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Throughput on asynchronous server applications

A case study on CoAP.NET

Philip Wille
Supervisors: Michael Felderer, Andreas Danek

1. Programming paradigms
2. Synchronous and asynchronous server
3. Task-based Asynchronous Pattern (TAP)
4. Constrained Application Protocol (CoAP)
5. Bachelor thesis

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Synchronous server

Figure: Sequence diagram of synchronous server

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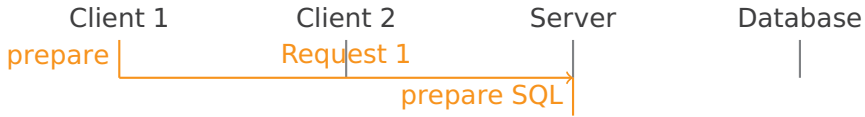

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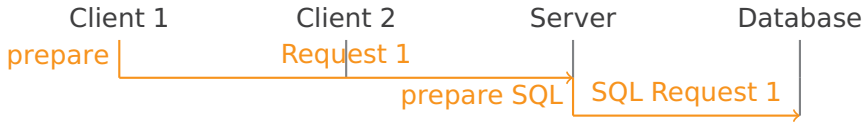

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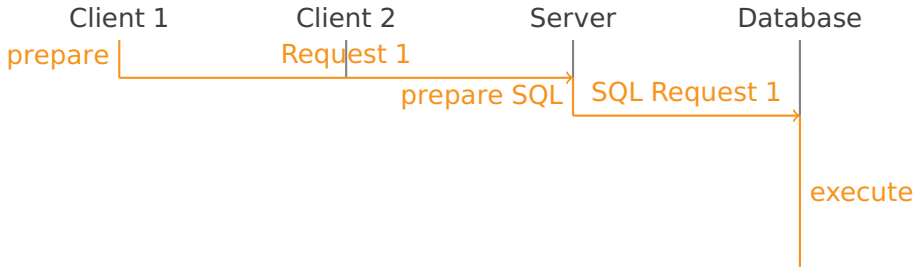

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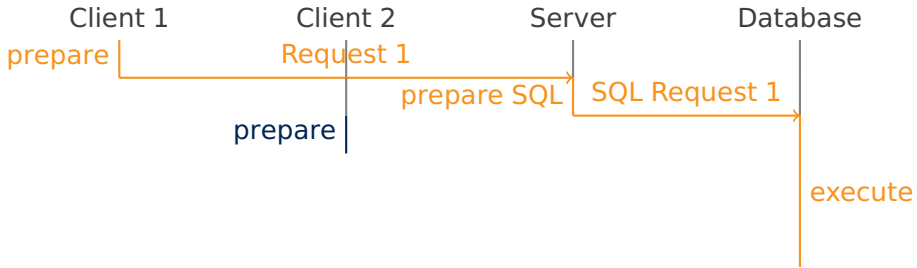

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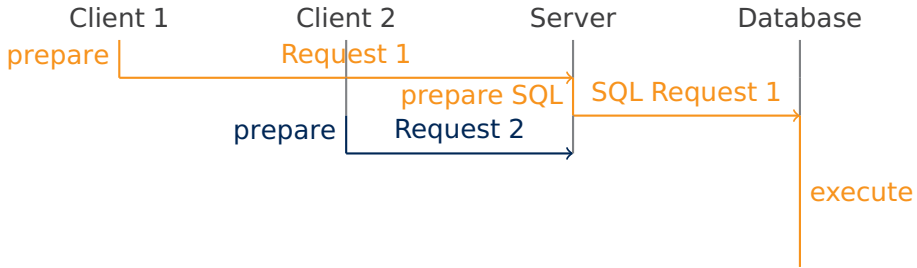

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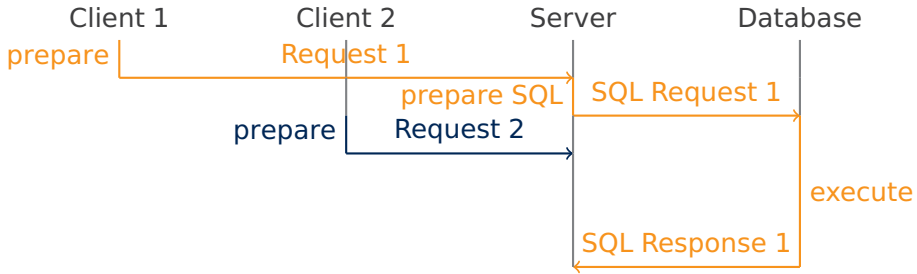

