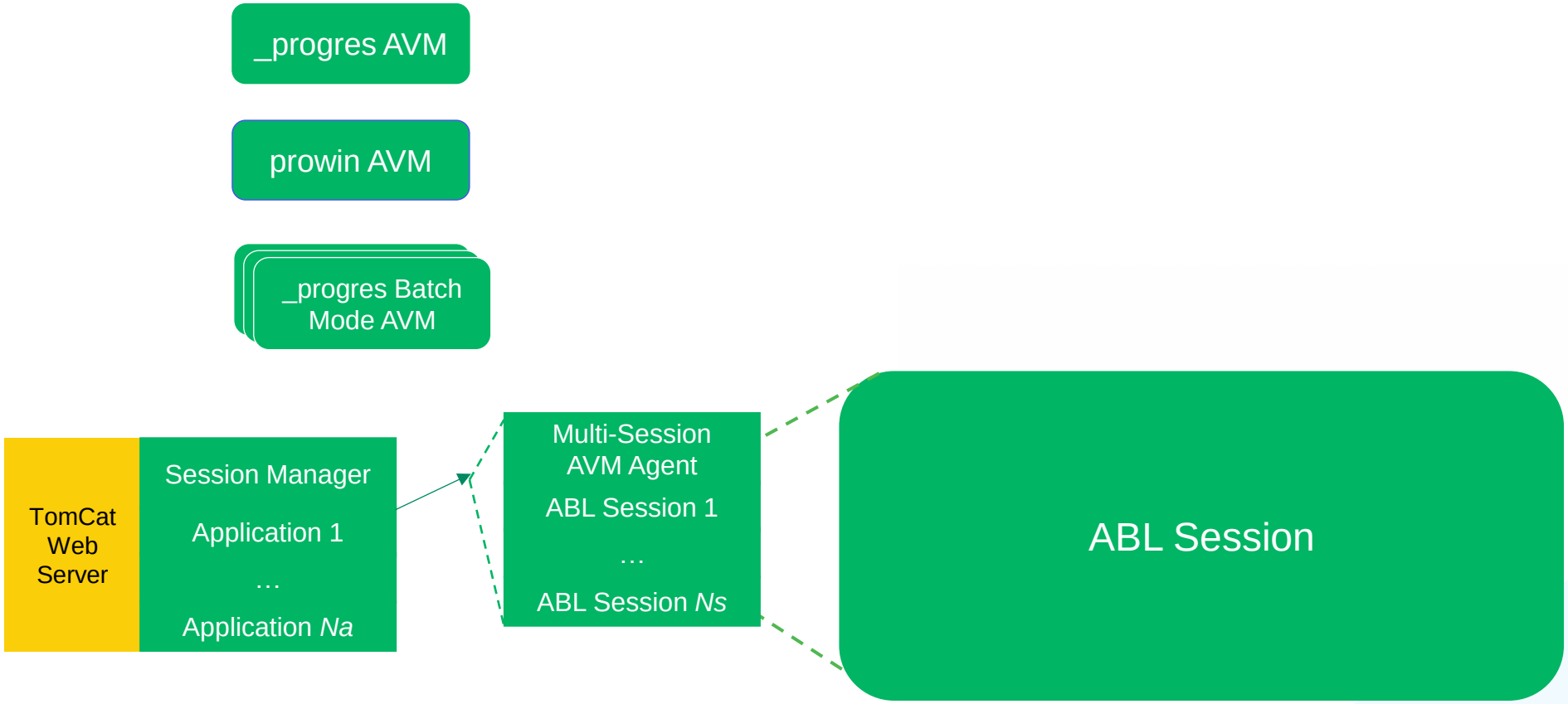
The AVM needs to collect what Objects are Alive at any time, and…

- What each Object is (its name, type)
- How much memory it’s using
- When it was created
- Where it was created (Call-Stack)
- Where the Object is Scoped (if it is scoped)

