LAVA

17: Performance

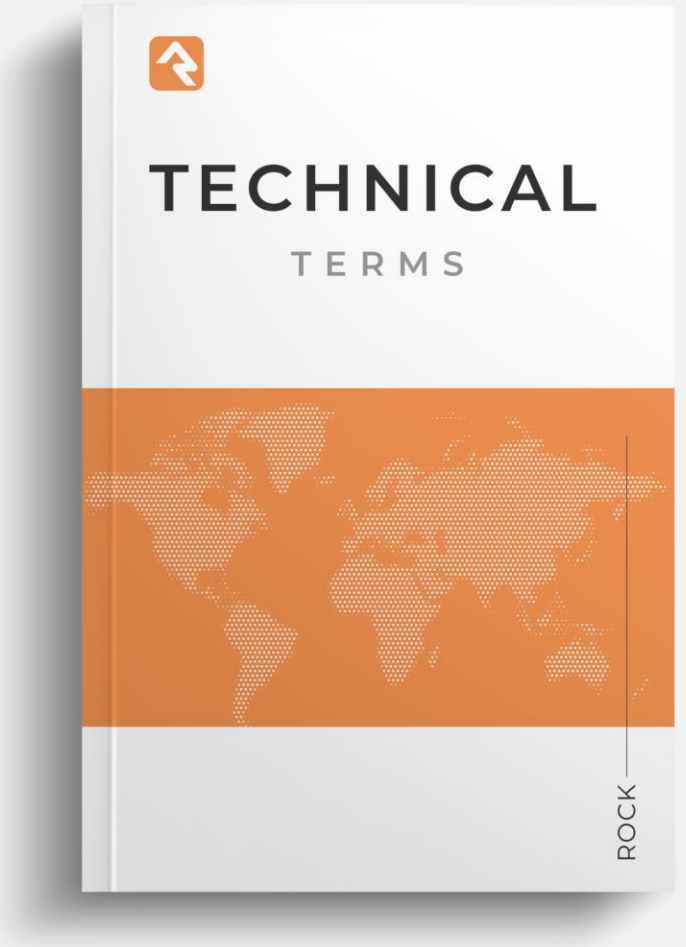
performance

[per-form-***uh***ns]

The amount of useful work accomplished by a computer.

Demystified:

The “faster” a computer is, the more work it can do in the same amount of time.



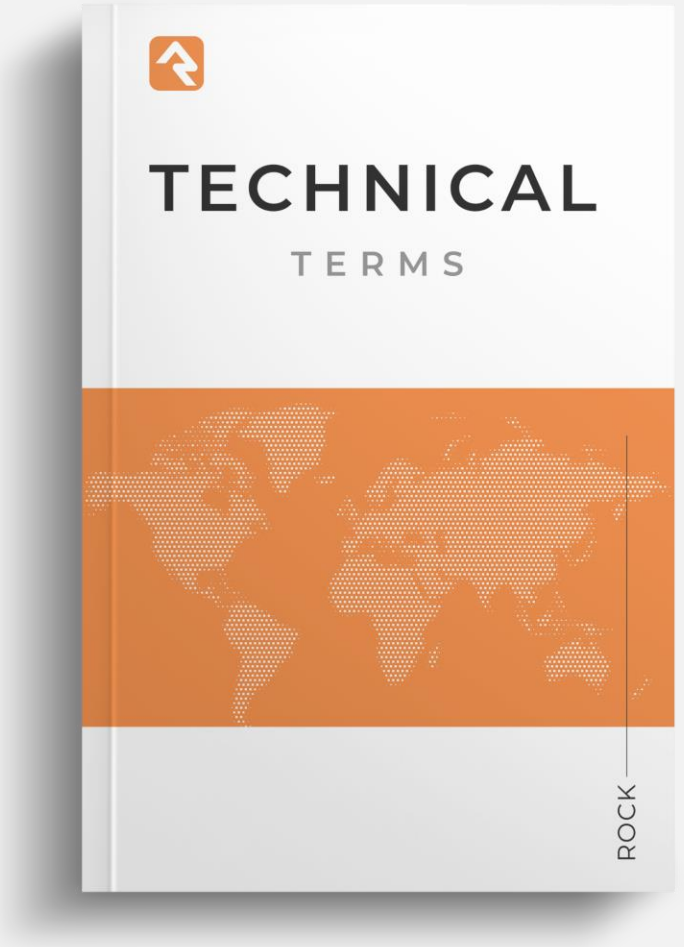
performance

[per-form-***uh***ns]

The amount of useful work accomplished by a computer.

Demystified:

If you have a set amount of work that needs to be done, better performance allows it to complete sooner.



Websites that are too fast:

-
-
-

😂

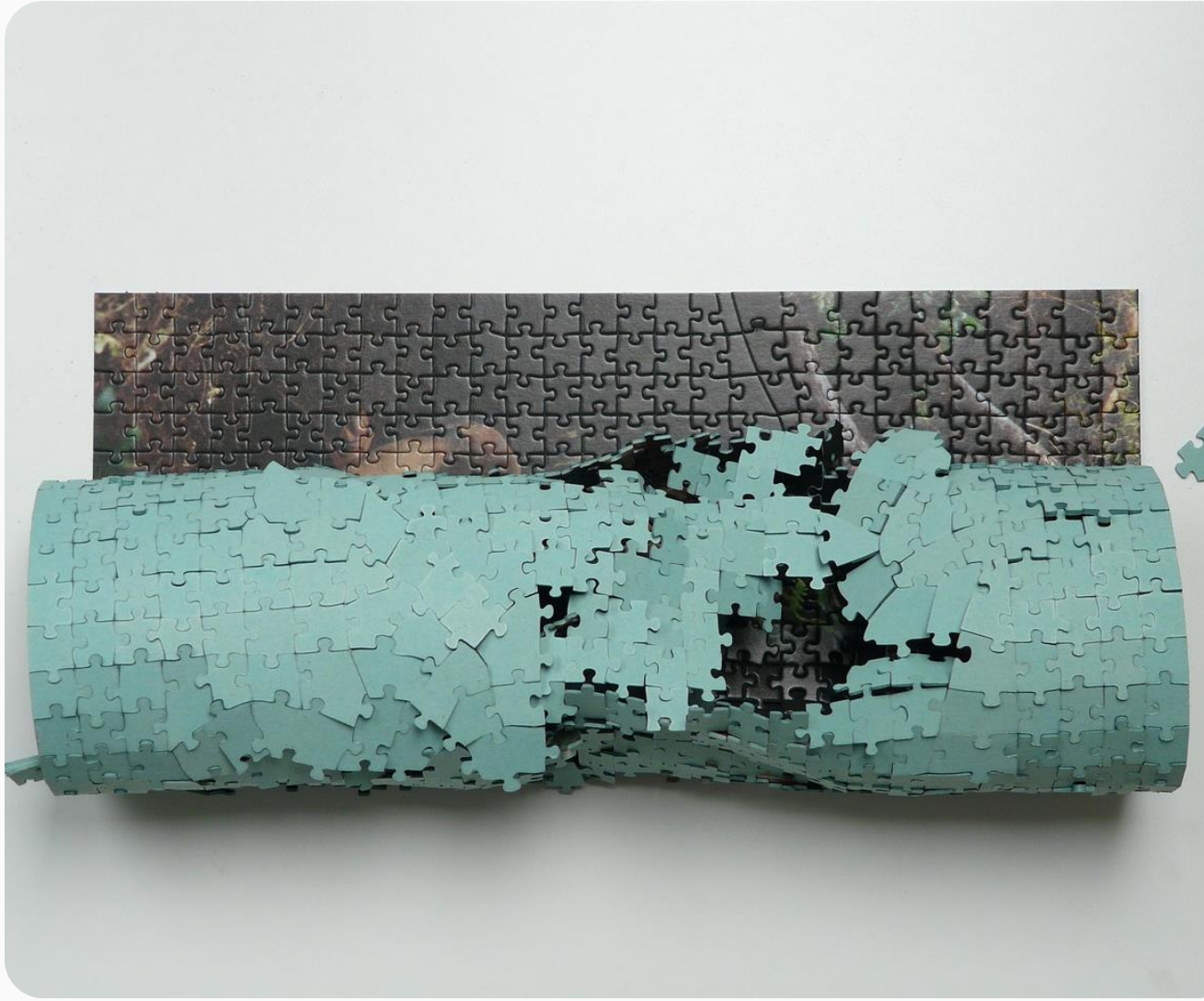
Performance is a Partnership

- Core System Efficiency
- Configuration Impact
  - (including server resources)
- Custom Development Impact

Rock's Performance Challenges:

1. Extensibility is hard.

   - It's easy to make a page efficient when it only ever has to do one thing.
   - But in Rock, each church can add content and configure any page.
   - We are constantly improving efficiency, measuring in fractions of milliseconds.



Rock's Performance Challenges:

2. Usage is Concentrated.

   - A server must have its resources set up before they're needed.
   - Peak usage isn't evenly distributed through a day or week.
   - Requirements change as your church and database grows.

Rock's Performance Challenges:

3. Customization is a double-edged blade.

   - If a church adds a single slow experience on a really fast page, the whole page suffers.

   - In these cases, the whole site feels slow to your visitors.