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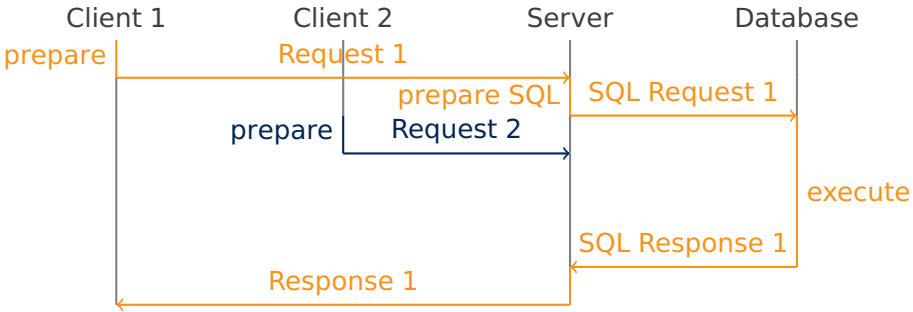

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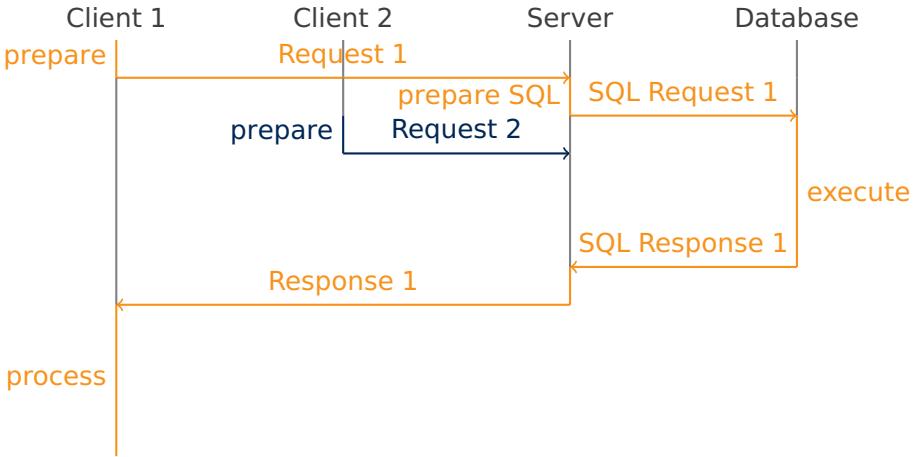

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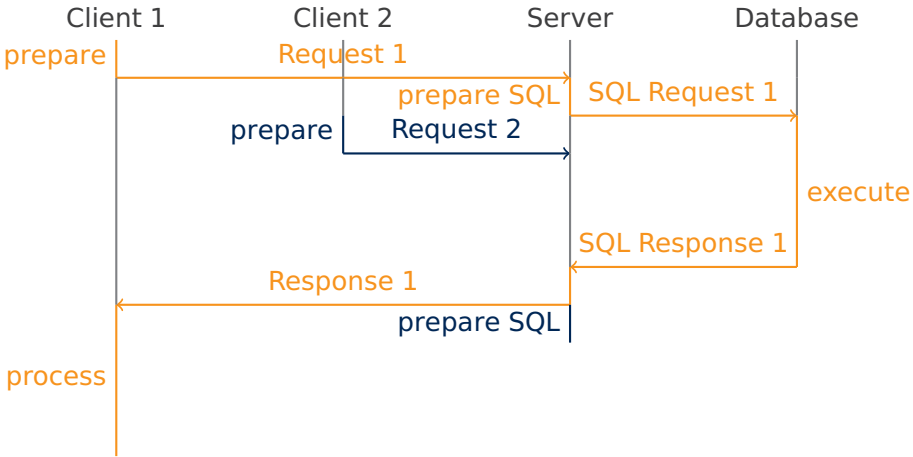