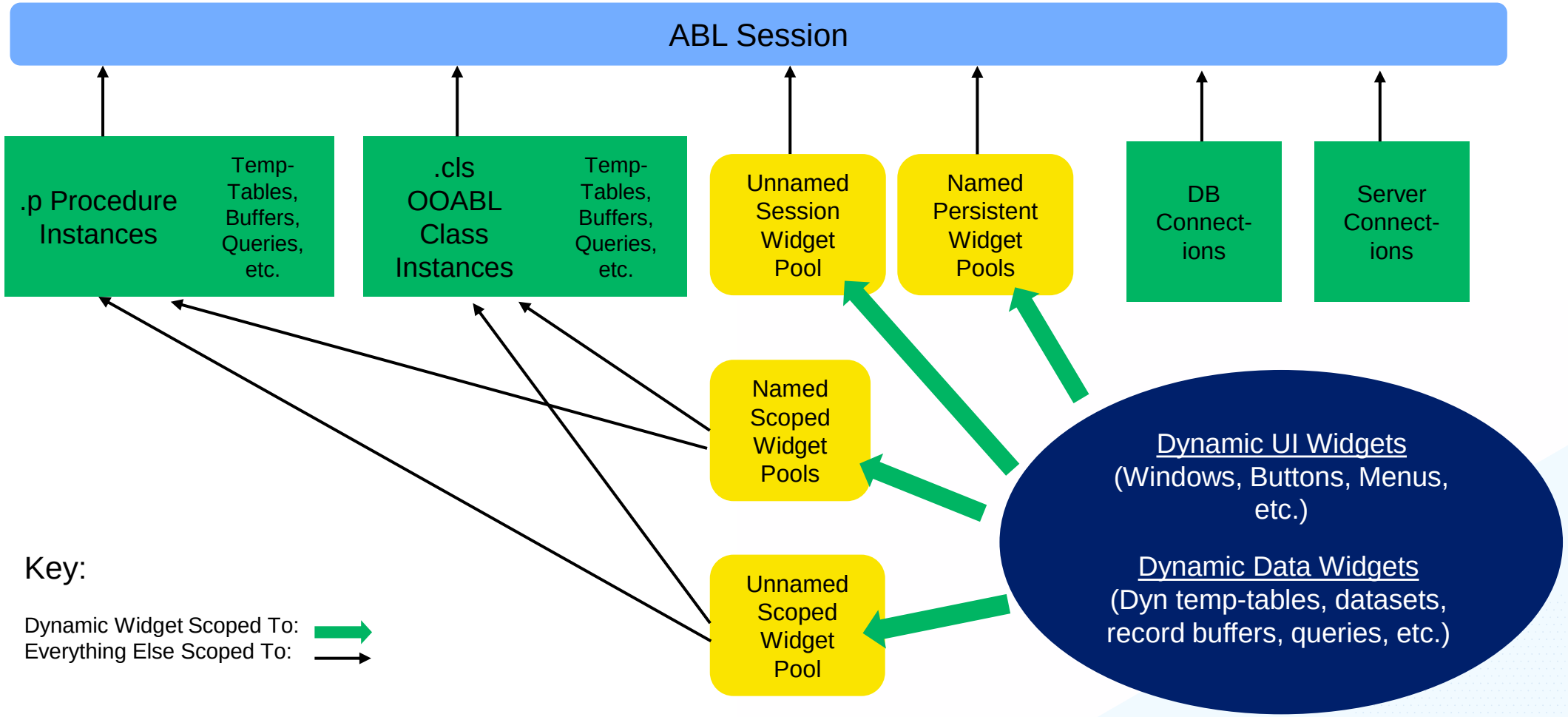
Memory Profiling Overview

ABL Memory Profiling Overview

OpenEdge AVM Processes

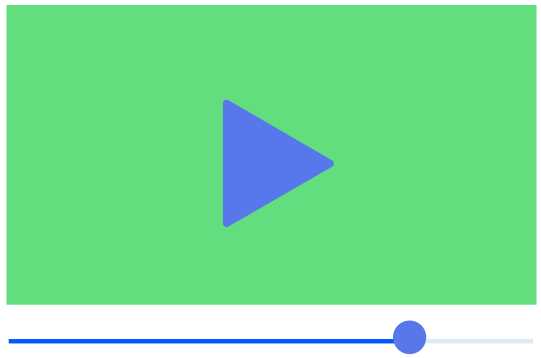


Types of Application Objects and Their Scope

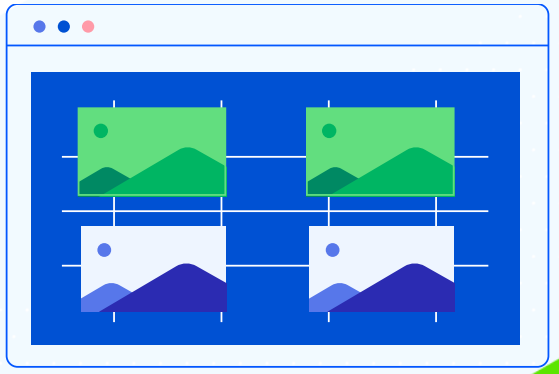


Memory Use In Your App Changes Over Time…Your Memory Profile Is Time Series Data

A Stream of Data Telling the Story of the App's Allocations and Deallocations



A Series of Snapshots at Regular Time Intervals



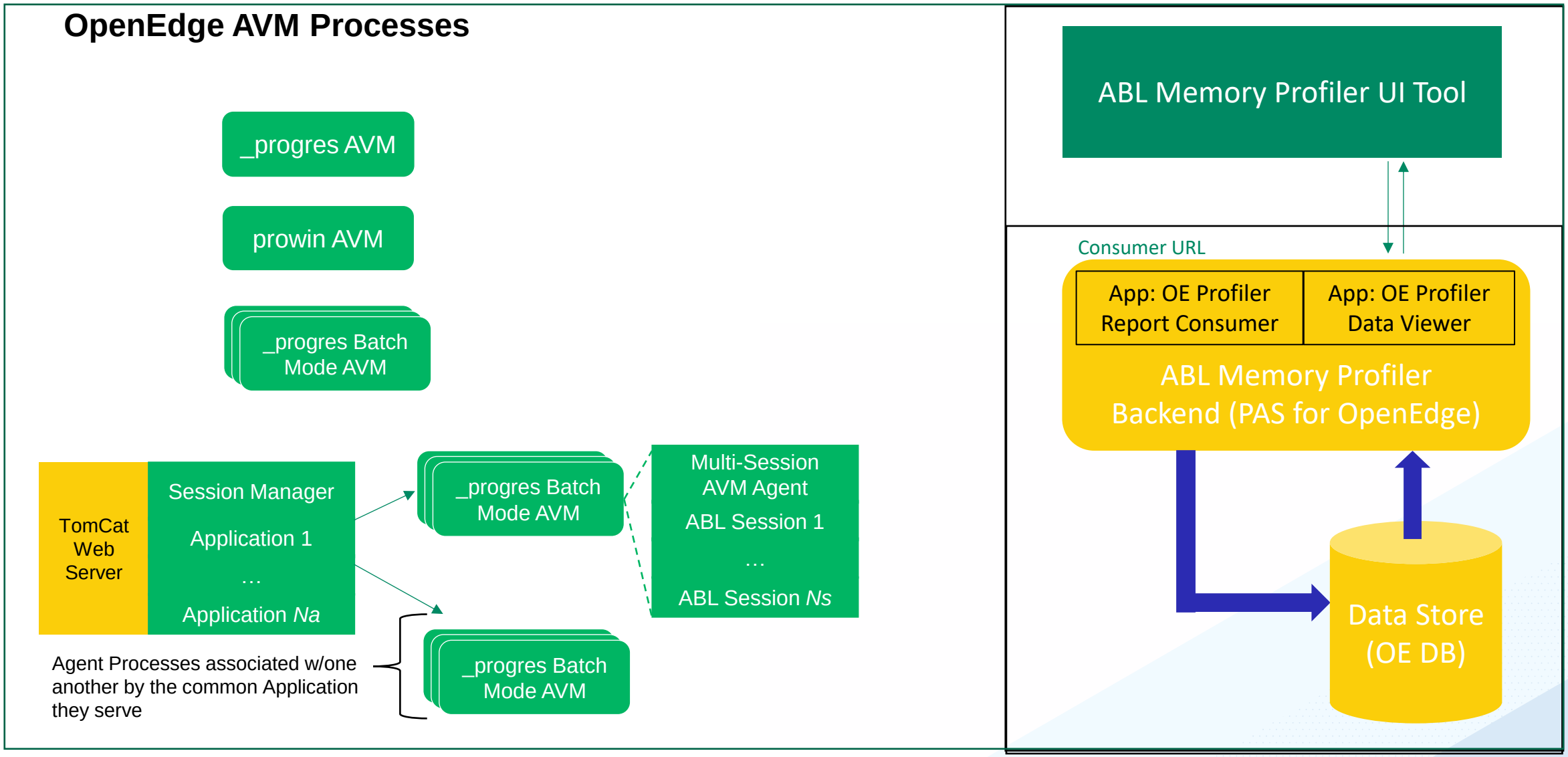
Memory Profiling Configuration