Performance is a Partnership

- The core team takes care of the core efficiency and provides guidelines on server resourcing.

- Let’s talk about making sure your customizations are efficient.

Principle:

Rock is *fast*.
But Lava templates, if not carefully designed, can undo that.

When your pages are loaded, they need to get stored information.

- The server makes a request for the information and needs to wait to get the data.
- There are lots of places the information can be stored.

What requests are faster and slower than others?

- Computers are fast, so let’s break things into human-scale.
- Assume one processor cycle is equivalent to you taking one step.

L1 Cache: 3 steps (7.5 feet)

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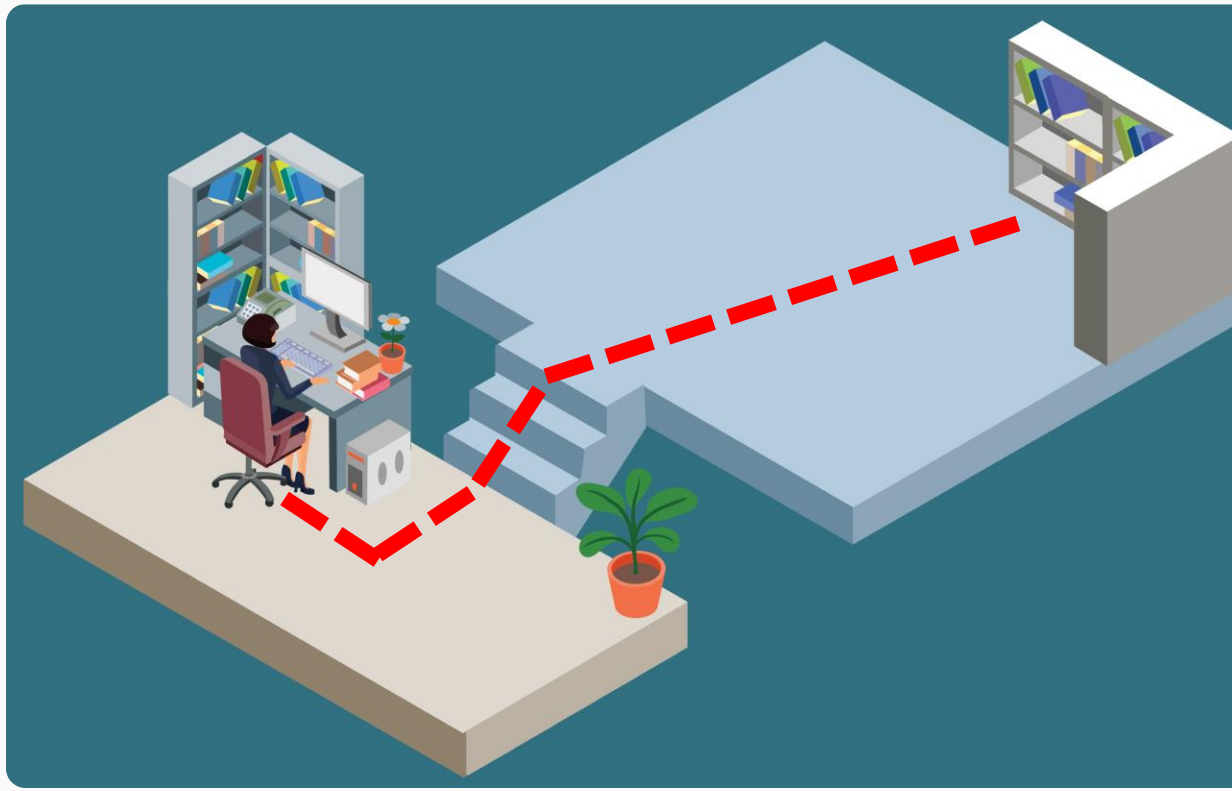
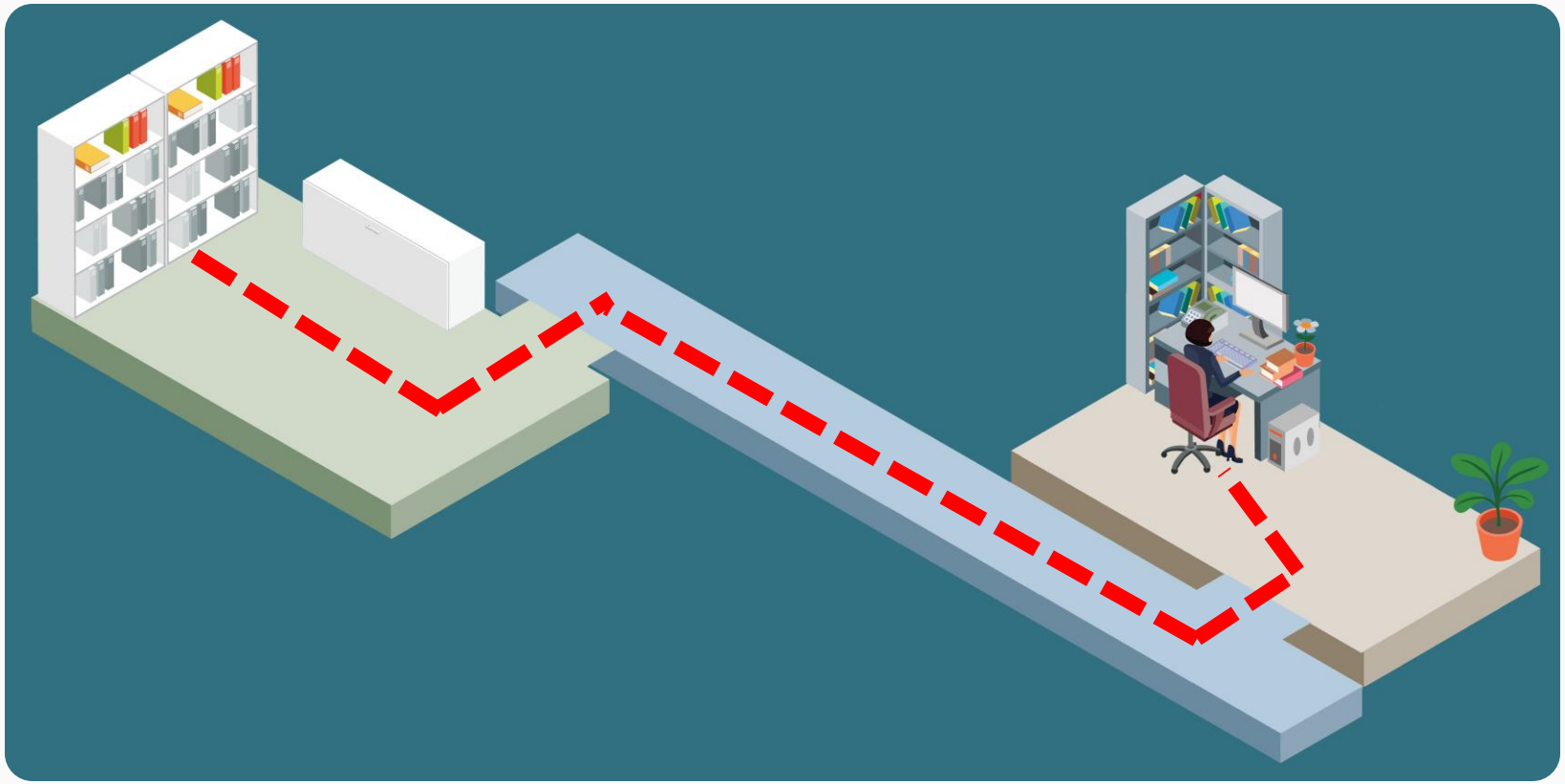
L2 Cache: 9 steps (22.5 feet)



L1 Cache: 3 steps (7.5 feet)

L2 Cache: 9 steps (22.5 feet)

L3 Cache: 43 steps (107.5 feet)



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Main Memory: 300 steps (750’)

