

互联网应用开发技术

*Web Application Development*

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# 第9课

## WEB前后台通信-CORS & FETCH

Episode Nine

**CORS and Fetch API**

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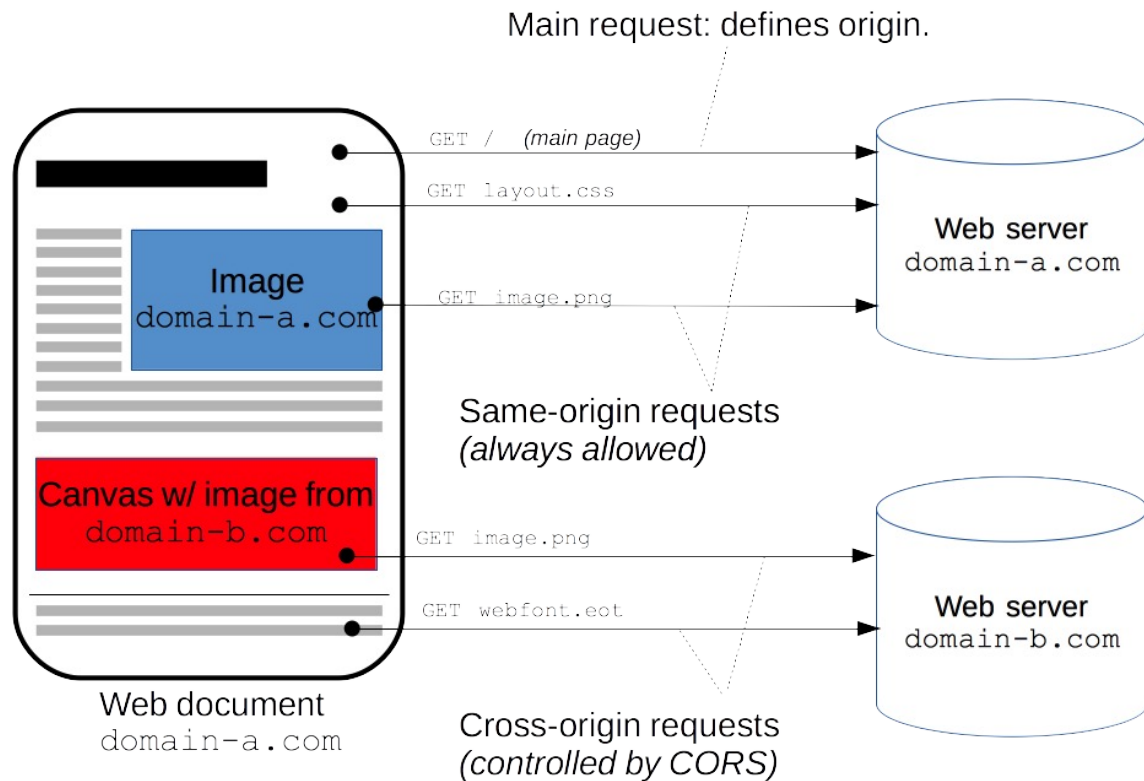
Web Application  
Development

- **Cross-Origin Resource Sharing (CORS)**

- is a mechanism that uses additional **HTTP** headers to tell browsers to give a web application running at one origin, access to selected resources from a **different origin**.
- A web application executes a cross-origin HTTP request when it requests a resource that has a different origin (domain, protocol, or port) from its own.

- **Cross-Origin Resource Sharing (CORS)**

- An example of a cross-origin request: the front-end JavaScript code served from <https://domain-a.com> uses XMLHttpRequest to make a request for <https://domain-b.com/data.json>.
- For security reasons, browsers restrict cross-origin HTTP requests initiated from scripts.
  - For example, XMLHttpRequest and the Fetch API follow the same-origin policy.
  - This means that a web application using those APIs can only request resources from the same origin the application was loaded from, unless the response from other origins includes the right CORS headers.