- Startup parameter
- Configuration file
- Language extension
- Snapshot File

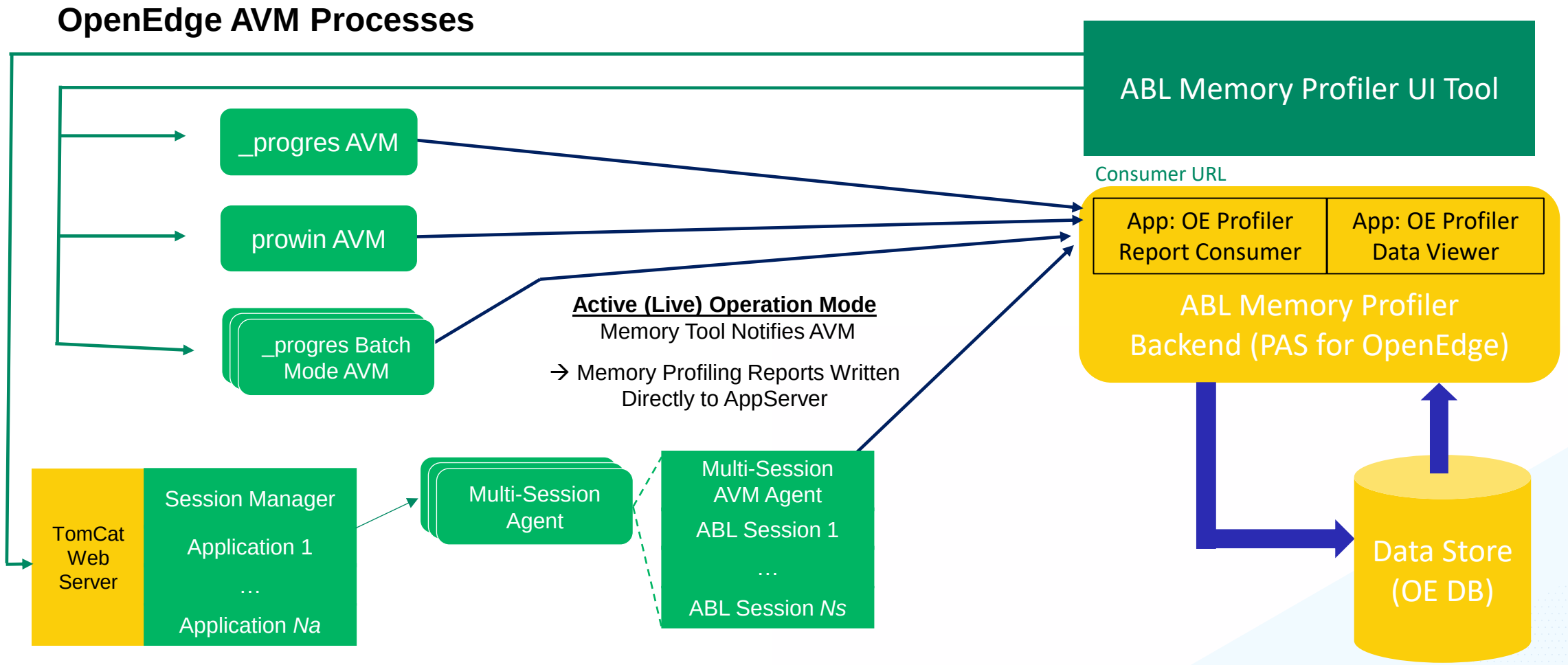
Demo

Architecture

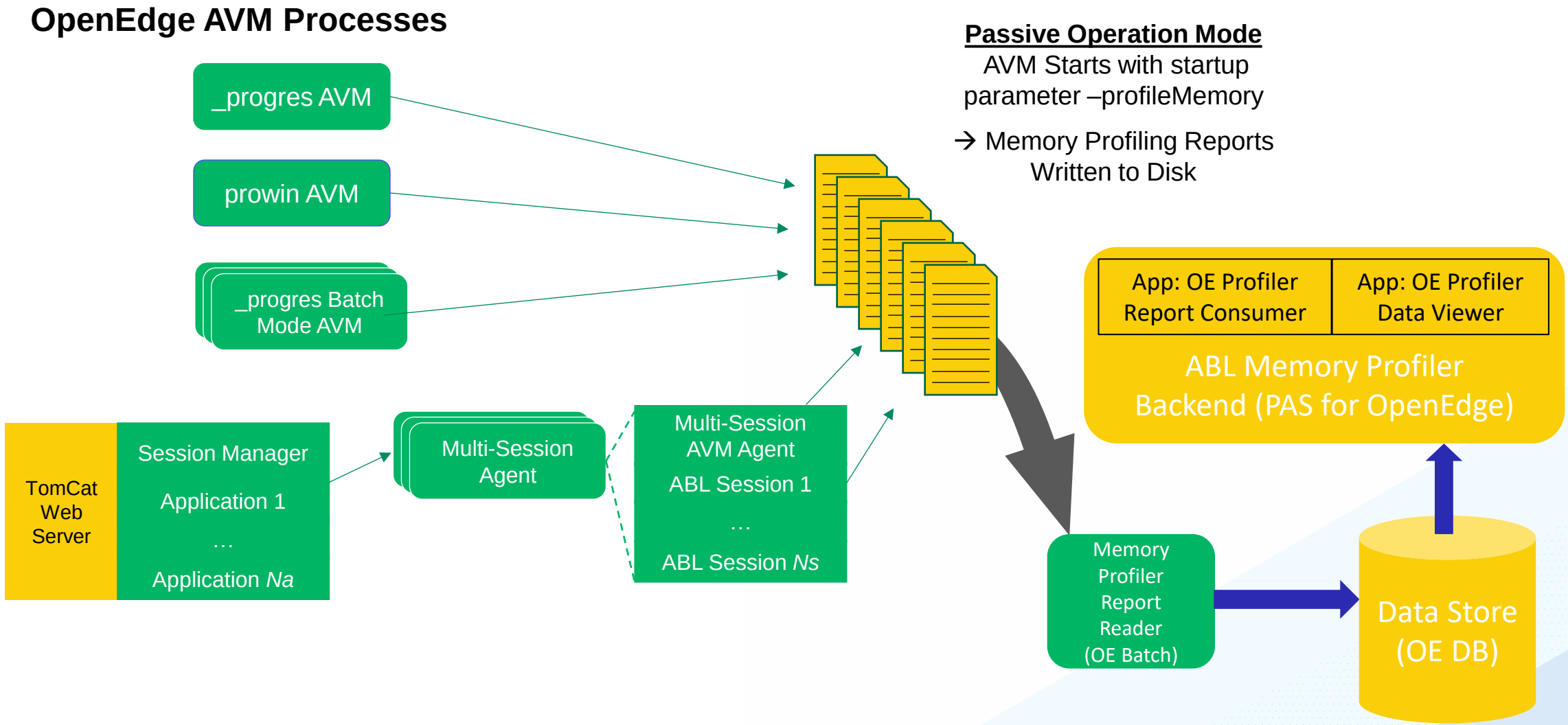
ABL Memory Profiling Architecture



ABL Memory Profiling Architecture



ABL Memory Profiling Architecture



Memory Profiler Tool Product Vision

Profiler Product Vision

Purpose

- Identify memory leaks
- Benchmarking
- Review application architecture

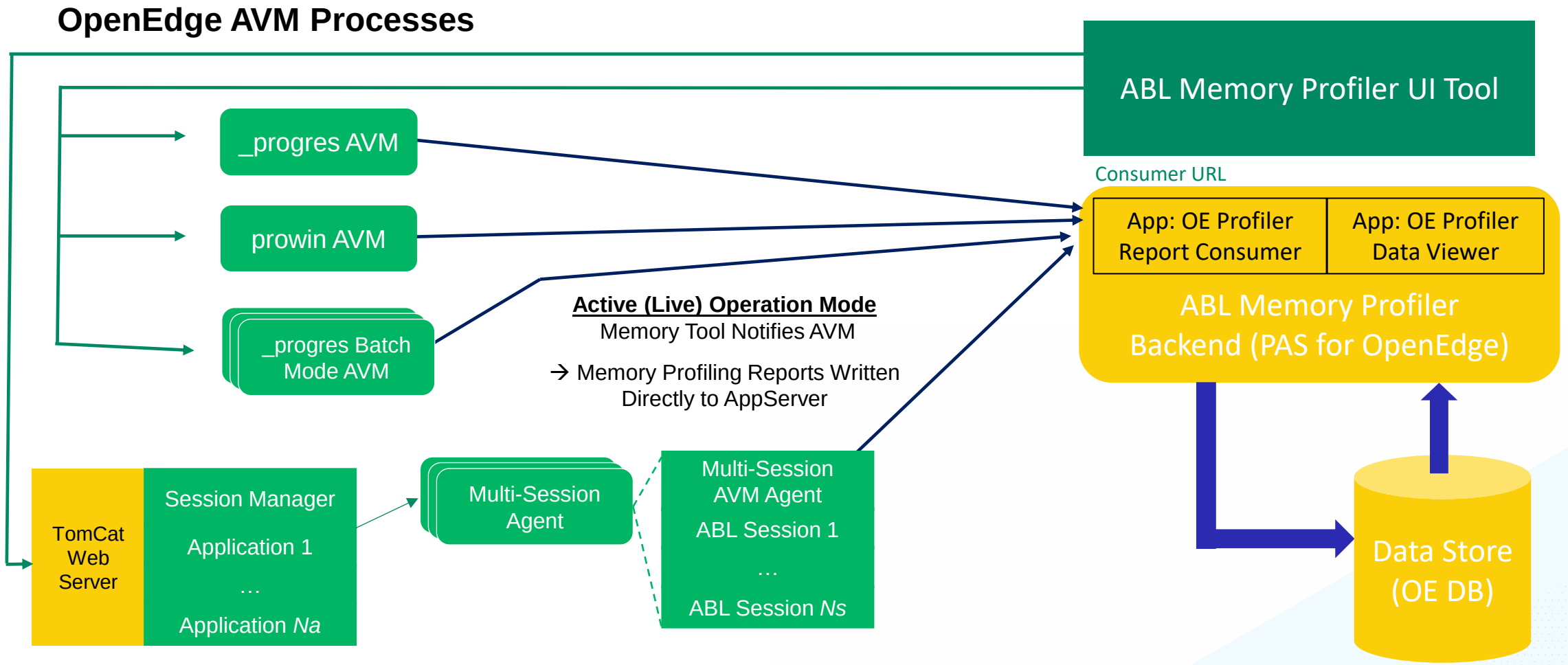
Persona

- Developer

Scope

- Development
- Production (recording only)