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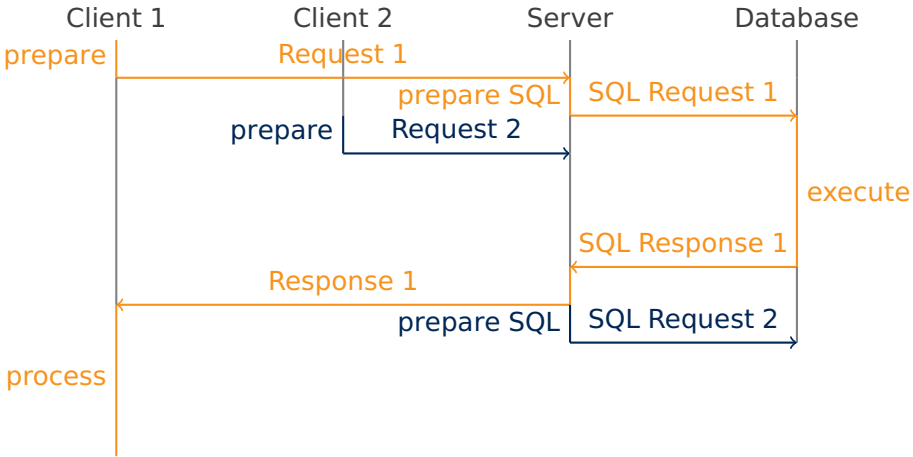

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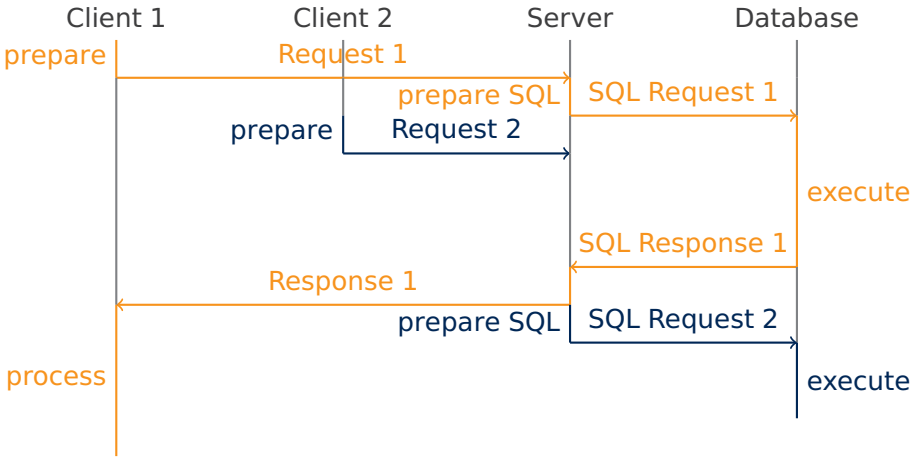

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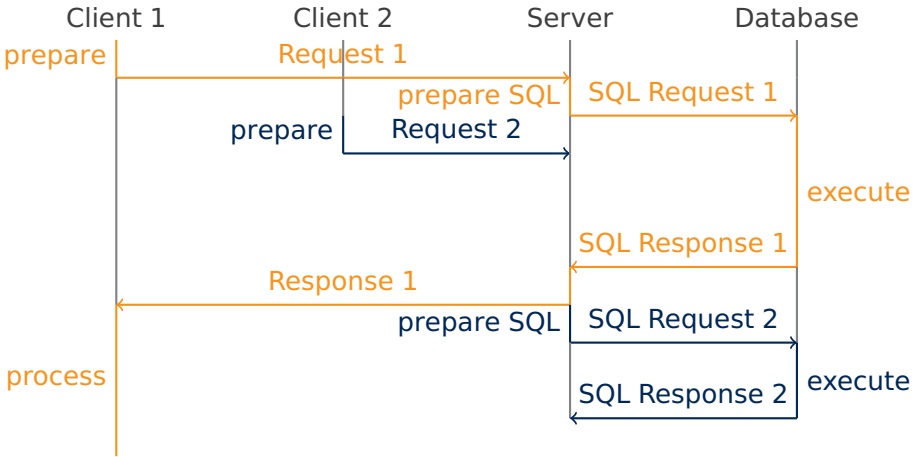

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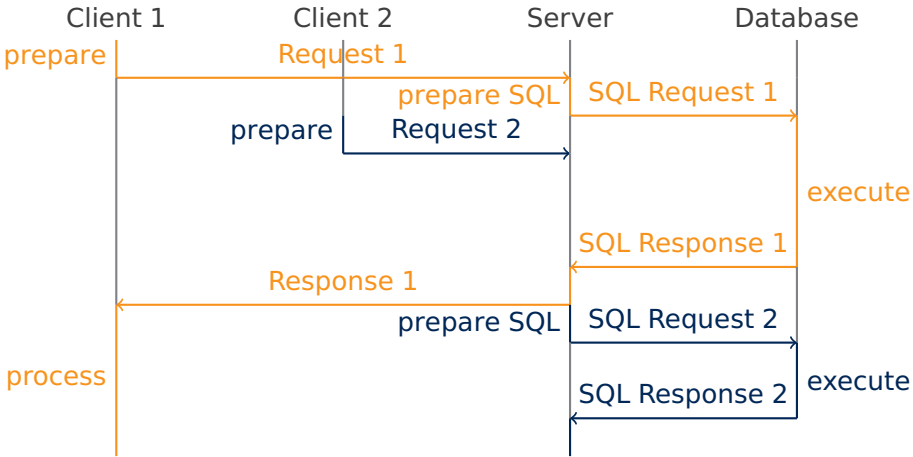