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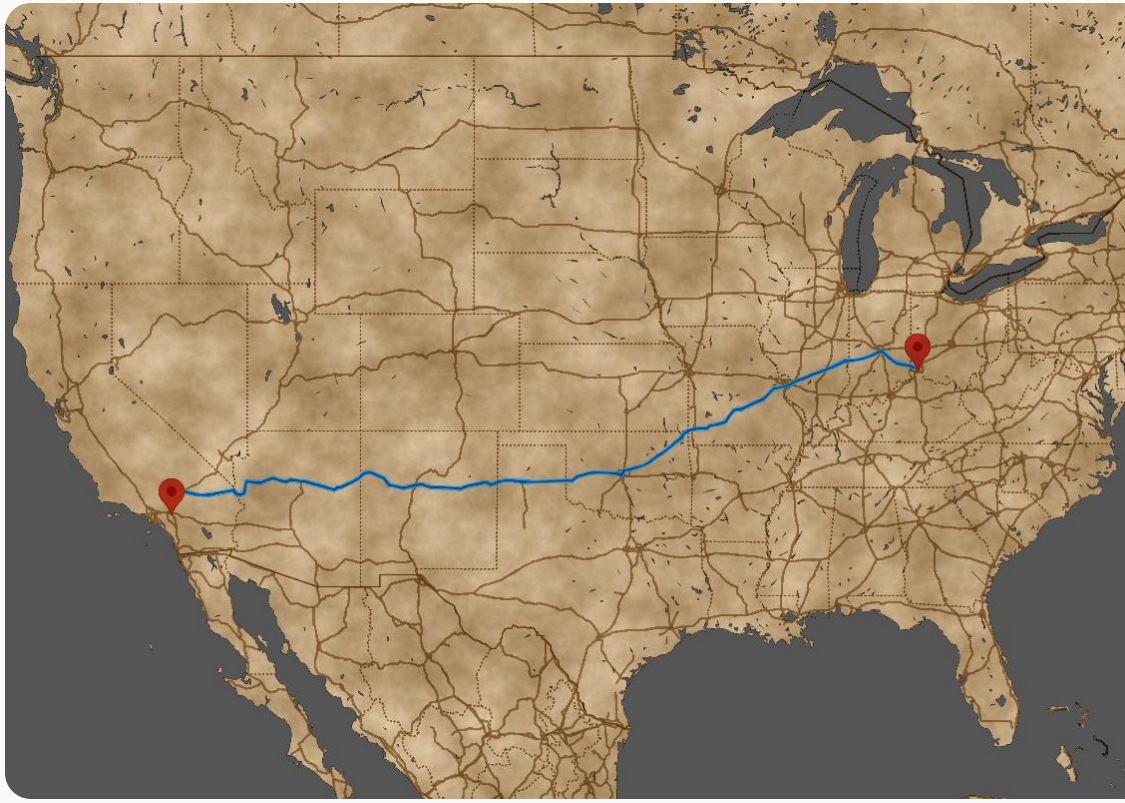
Simple Database Read: 7.75m steps (3,700 miles)



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SSD access: 150,000 steps (71mi)
HDD access: 3 million steps (1,420 mi)
Simple DB Read: 7.75m steps
Complex DB Read: 59.75m steps (28,290 miles)

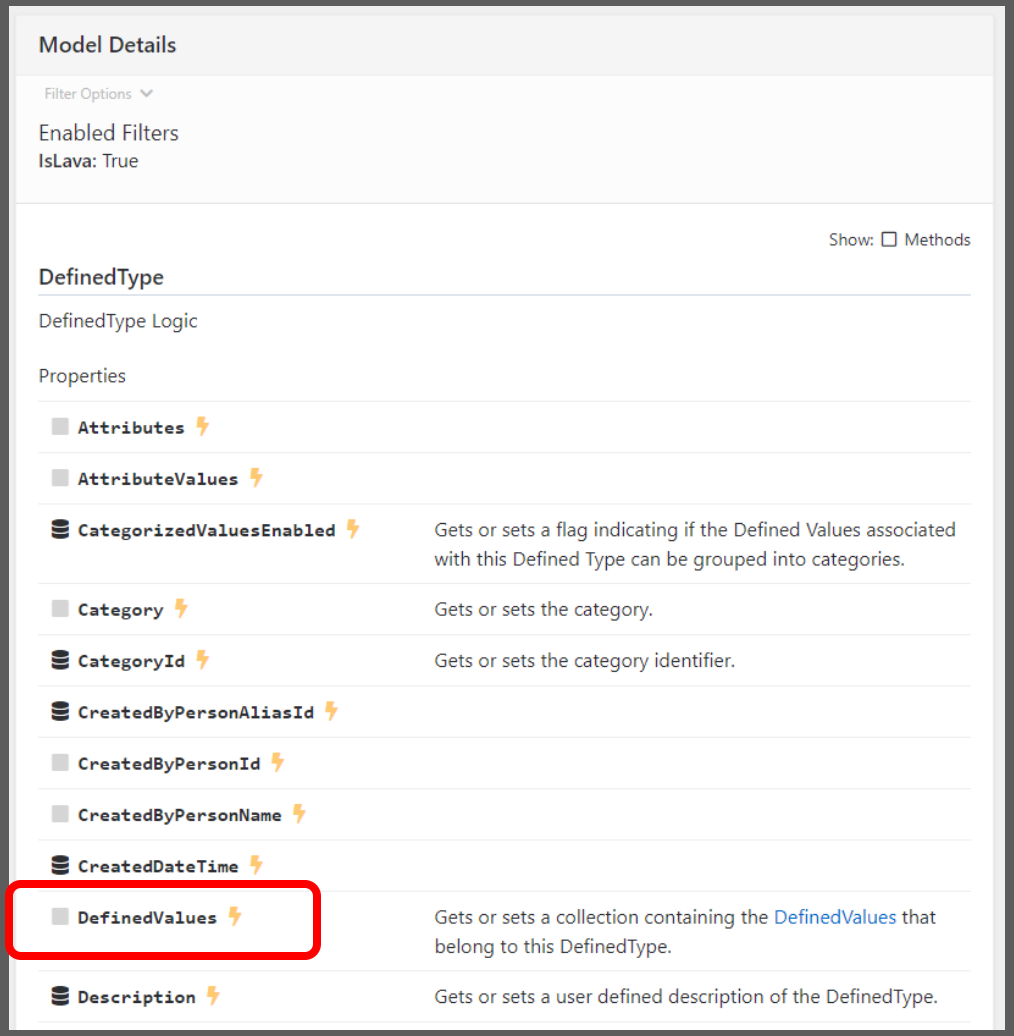
Clearly, it’s better to use storage with faster retrieval.

Rock automatically stores certain records in cache (RAM)

- Defined Value/Types
- Campus
- Page
- Block
- Attribute
- (etc)

FromCache

```
{% assign schoolList = 34 | FromCache:'DefinedType' %}
```



schoolList:


```
{
  "Id": 34,
  "Name": "School",
  "Description": "Is where the person currently attends or last attended school.“
}
```

FromCache

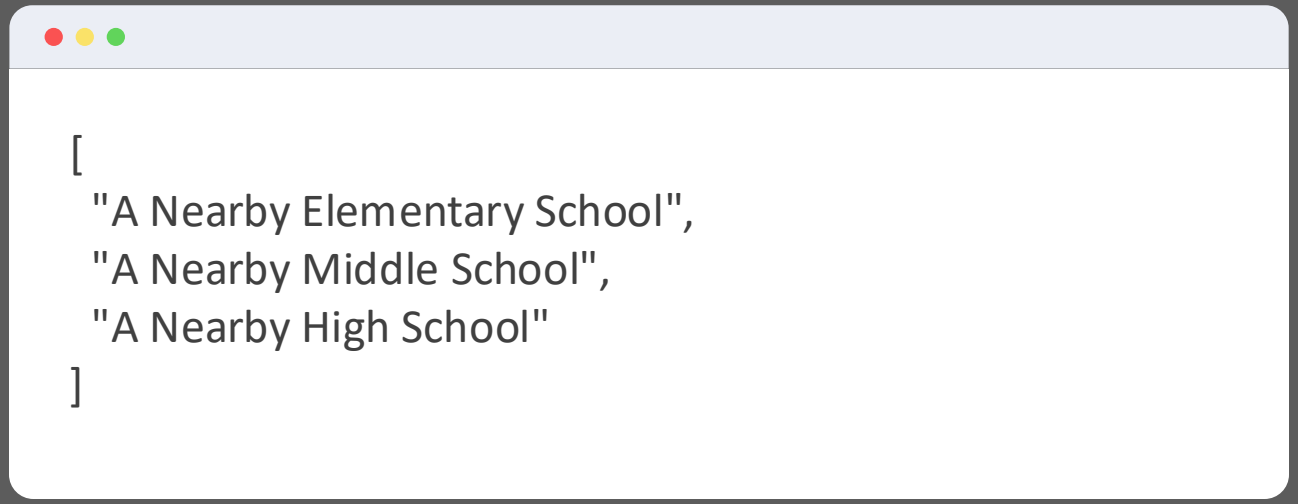
```
1  {% assign schoolList = 34 | FromCache:'DefinedType' %}
2  {% assign schools = schoolList.DefinedValues %}
```

schools:


```
[
 {
  "Id": 173,
  "Value": "A Nearby Elementary School"
 },
 {
  "Id": 174,
  "Value": "A Nearby Middle School"
 },
 {
```

FromCache

```
{% assign schoolList = 34 | FromCache:'DefinedType' %}
{% assign schools = schoolList.DefinedValues %}
{{ schools | Map:'Value' | ToJSON }}
```



FromCache

```
1  {% assign schoolList = 34 | FromCache:'DefinedType' %}
2  {% assign schools = schoolList.DefinedValues %}
3  {{ schools | Map:'Value' | Join:', ' | ReplaceLast:',',' and' }}
```

A Nearby Elementary School, A Nearby Middle School, and A Nearby High School

Shortening the Template

```
1  {% assign schools = 34 | FromCache:'DefinedType' | Property:'DefinedValues' %}
2  {{ schools | Map:'Value' | Join:', ' | ReplaceLast:',',' and' }}
```

A Nearby Elementary School, A Nearby Middle School, and A Nearby High School

Shortening the Template

```
{{ 34 | FromCache:'DefinedType' | Property:'DefinedValues' | Map:'Value' | Join:', ' | ReplaceLast:',',' and' }}
```

Code Smell

Is this understandable?
Will you need the records again?