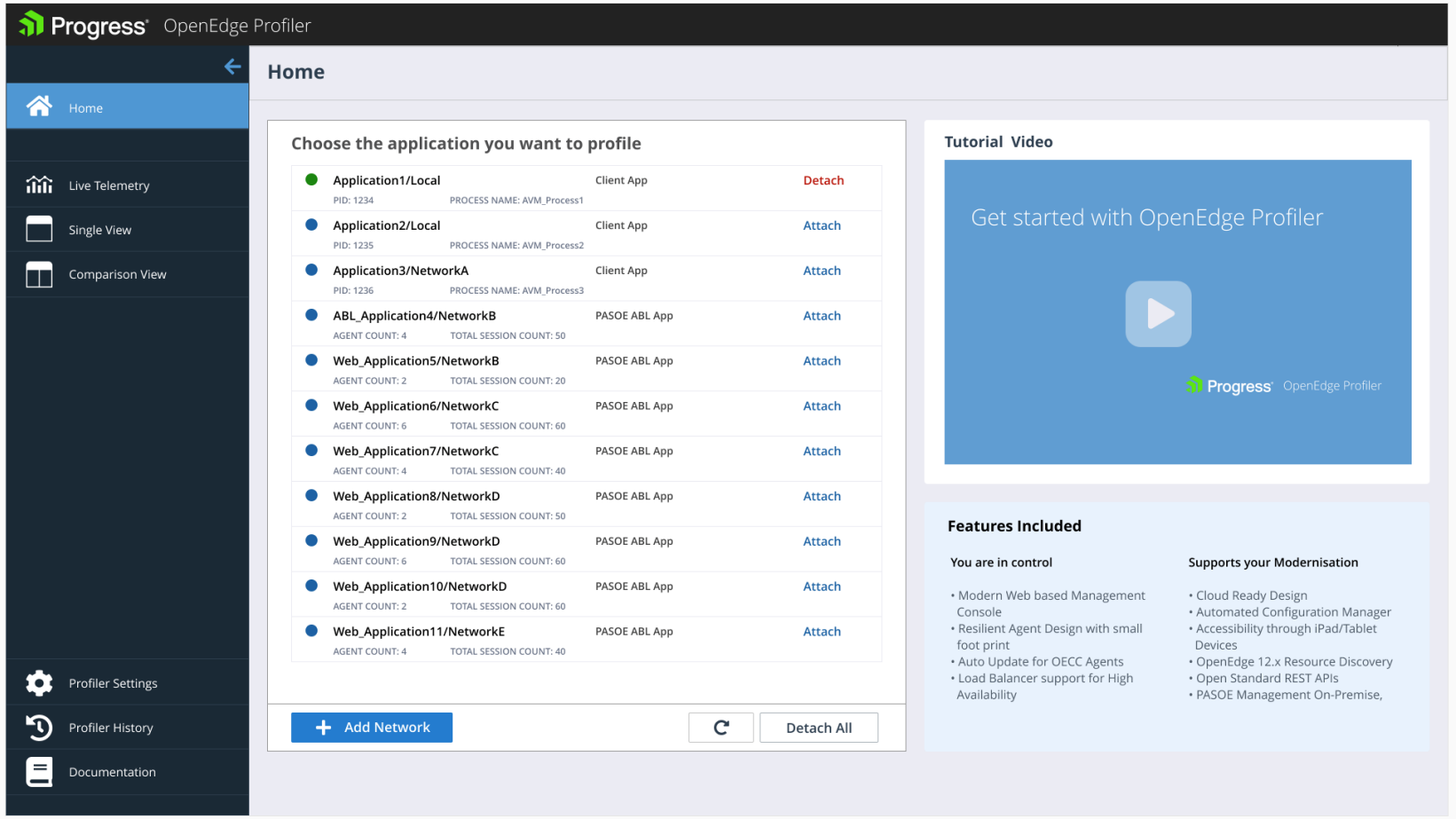
ABL Memory Profiling Architecture



Profiler Product Vision

Ways to Profile

- Attach to a PAS for OpenEdge ABL App or a standalone AVM for live profiling
- Start/Stop profiling through CLI or ABL code
- Import a profiling session stored to disk

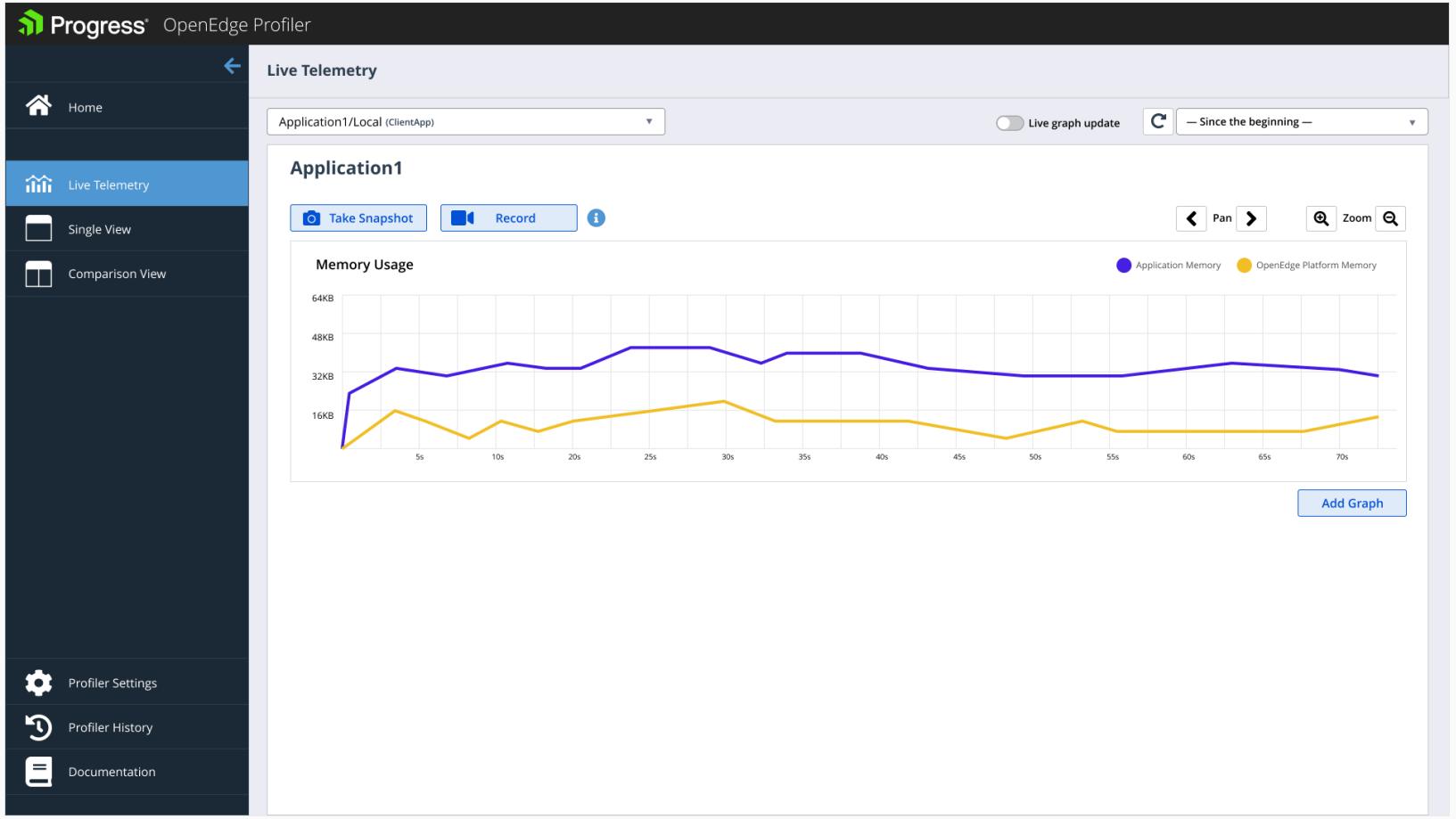


Profiler Product Vision

Connect Only (Live)

Once connected to an application, you can see some basic graphs showing the live memory allocations