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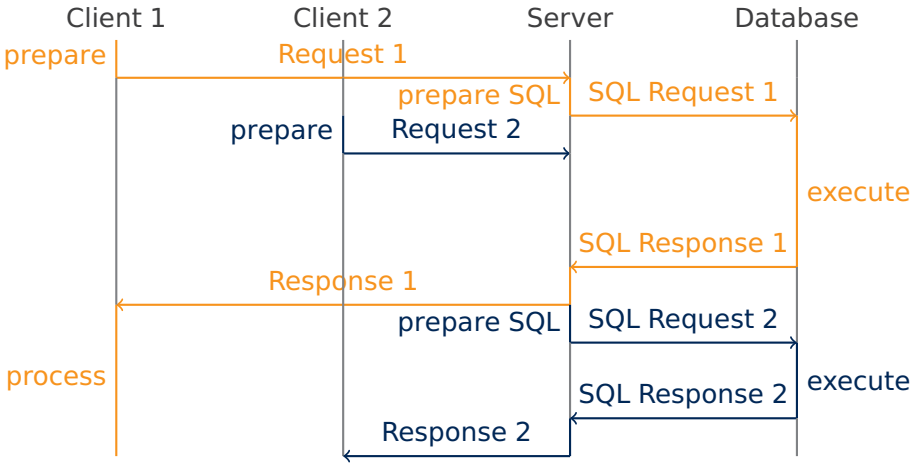

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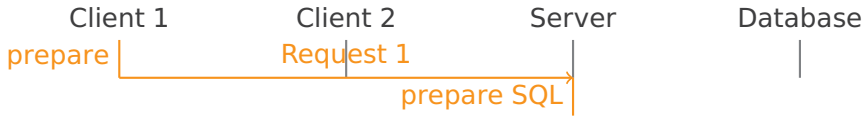

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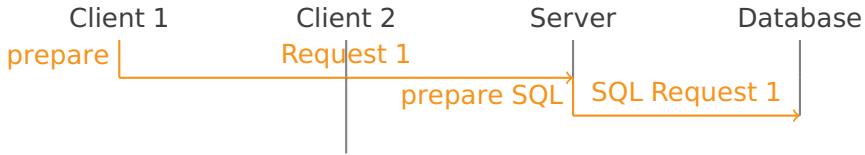

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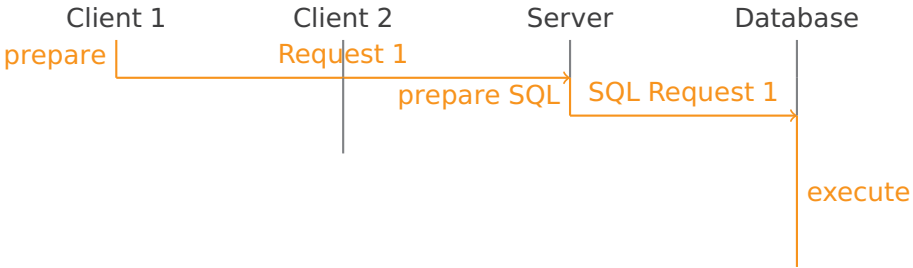

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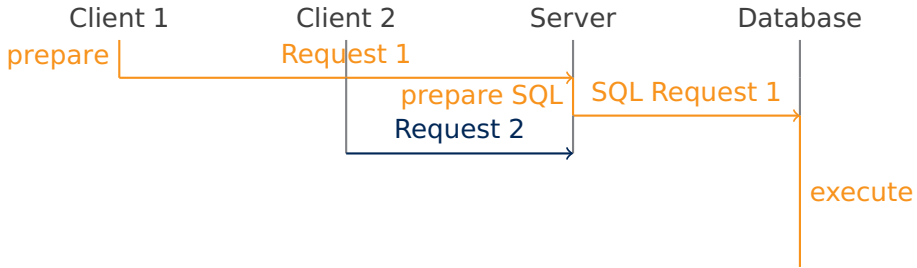