A Nearby Elementary School, A Nearby Middle School, and A Nearby High School

FromCache

```
1  {% assign campuses = 'All' | FromCache:'Campus' | Where:'CampusTypeValueId',768 %}
2  {% for campus in campuses %}
3    {{ campus.Name }} <small>({{ campus.CampusStatusValue.Value }})</small>
4  {% endif %}
```

Code Smell

Are you going to understand what 768 means next week?

Main Campus (Open)
South Campus (Closed)

FromCache

```
{% assign physicalCampusValueId = 768 %}
//- ------------------------
{% assign campuses = 'All' | FromCache:'Campus' | Where:'CampusTypeValueId',physicalCampusValueId %}
{% for campus in campuses %}
  {{ campus.Name }} <small>({{ campus.CampusTypeValue.Value }})</small>
{% endif %}
```

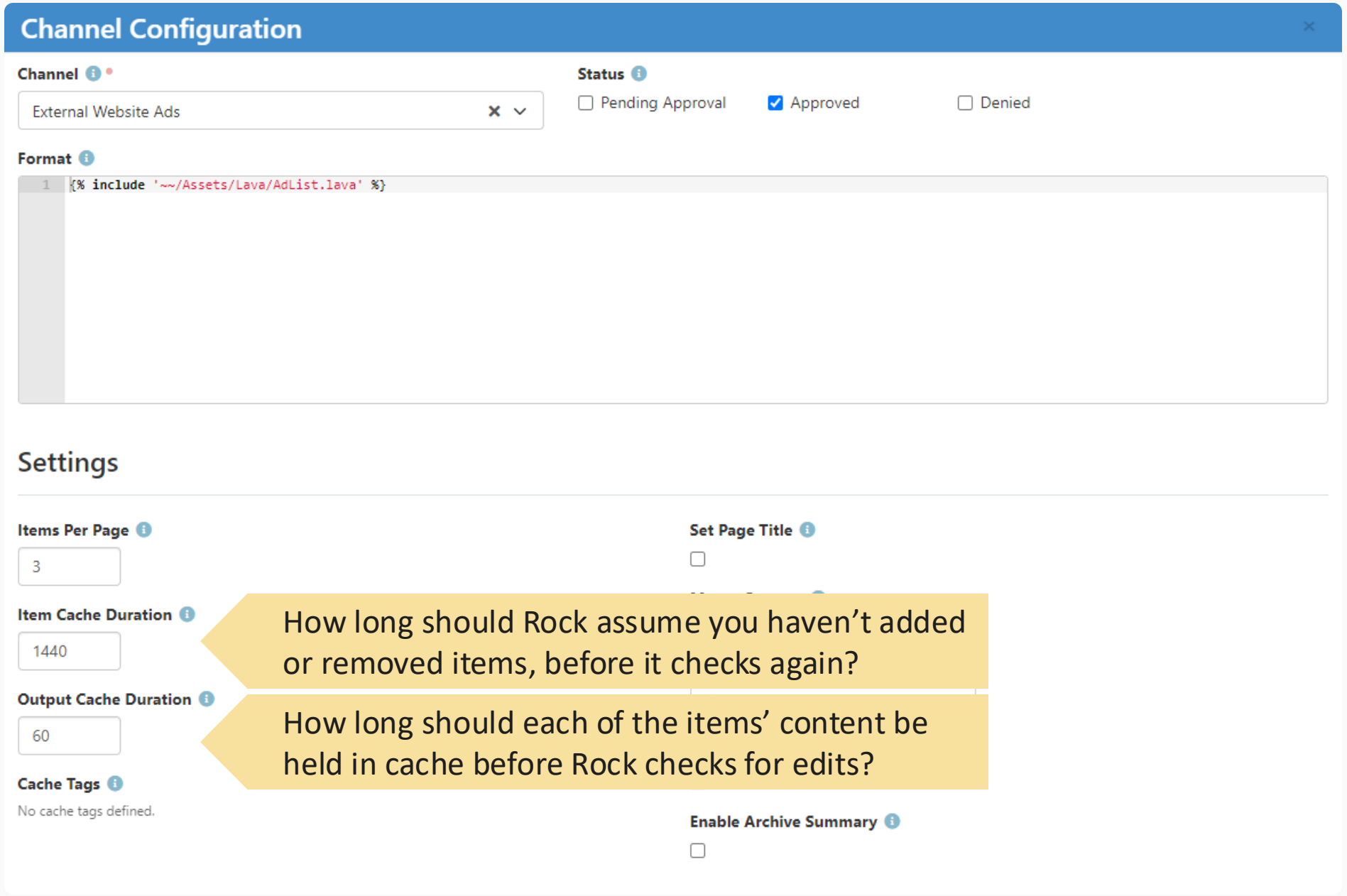
Main Campus (Open)
South Campus (Closed)

Adding to Cache Yourself

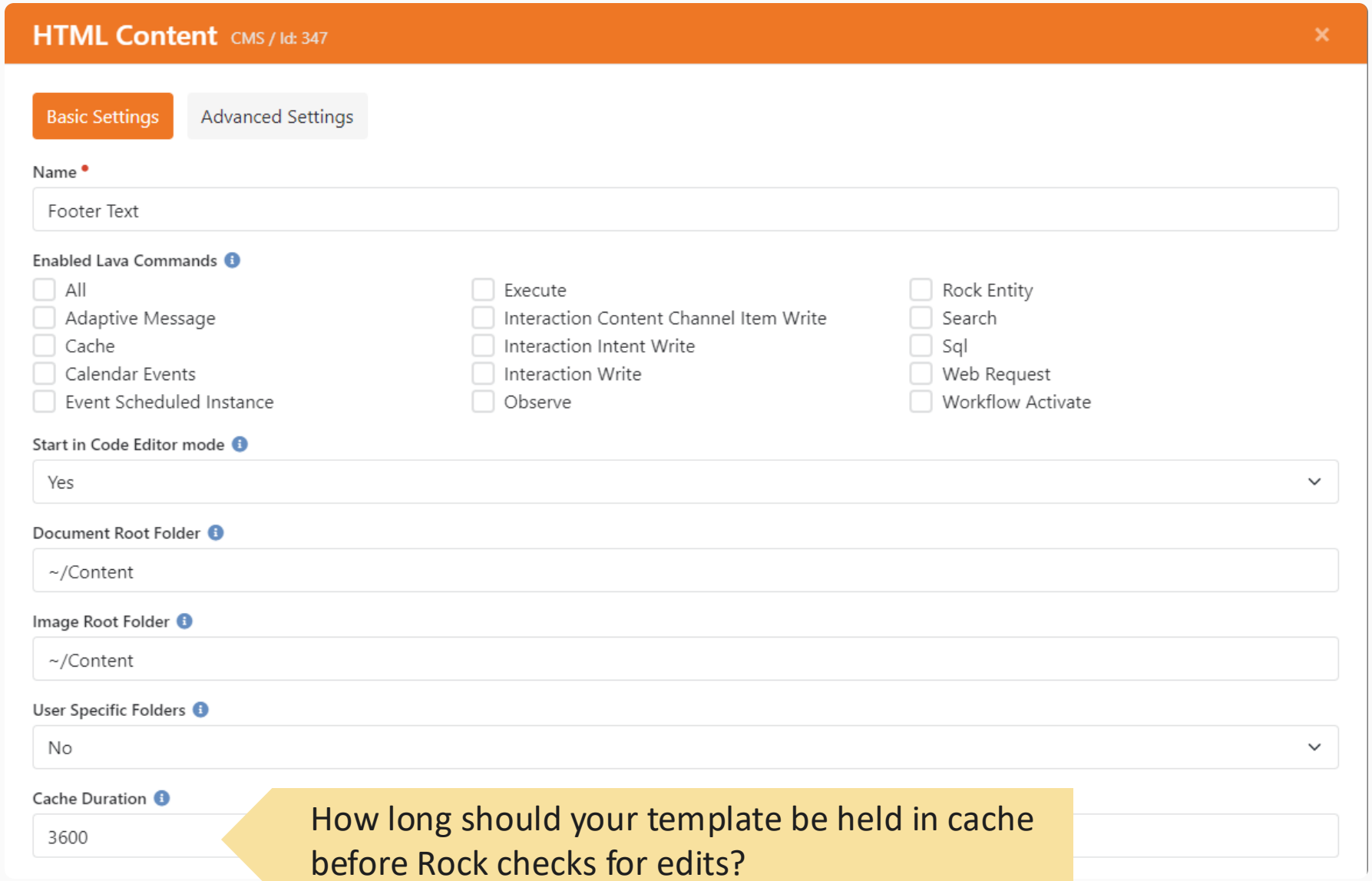
Most of the normal “content” blocks have cache settings.