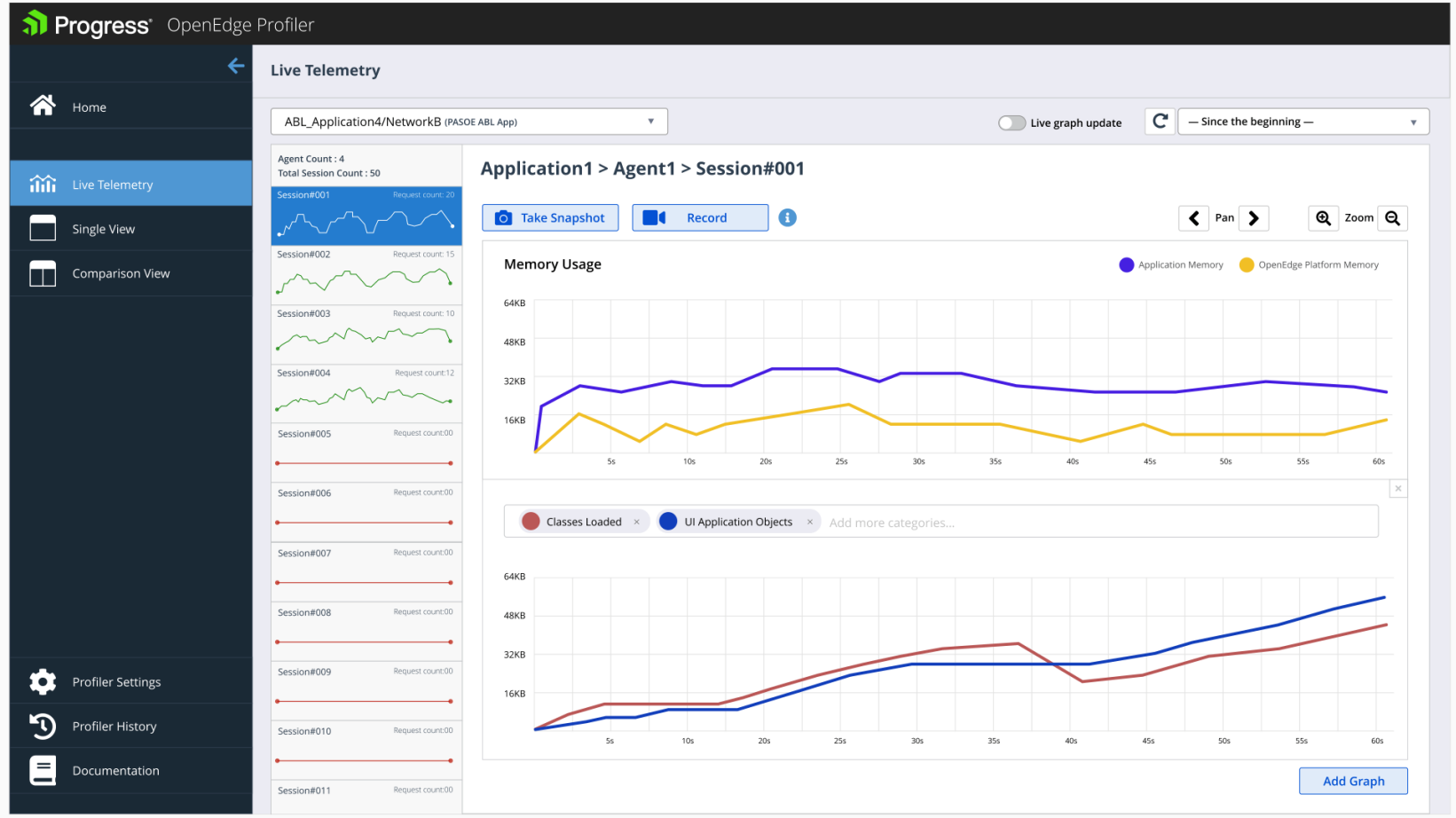
- Here you can see the memory occupied by a standalone ABL client over time, divided into application and platform memory



Profiler Product Vision

Connect Only (Live)

- Here you can see the memory occupied over time by a session of a PAS for OpenEdge ABL app
- Another graph added to the dashboard has only some filtered elements of ABL application

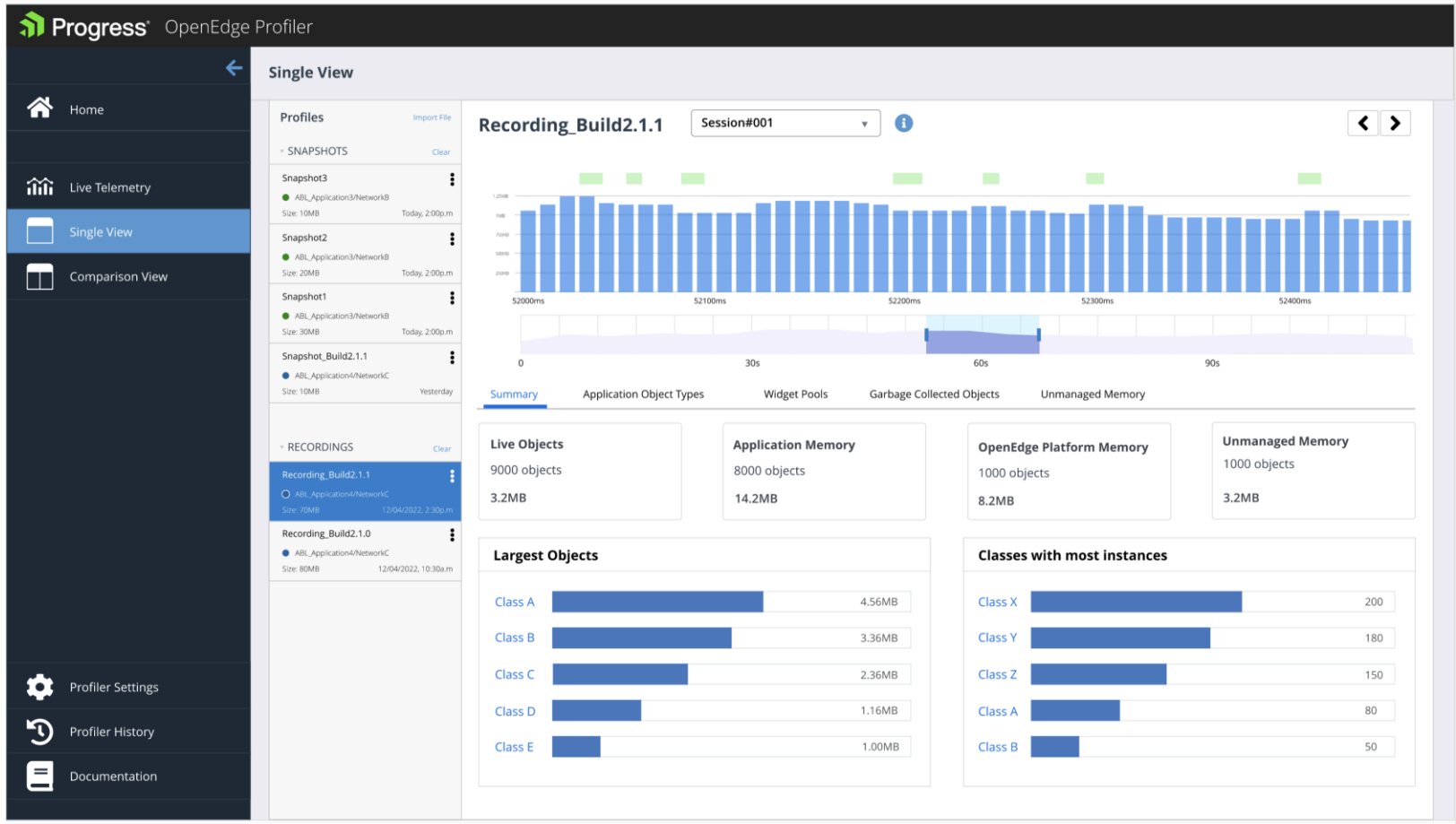


Profiler Product Vision

Summary View

Recordings will have a summary view to provide an overview

- Here you can see the summary of memory allocation for a window of time frame selected in a recording