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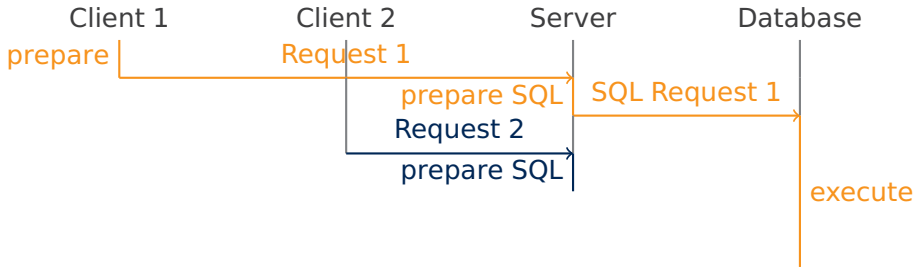

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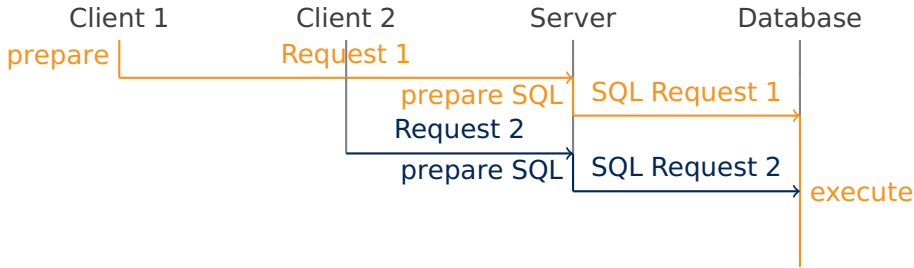

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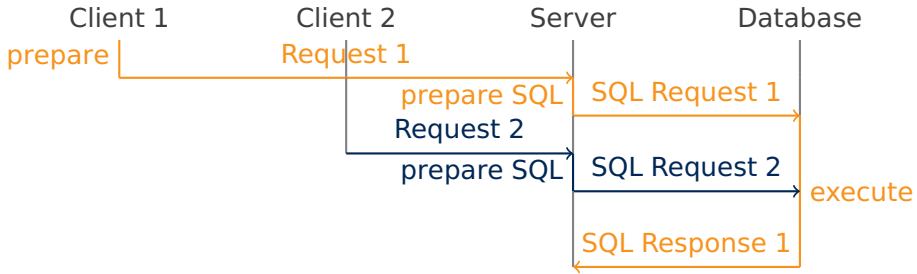

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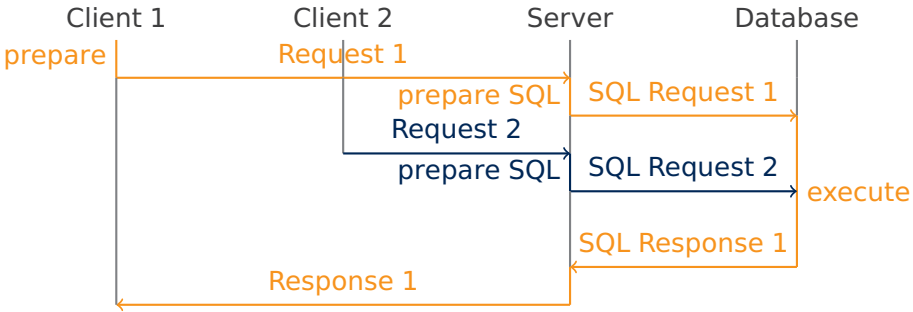

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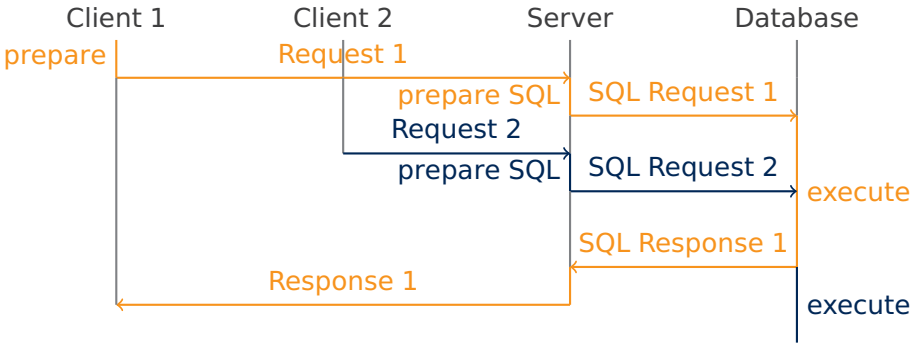

