Lesson 7 - Understanding performance tuning: Key takeaways

- Performance core concepts you've learned in those lessons:
  - Database Time (DB Time): sum of non idle time spent by foreground sessions
  - Average Active Sessions (AAS): number of active session, on average. An active session is a session consuming CPU or waiting for non idle wait events, like I/O.
  - During an interval of time, AAS is computed as (DB Time/Elapsed time). Elapsed time is also called "**Wall Clock Time**".
    - That's why another interpretation of AAS is "*a normalization of the DB Time, by seconds*". If during an interval of time DB Time has been measured to be 15.3 s per second, then AAS=15.3 during this interval of time.
  - DB Time = Service Time + Wait Time, Service Time being the time spent on CPU, Wait time being the time spent waiting (for example waiting for I/O calls to complete).
  - Tuning database performance is about reducing the DB Time measured during an interval of time, usually when the database is busy.
  - DB Time distribution will vary depending on the load profile of your database. Typically, on an OLTP database (short fast transactions), we expect the DB Time distribution to be around 90% CPU – 10% Wait. On a Data Warehouse, we are more likely to see something like 60% CPU – 40% Wait, as huge analytic queries usually wait on disk.

- Performance tuning methodology: the 7 steps iteration

1. Identify performance issue: usually detected by end users, for example when performance SLA are not met.
2. Scope the issue: problem might not be in the database. Review application servers, network possible issues, if the database machine is CPU bound, etc ...
3. Set goals: **goals must be defined by business**.
4. Data capture: provided out of the box by database **instrumentation**.
5. Investigate DB Time distribution: attack the component (**Service Time or Wait Time**) that offers the biggest potential improvement.
6. Modify system to tune for largest gain: **one fix at a time**.
7. Evaluate against goals: **stop if goals are met, go to step 5 if not**.

Keep in mind that performance tuning might be **expensive** (Consultancy, new hardware acquisition, ...), hence must be delimited by measurable goals. *Tuning forever will generate infinite costs*.