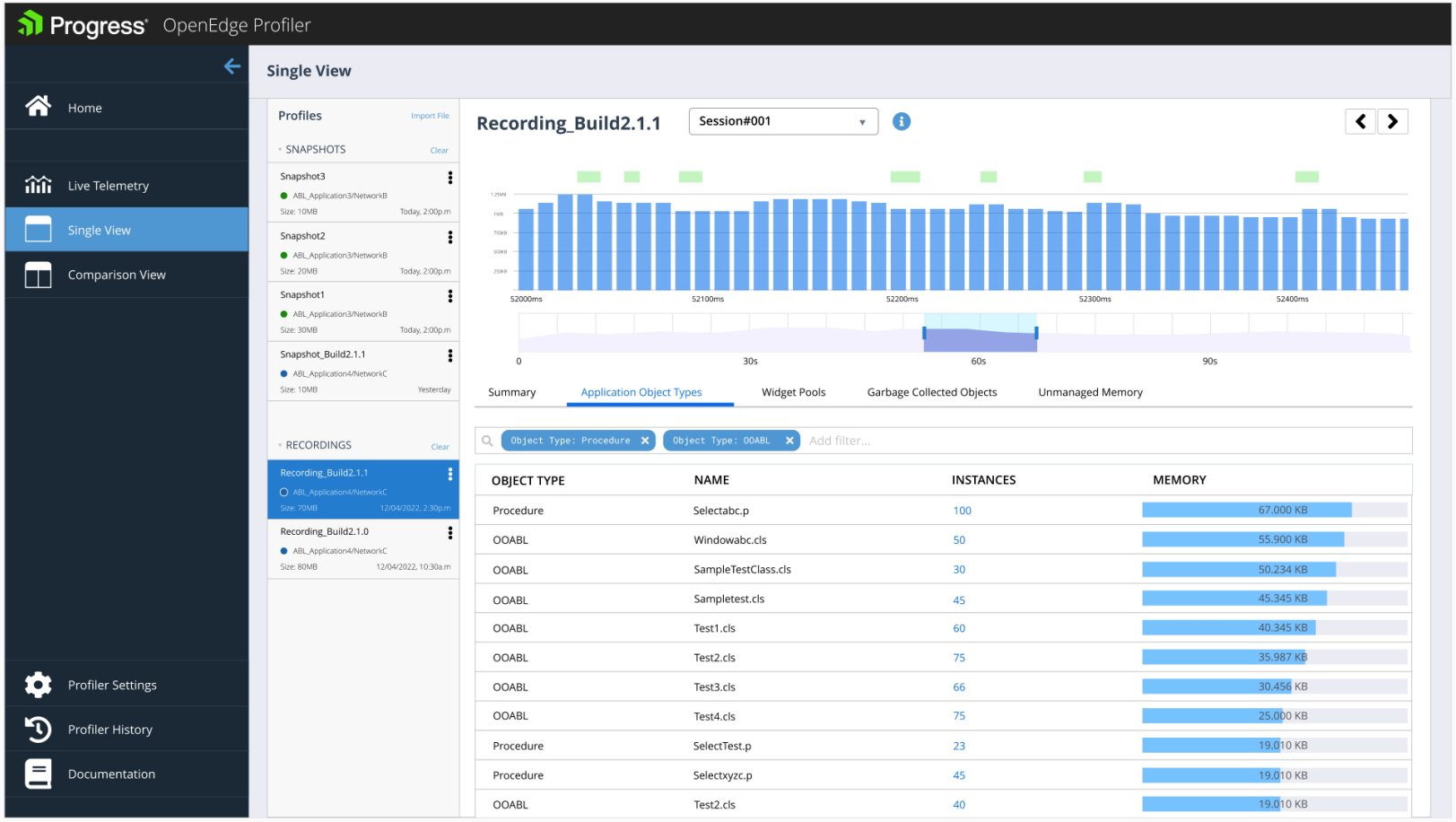


Profiler Product Vision

Recordings

View of the Application Object Types at this time in the recording

- Here you can see a window of time interval selected for a recording. The view below shows the memory allocation for the filtered ABL types within that time interval.

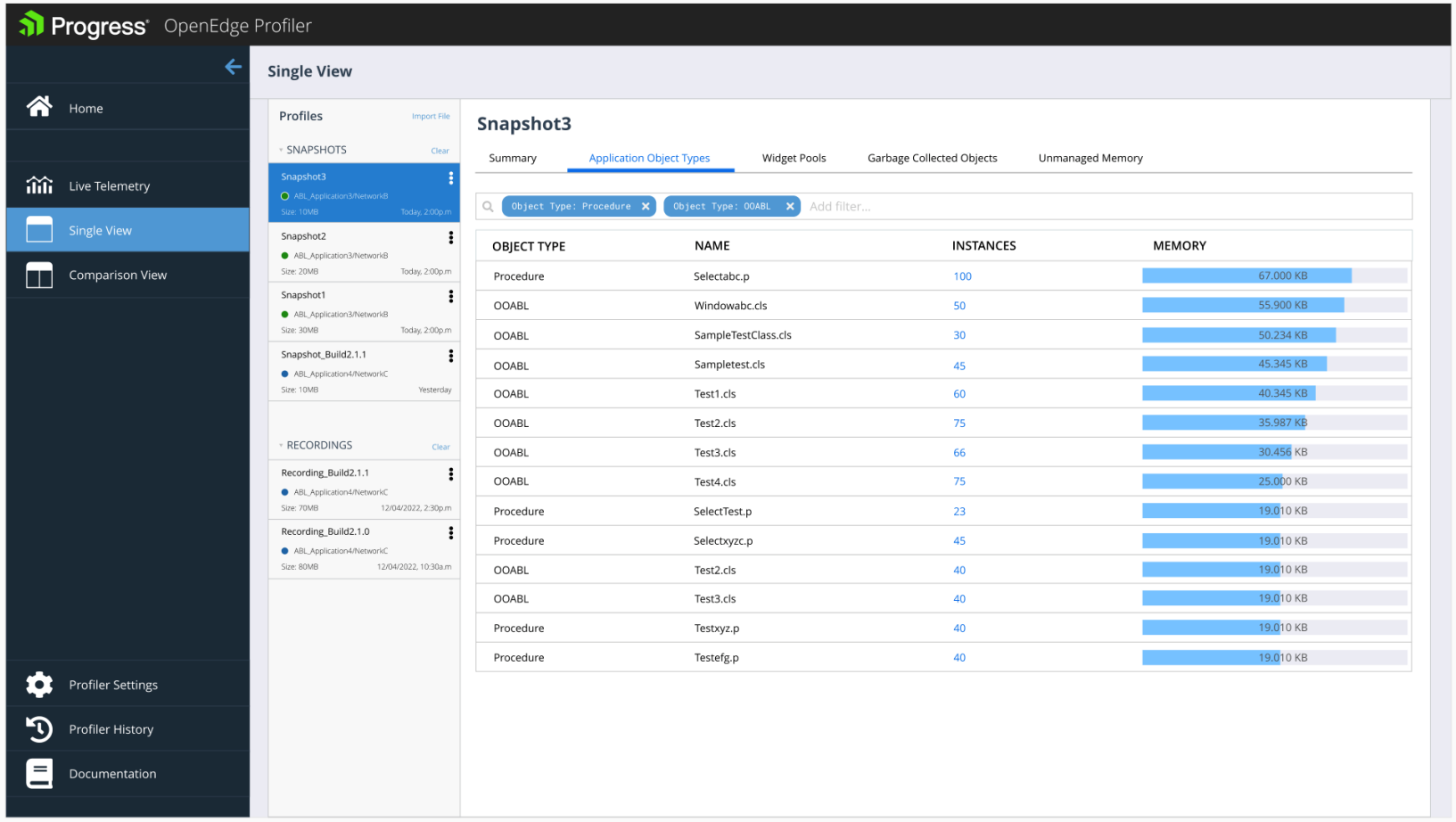


Profiler Product Vision

Snapshots

Snapshots are like a picture that captures the memory allocation at a moment in time

- Here you can see some filtered list of ABL types sorted by memory in a snapshot

