Performance Optimization

By: Mosh Hamedani

Rules of thumb

- Do not sacrifice the maintainability of your code to premature optimization.
- Be realistic and think like an “engineer”.
- Be pragmatic and ensure your efforts have observable results and give value.

And remember: **premature optimization is the root of all evils.**

Database tier

Schema

- Every table must have a primary key.
- Tables should have relationships.
- Put indexes on columns where you filter records on. But remember: too many indexes can have an adverse impact on the performance.
- Avoid Entity-Attribute-Value (EAV) pattern.

Queries

- Keep an eye on EF queries using Glimpse. If a query is slow, use a stored procedure.
- Use Execution Plan in SQL Server to find performance bottlenecks in your queries.

If after all your optimizations, you still have slow queries, consider creating a denormalised “read” database for your queries. But remember, this comes with the cost of maintaining two databases in sync. A simpler approach is to use caching.

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Application tier

- On pages where you have costly queries on data that doesn't change frequently, use **OutputCache** to cache the rendered HTML.

- You can also store the results of the query in cache (using **MemoryCache**), but use this approach only in actions that are used for displaying data, not modifying it.

- Async does not improve performance. It improves scalability given that you're not using a single instance of SQL Server on the back-end. You should be using a SQL cluster, or a NoSQL database (eg MongoDB, RavenDB, etc) or SQL Azure.

- Disable session in **web.config**.

- Use release builds in production.

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Client Tier

- Put JS and CSS files in bundles.
- Put the script bundles near the end of the <body> element. Modernizr is an exception. It needs to be in the head.
- Return small, lightweight DTOs from your APIs.
- Render HTML markup on the client. That's the case with single page applications (SPA).
- Compress images.
- Use image sprites. This is beyond the scope of the course and you need to read about them yourself.
- Reduce the data you store in cookies because they're sent back and forth with every request.
- Use content delivery networks (CDN). Again, beyond the scope of the course. Implementations vary depending on where you host your application.