- HTML block
- Content Channel View
- Content Channel Item View

Caching in Content Channel View Block



Caching in HTML Content Block



Partially-Cached Content

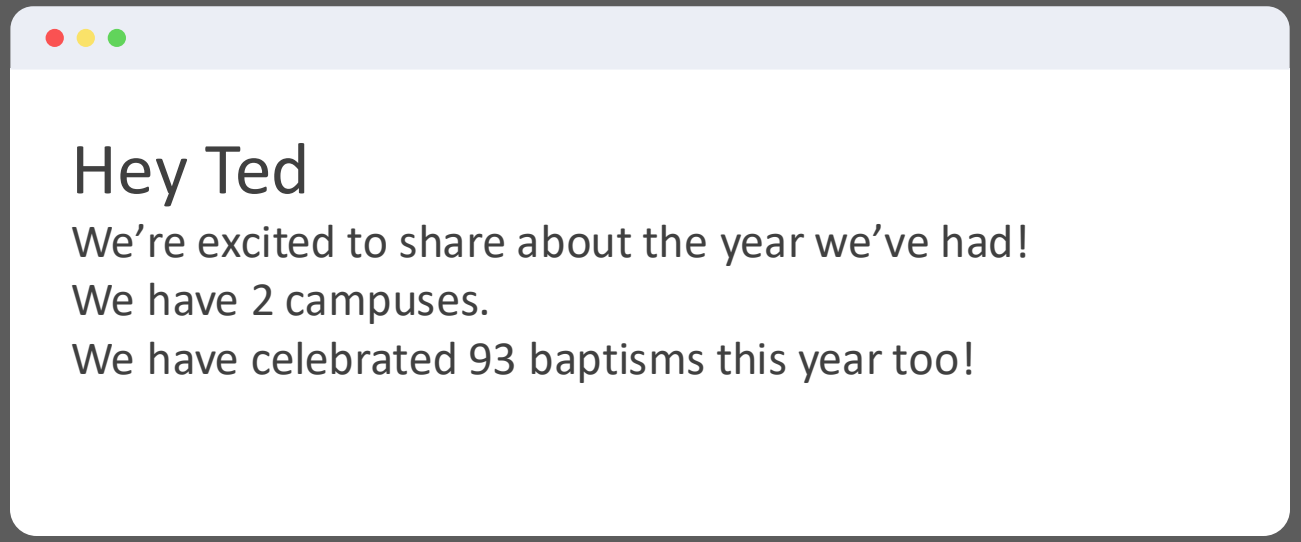
Personalization:

Be careful not to cache content that gets personalized, or else everyone using that page will see content for the first visitor.

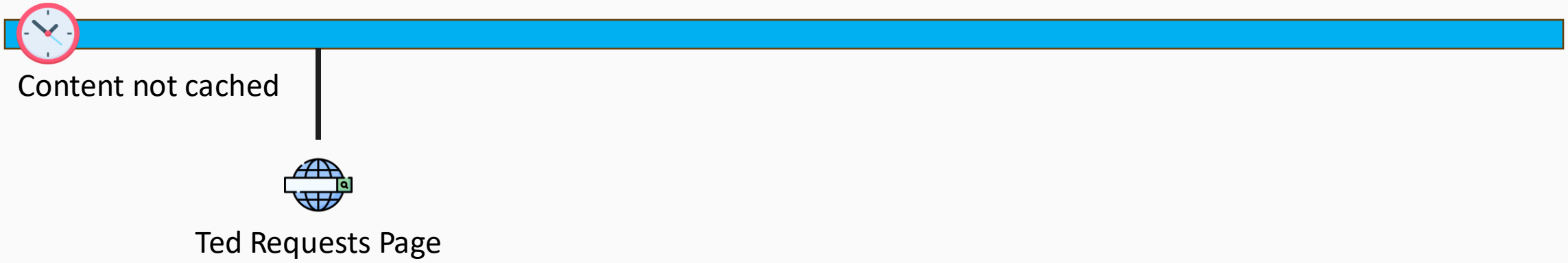
So … how can I cache some, but not all, of a block's content?

Sample Template

```
<h3>Hey {{ CurrentPerson.NickName }}</h3>
<p>We're excited to share about the year we've had!</p>
<p>We have {{ Campuses | Size }} campuses.</p>
{% person where:'BaptismDate >= "2024-01-01"' count:'true' %}
  <p>We have celebrated {{ count }} baptisms this year too!</p>
{% endperson %}
```



Caching



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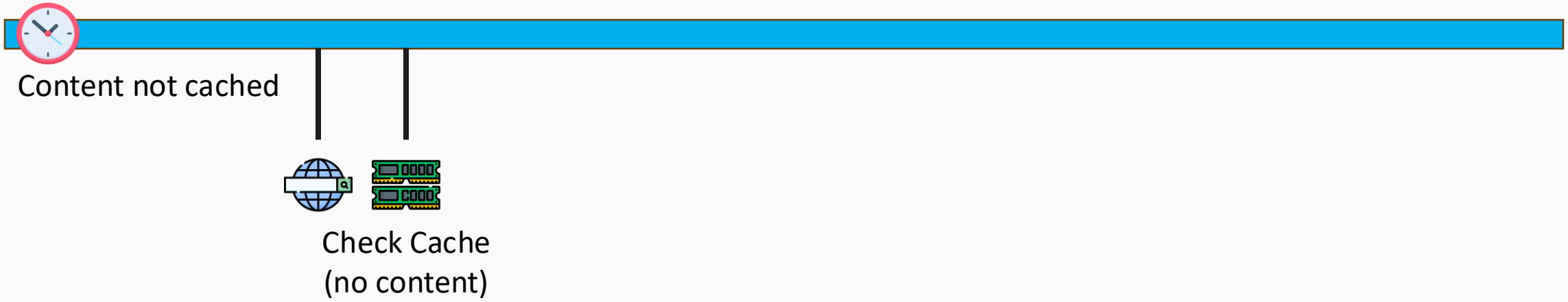
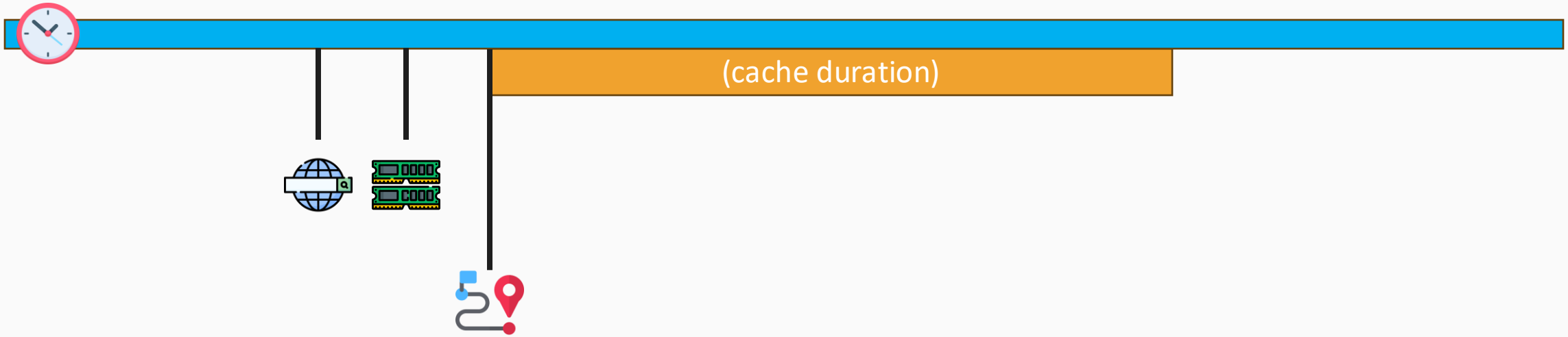
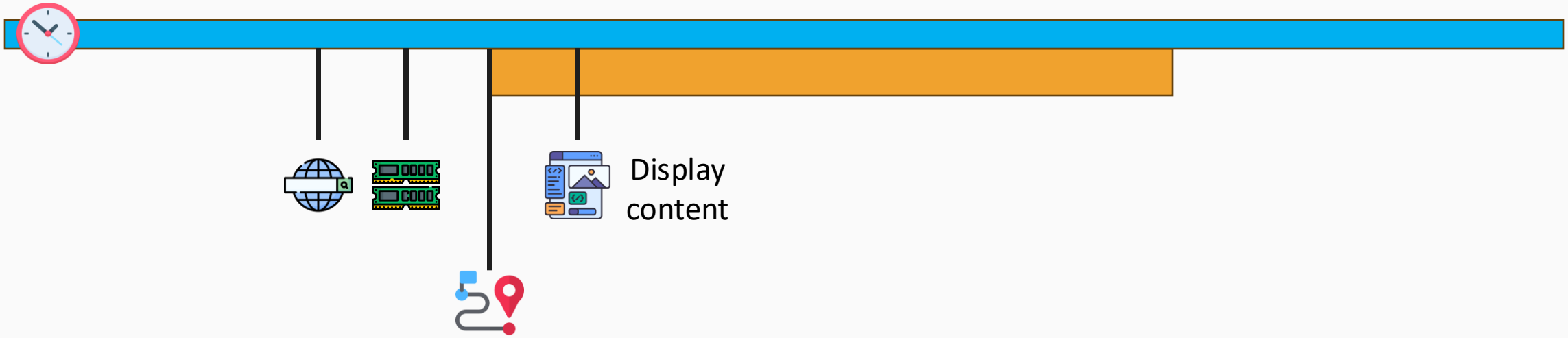