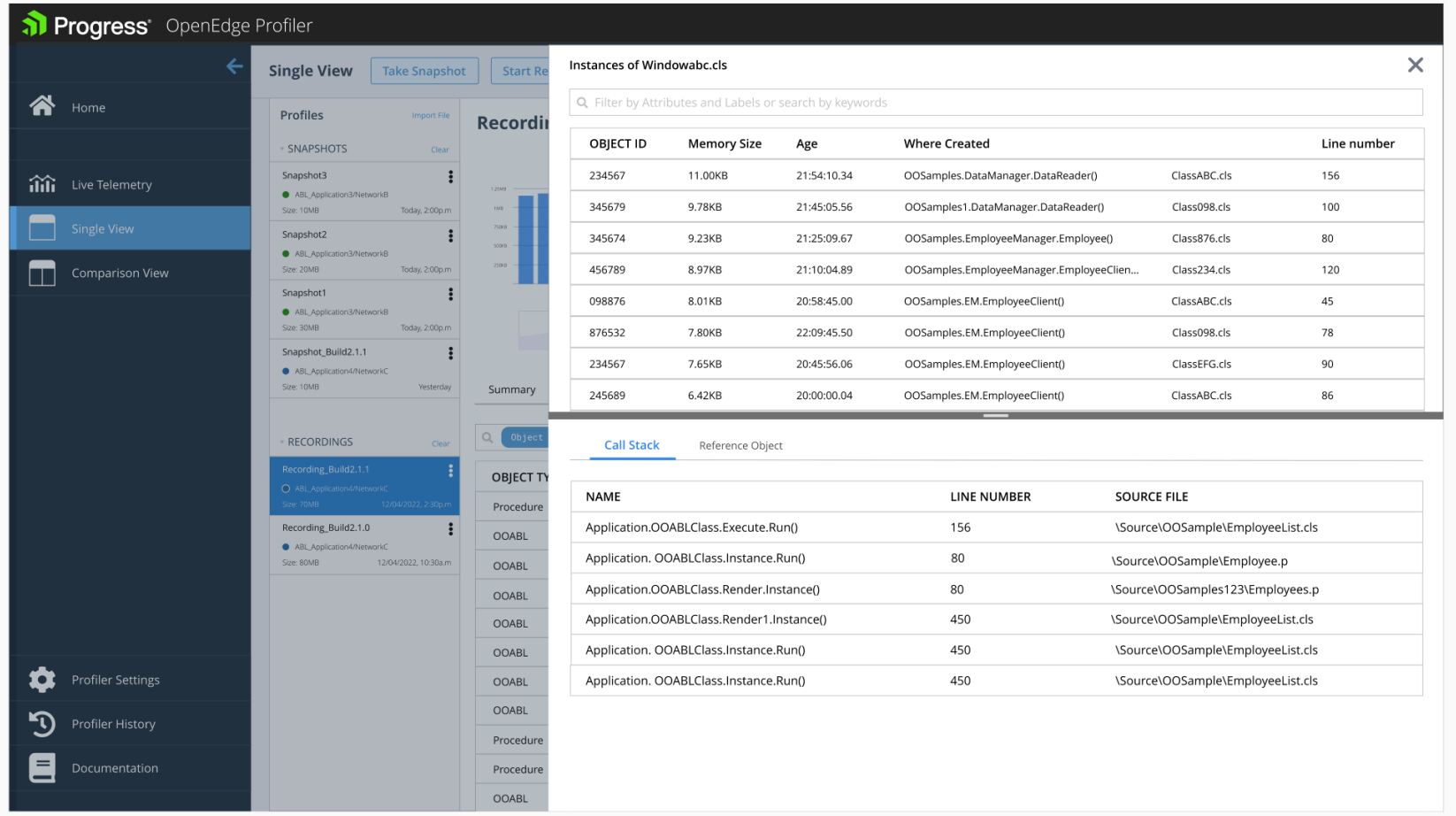


Profiler Product Vision

Drill Down Further

For any particular ABL type you can drill down to get more information on it

- Here you can see an interactive view that opens when clicking on the instances to show details of the instances. For every instance you can view its Call-Stack

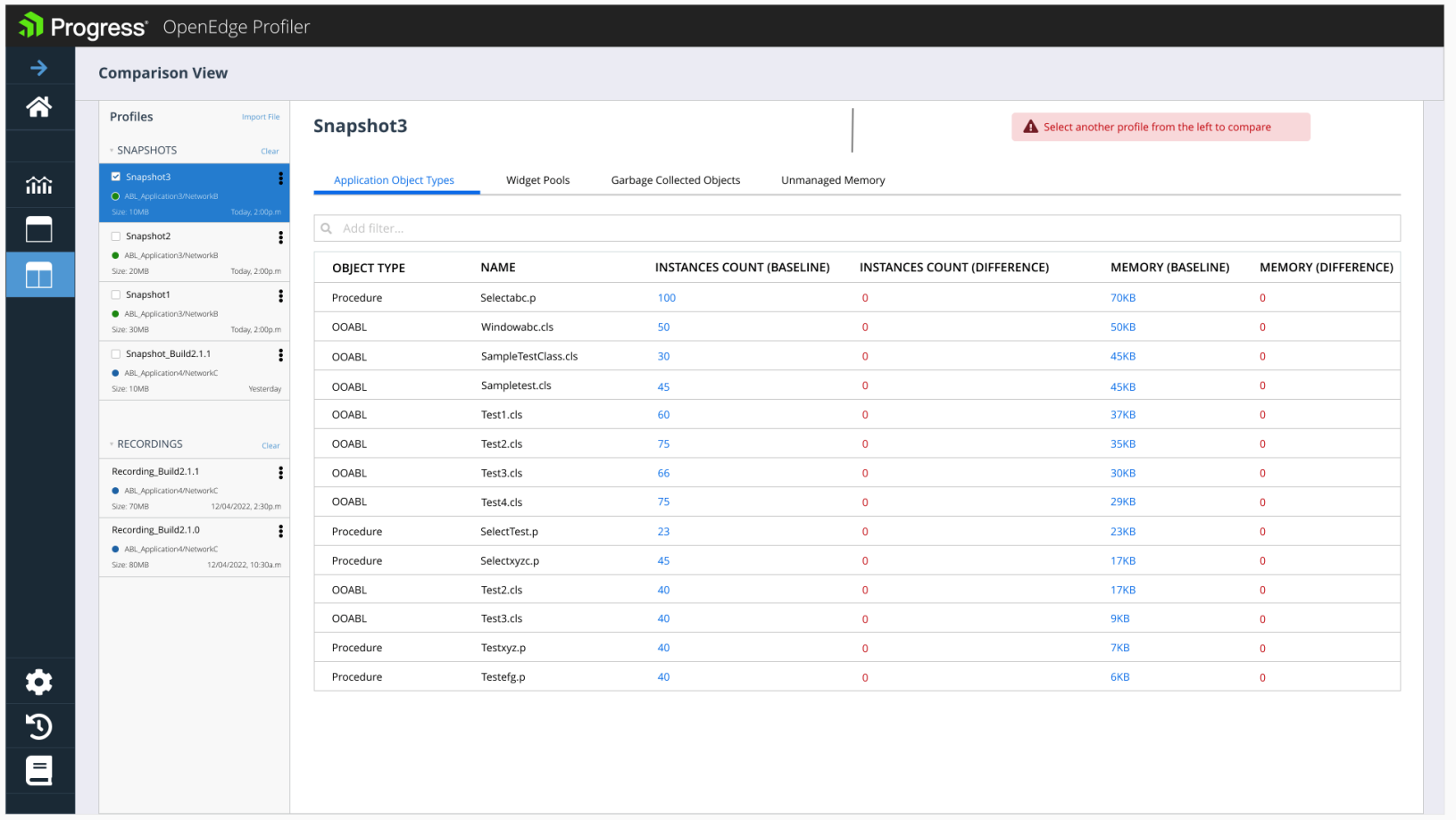


Profiler Product Vision

Compare Snapshots

Compare snapshots taken at different times

- From a list of available snapshots, you can select any two for comparison and inspect the differences