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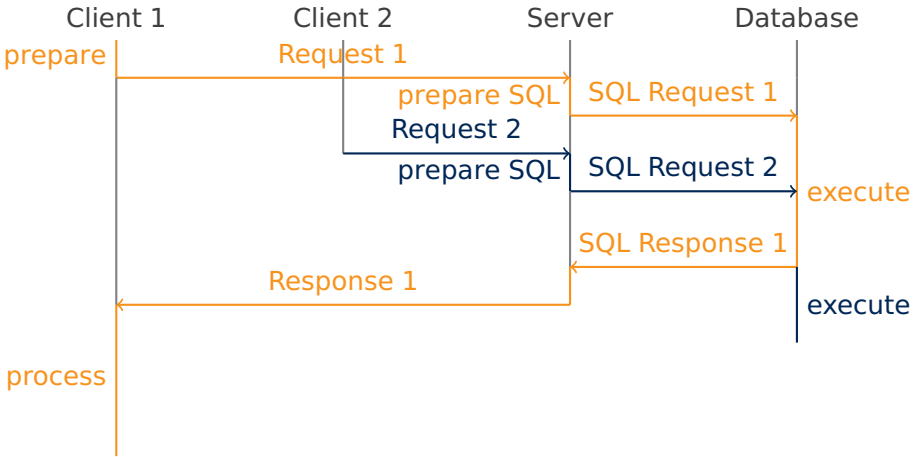

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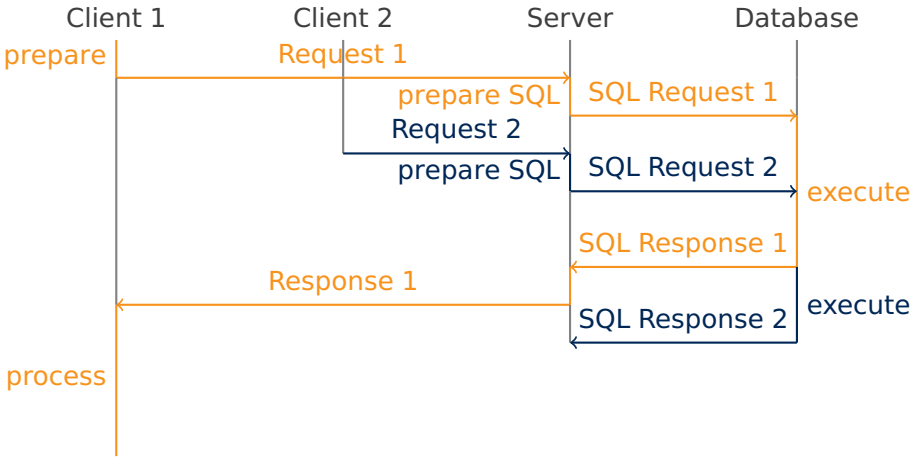

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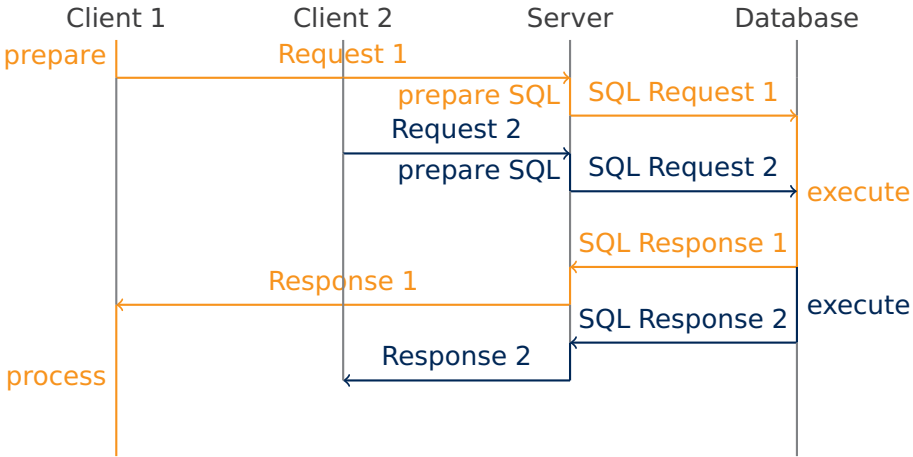