Caching



Caching



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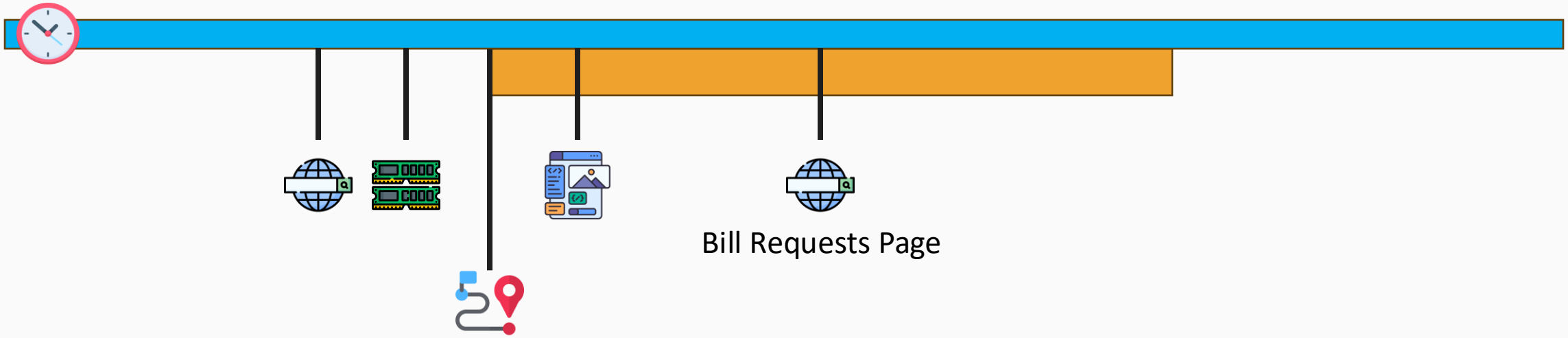

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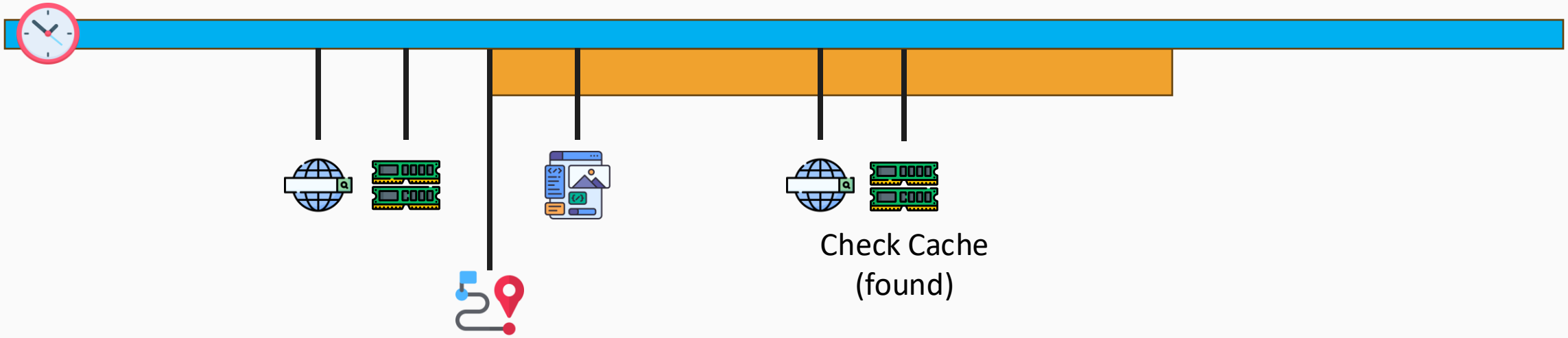

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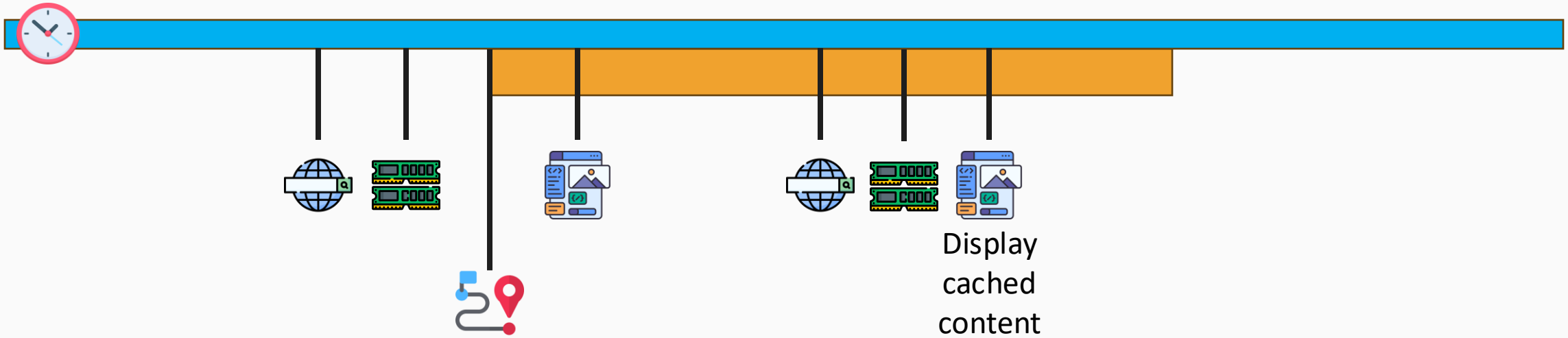

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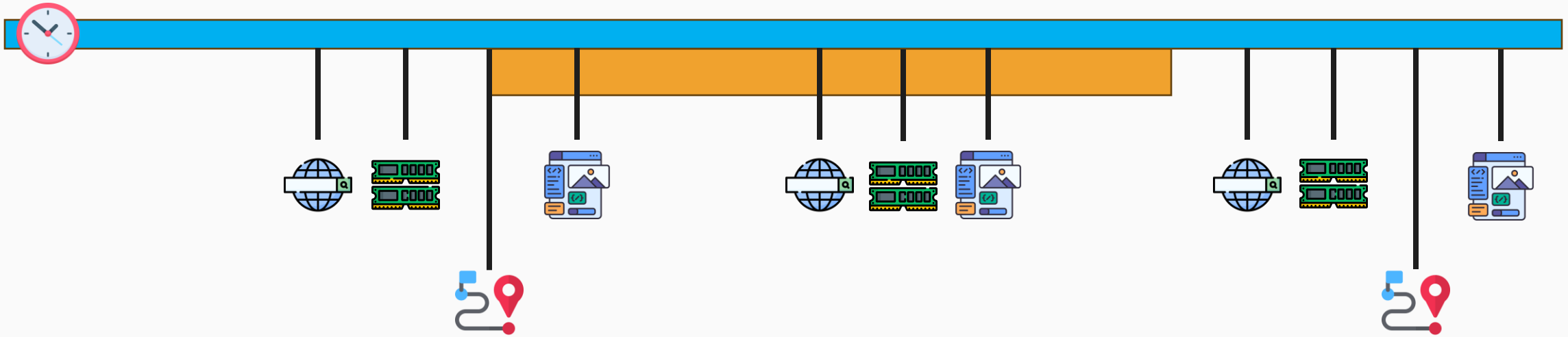