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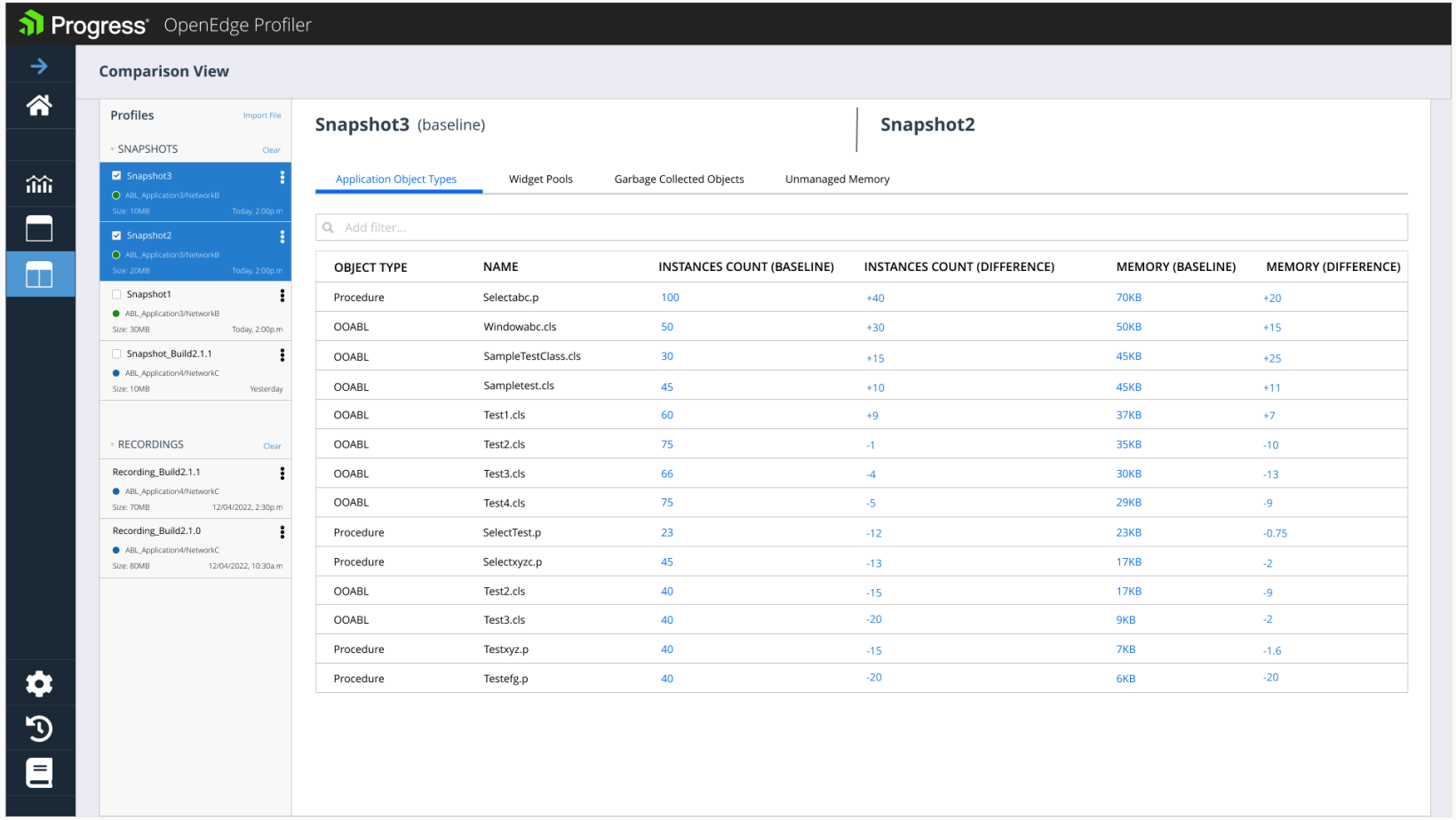
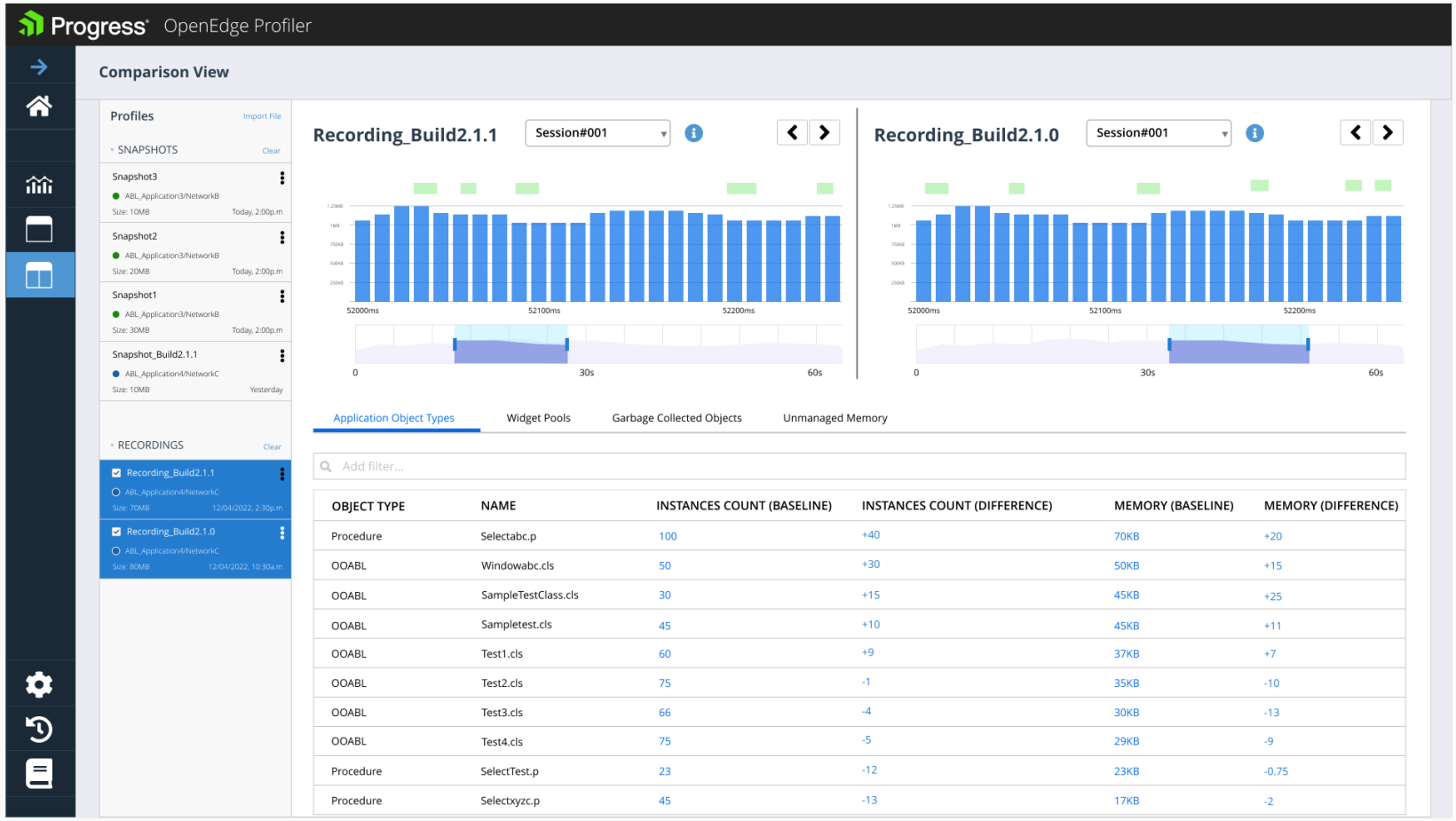


Profiler Product Vision

Compare Recordings

Compare part of recordings taken at different times

- From a list of available recordings, you can select the range of time for any two to compare and inspect the differences



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Questions
(and a few FAQs)

Questions? (And a few FAQs)

Q. Will the memory profiler work with any OpenEdge release?

A. No. It will only work starting with the release the capability is offered in.

Q. What is the overhead of using the memory profiler?

A. With what is built out so far, we found the overhead to be less than 9% CPU overhead and 7% memory overhead.

Q. Will the profiler tool also have CPU profiling capability?

A. Yes, we intend to include CPU profiling but not in the initial release.

Q. Will the format of the memory profiling data be available publicly?

A. Yes

Questions? (And a few FAQs)

Q. Will the memory profiler also profile memory allocations of the .NET ABL objects?

A. We will try to do this, but no promises. The AVM can monitor memory use by .NET, but it can’t track it in the same way.

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