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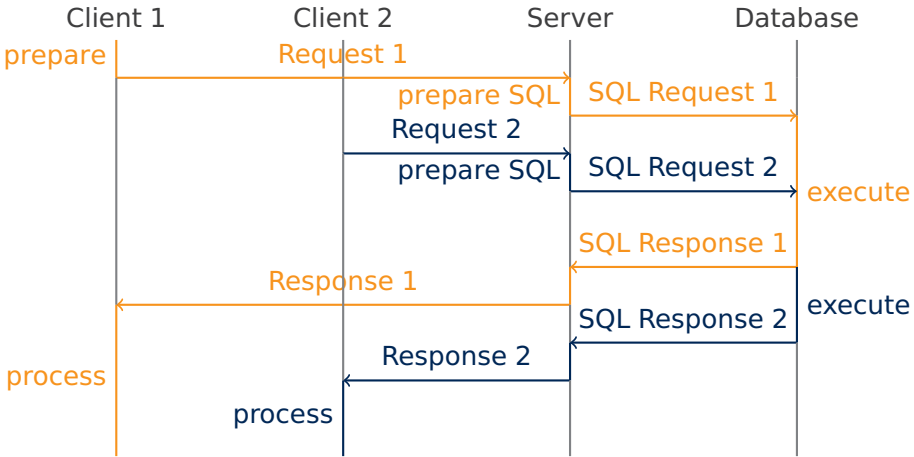

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  - async/await keyword

Synchronous execution in C#

```
1  public string Download(Uri uri) {
2      var client = new DownloadClient();
3      var result = client.Download(uri);
4
5      return result;
6  }
```

Listing 1: Synchronous usage in C#

Event-based execution in C#

```
1  public DownloadResult Download(Uri uri) {
2      var client = new DownloadClient();
3      var result = new DownloadResult();
4
5      client.DownloadComplete += (content) => result.SetComplete(content);
6      client.StartDownload(uri);
7
8      return result;
9  }
```

Listing 2: Usage of events in C#

Asynchronous execution in C#

```
1  public async Task<string> DownloadAsync(Uri uri, CancellationToken ct) {
2      var client = new DownloadClient();
3      var result = await client.DownloadAsync(uri, ct).ConfigureAwait(false);
4
5      return result;
6  }
```

Listing 3: Asynchronous usage in C#

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- Implementation of CoAP for C#.

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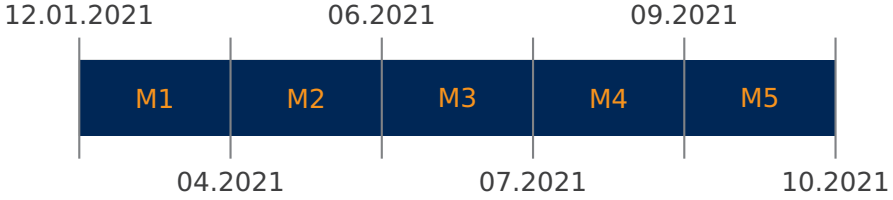

Figure: Phase-Milestone plan

Bachelor thesis

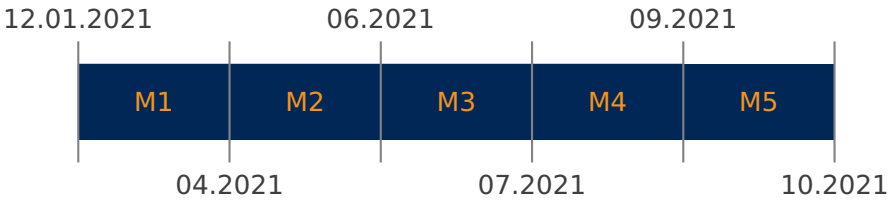

Figure: Phase-Milestone plan

Bachelor thesis

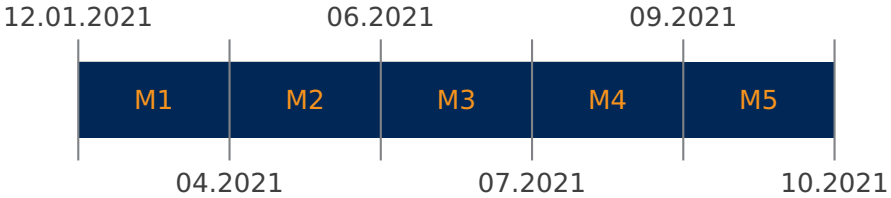

Figure: Phase-Milestone plan

1. 12.01.2021: Initial presentation.