Sample Template

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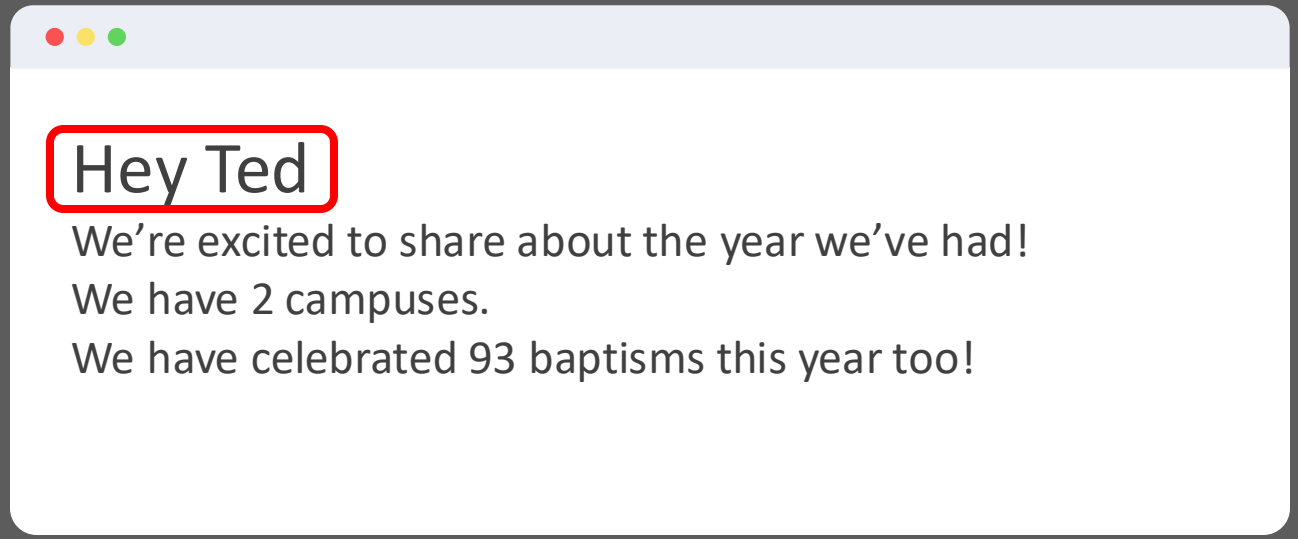
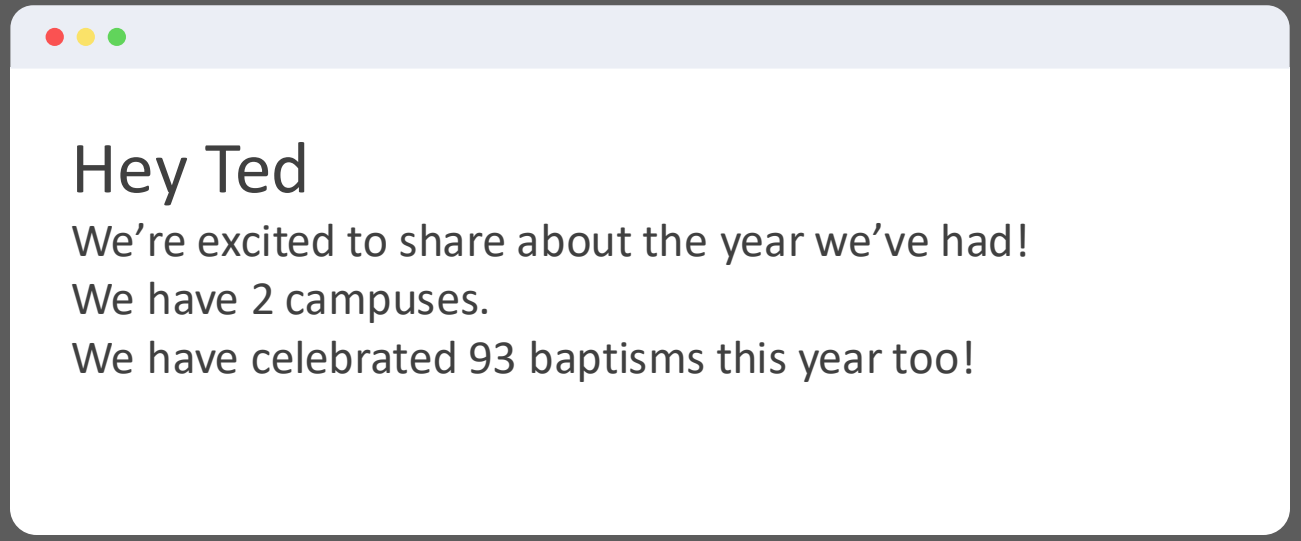
2 <p>We're excited to share about the year we've had!</p>
3 <p>We have {{ Campuses | Size }} campuses.</p>
4 {% person where:'BaptismDate >= "2024-01-01"' count:'true' %}
5   <p>We have celebrated {{ count }} baptisms this year too!</p>
6 {% endperson %}
```



Cache Tag

```
<h3>Hey {{ CurrentPerson.NickName }}</h3>
{% cache key:'yearStats' duration:'3600' %}
  <p>We're excited to share about the year we've had!</p>
  <p>We have {{ Campuses | Size }} campuses.</p>
  {% person where:'BaptismDate >= "2024-01-01"' count:'true' %}
    <p>We have celebrated {{ count }} baptisms this year too!</p>
  {% endperson %}
{% endcache %}
```



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```
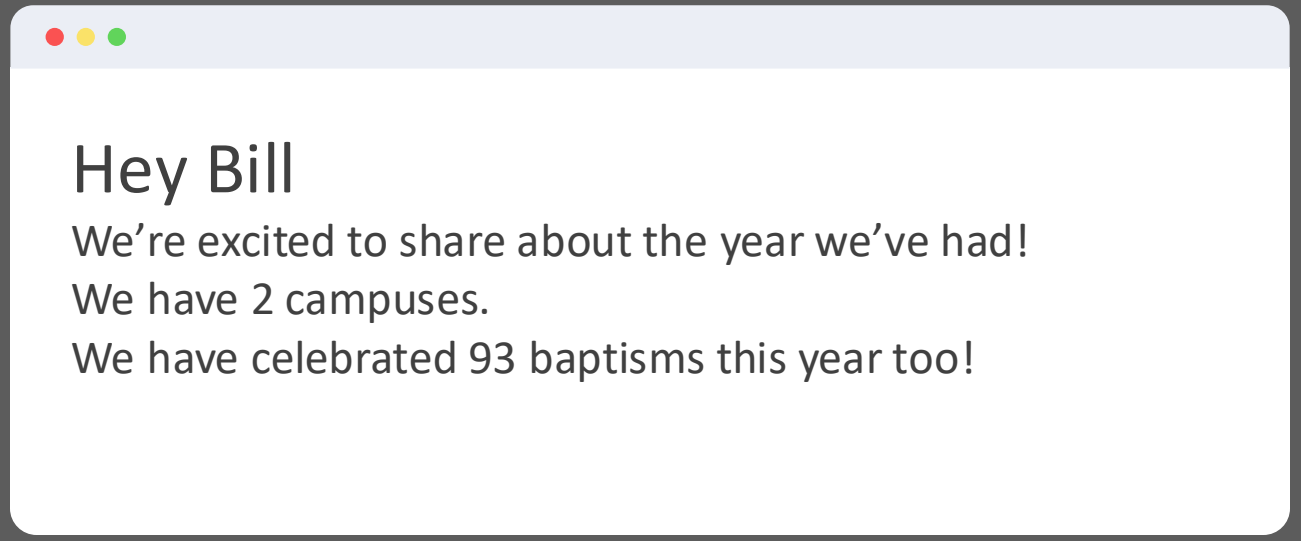
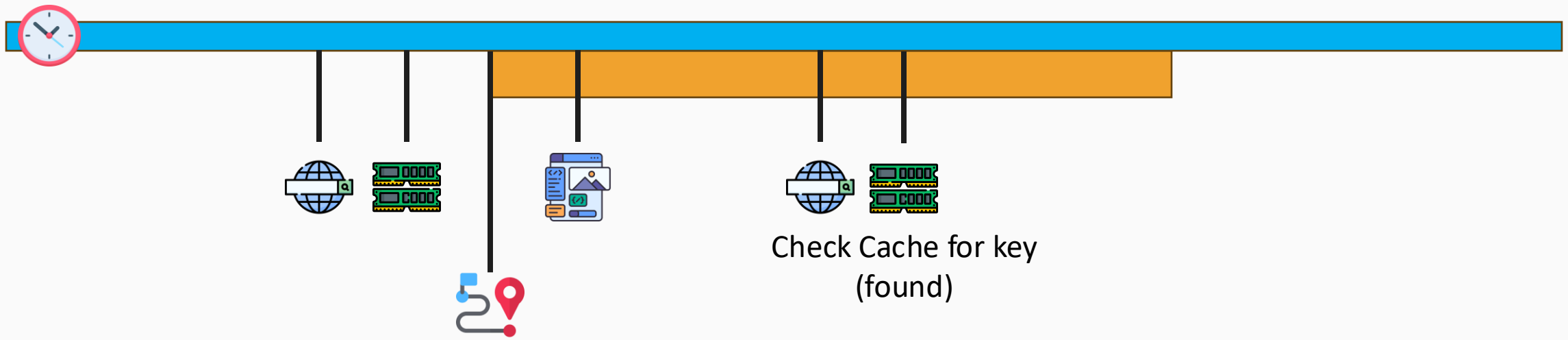



Cache Tag

```
{% cache key:'' duration:'' %}

{% endcache %}
```

- Instead of caching the contents by the block it’s in, Rock will use the key you provide instead.



Caching

Cache Tag

```
{% cache key:'yearStats' duration:'3600' twopass:'true' %}
  <p>We're excited to share about the year we've had!</p>
  <p>We have {{ Campuses | Size }} campuses.</p>
  <p>You're a part of this, {% raw %}{{ CurrentPerson.NickName }}{% endraw %}!</p>
  {% person where:'BaptismDate >= "2024-01-01"' count:'true' %}
    <p>We have celebrated {{ count }} baptisms this year too!</p>
  {% endperson %}
{% endcache %}
```

We’re excited to share about the year we’ve had!
We have 2 campuses.
You’re a part of this, Ted!
We have celebrated 93 baptisms this year too!

Raw Tag

```
{% raw %}

{% endraw %}
```

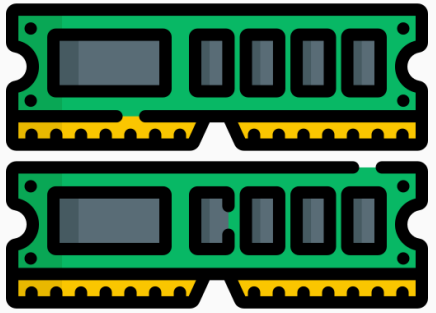
- The raw tag prevents Lava from getting interpreted – it outputs exactly what you typed.

- But naturally the raw tag doesn’t get included.

Two Pass Caching

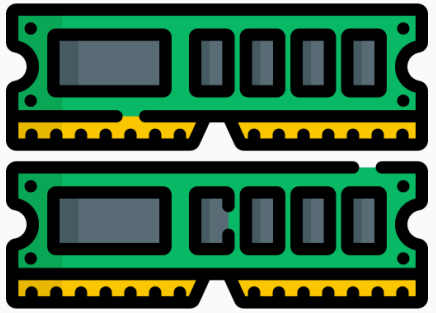
```
{% cache key:'yearStats' duration:'3600' twopass:'true' %}
  <p>We're excited to share about the year we've had!</p>
  <p>We have {{ Campuses | Size }} campuses.</p>
  <p>You're a part of this, {% raw %}{{ CurrentPerson.NickName }}{% endraw %}!</p>
  {% person where:'BaptismDate >= "2024-01-01"' count:'true' %}
    <p>We have celebrated {{ count }} baptisms this year too!</p>
  {% endperson %}
{% endcache %}
```

We’re excited to share about the year we’ve had!
We have 2 campuses.
You’re a part of this, {{ CurrentPerson.NickName }}!
We have celebrated 93 baptisms this year too!



Two Pass Caching