Bachelor thesis

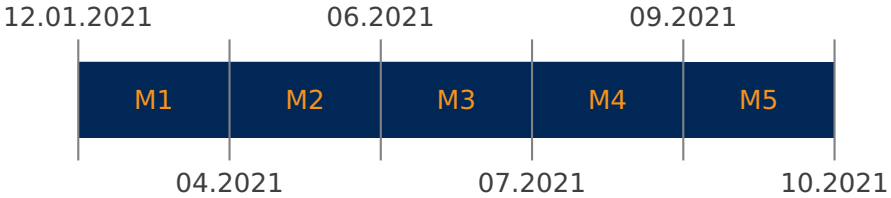

Figure: Phase-Milestone plan

1. 12.01.2021: Initial presentation.
2. 04.2021: Finish asynchronous implementation.

Bachelor thesis

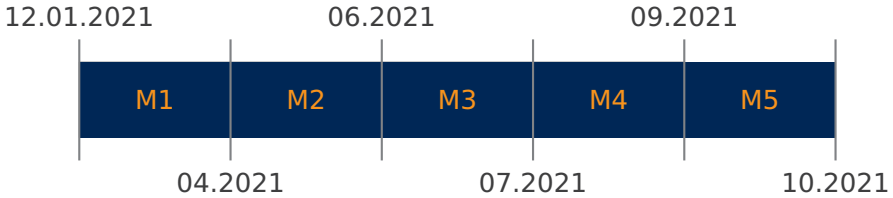

Figure: Phase-Milestone plan

1. 12.01.2021: Initial presentation.
2. 04.2021: Finish asynchronous implementation.
3. 06.2021: Finish measurements.

Bachelor thesis

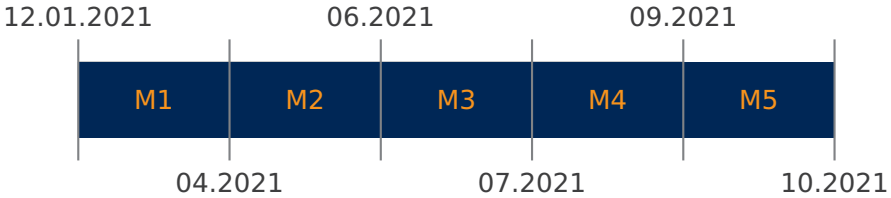

Figure: Phase-Milestone plan

1. 12.01.2021: Initial presentation.
2. 04.2021: Finish asynchronous implementation.
3. 06.2021: Finish measurements.
4. 07.2021: Finish comparison.

Bachelor thesis

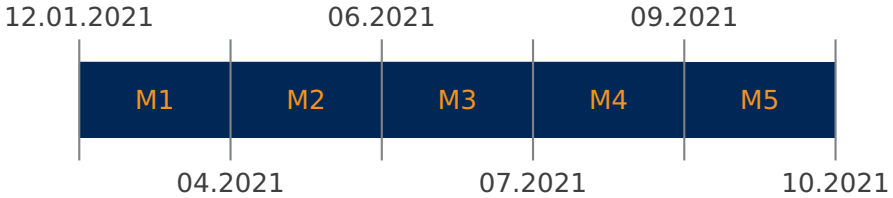

Figure: Phase-Milestone plan

1. 12.01.2021: Initial presentation.
2. 04.2021: Finish asynchronous implementation.
3. 06.2021: Finish measurements.
4. 07.2021: Finish comparison.
5. 09.2021: Finish writing of bachelor thesis.

Bachelor thesis

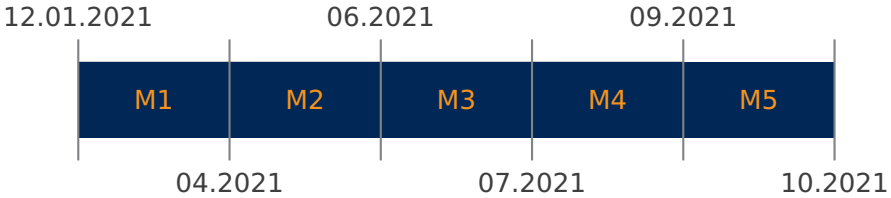

Figure: Phase-Milestone plan

1. 12.01.2021: Initial presentation.
2. 04.2021: Finish asynchronous implementation.
3. 06.2021: Finish measurements.
4. 07.2021: Finish comparison.
5. 09.2021: Finish writing of bachelor thesis.
6. 10.2021: Final presentation.