```
{% cache key:'yearStats' duration:'3600' twopass:'true' %}
  <p>We're excited to share about the year we've had!</p>
  <p>We have {{ Campuses | Size }} campuses.</p>
  <p>You're a part of this, {% raw %}{{ CurrentPerson.NickName }}{% endraw %}!</p>
  {% person where:'BaptismDate >= "2024-01-01"' count:'true' %}
    <p>We have celebrated {{ count }} baptisms this year too!</p>
  {% endperson %}
{% endcache %}
```



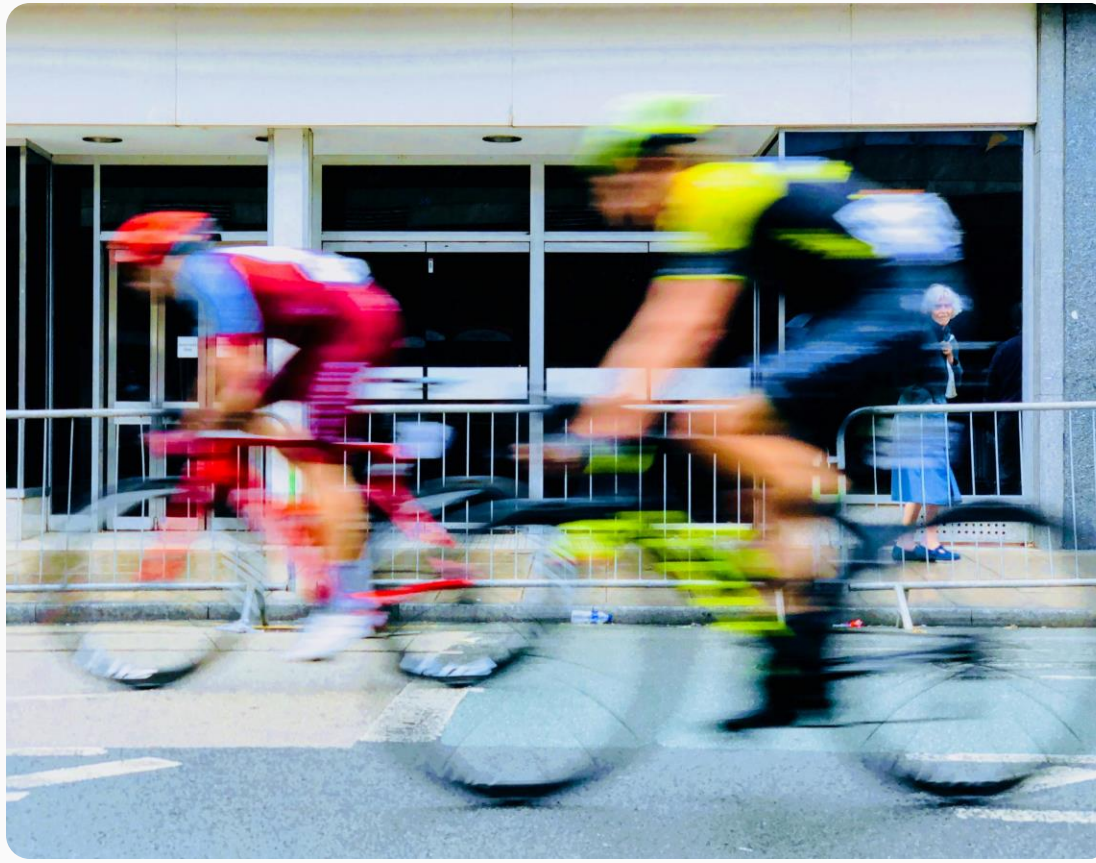
Two Pass Caching

```
1  <p>We're excited to share about the year we've had!</p>
2  <p>We have 2 campuses.</p>
3  <p>You're a part of this, {{ CurrentPerson.NickName }}!</p>
4  <p>We have celebrated 93 baptisms this year too!</p>
```

We're excited to share about the year we've had!
We have 2 campuses.
You're a part of this, Ted!
We have celebrated 93 baptisms this year too!

Request Efficiency

Even when requests are cached, you should try to make sure they’re as fast as possible.



Limit the Number of Database Lookups

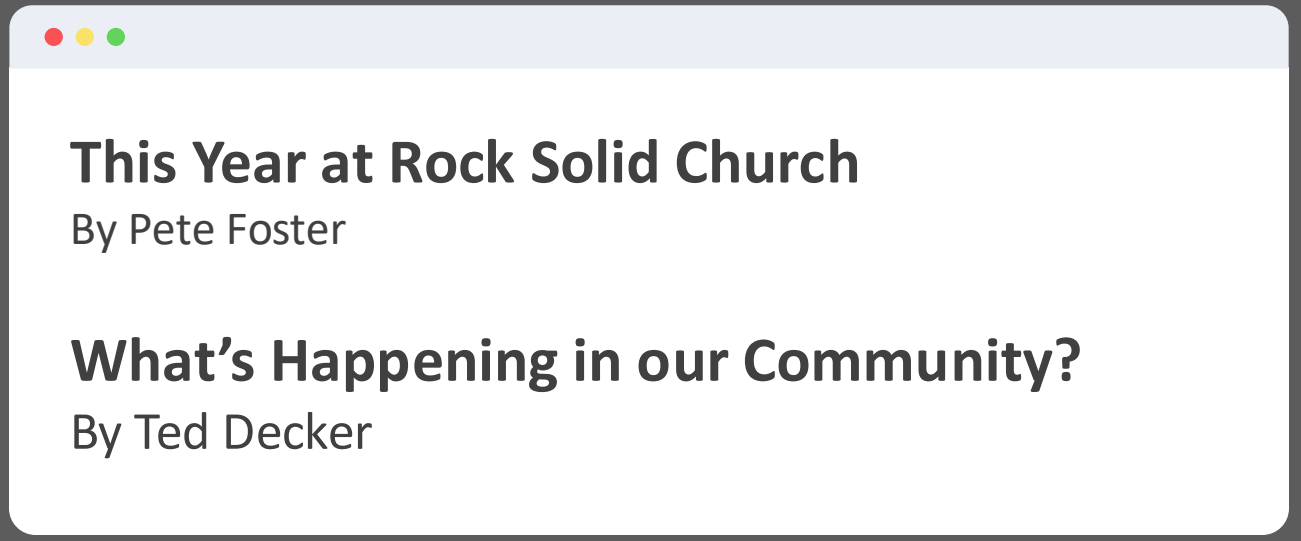
- Remember the slowest request is a trip to the database.

Principles of Efficient Queries

```
1  {% for item in Items %}
2    <h3>{{ item.Title }}</h3>
3    <p>By {{ item | Attribute:'Author','FullName' }}</p>
4  {% endfor %}
```


Attributes:

Every attribute lookup requires a trip to the database



This Year at Rock Solid Church

By Pete Foster

What's Happening in our Community?

By Ted Decker

Principles of Efficient Queries

```
1  {% for person in People %}
2    {% assign startingPointClasses = person | Steps:'1','Complete','2' %}
3    {{ person.NickName }} has taken Starting Point with:
4    <ul>
5      {% for class in startingPointClass %}
6        <li>
7          {{ class | Attribute:'Leader','FullName' }}
8          ({{ class.CompletedDateTime }})
9        </li>
10     {% endfor %}
11   </ul>
12 {% endfor %}
```

Requires a lookup for every person in the loop

Requires a lookup for every class each person has taken

Ted has taken Starting Point with:

- Pete Foster (6/7/2003)
- Daniel Peak (2/29/2012)

Sarah has taken Starting Point with:

- Pete Foster (11/3/2019)

Principles of Efficient Queries

```
1  {% for person in People %}
2    <img src="{{ person.PrimaryFamily.Campus.Location.Image.Url }}" />
3    {{ person.NickName }}
4  {% endfor %}
```

Start with the person record
└ Request the Family
  └ Request the Campus
    └ Request the Location
      └ Request the Image -> to get the URL property.

Let Multiple Dots be a Mental Flag

Frequently when there is more than one “dot”, it means you’re going from entity to entity. Each entity lookup is a separate trip to the database.

Are Templates like this “Bad”?

- It’s all about context.
- Be aware of what we’re asking the server to do.
- The scale of a page’s use makes a huge difference!

Principles of scaling

- Things work great when there's just one person using the page.
- What changes when 1,000 people load it at the same time?
- What happens when the cache expires?

Persisted Dataset

A tool for proactively getting and caching the facts you need.

- Stored as JSON
- Refreshed on a schedule, not on load.