- The same-origin policy is a critical security mechanism that
  - restricts how a document or script loaded from one origin can interact with a resource from another origin.
  - It helps isolate potentially malicious documents, reducing possible attack vectors.
- Definition of an origin
  - Two URLs have the *same origin* if the **protocol**, **port** (if specified), and **host** are the same for both.

http://默认的port编号为80

- The following table gives examples of origin comparisons with the URL
  - <http://store.company.com/dir/page.html>:

URL	Outcome	Reason
<a href="http://store.company.com/dir2/other.html">http://store.company.com/dir2/other.html</a>	Same origin	Only the path differs
<a href="http://store.company.com/dir/inner/another.html">http://store.company.com/dir/inner/another.html</a>	Same origin	Only the path differs
<a href="https://store.company.com/page.html">https://store.company.com/page.html</a>	Failure	Different protocol
<a href="http://store.company.com:81/dir/page.html">http://store.company.com:81/dir/page.html</a>	Failure	Different port ( <a href="http://">http://</a> is port 80 by default)
<a href="http://news.company.com/dir/page.html">http://news.company.com/dir/page.html</a>	Failure	Different host

- This cross-origin sharing standard can enable cross-site HTTP requests for:
  - Invocations of the XMLHttpRequest or Fetch APIs, as discussed above.
  - Web Fonts (for cross-domain font usage in @font-face within CSS), so that servers can deploy TrueType fonts that can only be cross-site loaded and used by web sites that are permitted to do so.
  - WebGL textures.
  - Images/video frames drawn to a canvas using drawImage().
  - CSS Shapes from images.

```
@WebFilter(filterName = "corsFilter", urlPatterns = {"/"})
public class CorsFilter implements Filter{
    @Override
    public void init(FilterConfig filterConfig) throws ServletException { }

    @Override
    public void doFilter(ServletRequest servletRequest,
        ServletResponse servletResponse, FilterChain filterChain)
        throws IOException, ServletException {
        HttpServletResponse response = (HttpServletResponse) servletResponse;
        response.setHeader("Access-Control-Allow-Origin", "http://localhost:3000");
        response.setHeader("Access-Control-Allow-Methods",
            "POST, GET, OPTIONS, DELETE, PUT");
        response.setHeader("Access-Control-Max-Age", "3600");
        response.setHeader("Access-Control-Allow-Headers",
            "Content-Type, Access-Token, Authorization, ybg");
        filterChain.doFilter(servletRequest, servletResponse);
    }

    @Override
    public void destroy() {}
}
```



(在springboot框架下)

```
@RestController
public class HelloWorldController {

    @Autowired
    JdbcTemplate jdbcTemplate;

    @CrossOrigin
    @RequestMapping("/")
    public String home() {
        final Logger log = LoggerFactory.getLogger(HelloWorldController.class);
        List<Book> result = new ArrayList<Book>();

        log.info("Querying Books");
        jdbcTemplate.query(
            "SELECT * FROM book",
            (rs, rowNum) -> new Book(rs.getLong("id"),
                rs.getString("title"),
                rs.getString("author"),
                rs.getString("language"),
                rs.getString("published"),
                rs.getString("sales"))
        ).forEach(book -> {log.info(book.toString()); result.add(book)});
        Iterator<Book> it = result.iterator();
    }
}
```

- The Fetch API provides an interface for fetching resources (including across the network).
- Fetch Interfaces
  - `WindowOrWorkerGlobalScope.fetch()`: The `fetch()` method used to fetch a resource.
  - **Headers**: Represents response/request headers, allowing you to query them and take different actions depending on the results.
  - **Request**: Represents a resource request.
  - **Response**: Represents the response to a request.

- A basic fetch request is really simple to set up. Have a look at the following code:

```
fetch('http://example.com/movies.json')
  .then((response) => {
    return response.json();
  })
  .then((data) => {
    console.log(data);
  });
```

- Here we are fetching a JSON file across the network and printing it to the console.
- The simplest use of `fetch()`
  - takes one argument — the path to the resource you want to fetch — and returns a promise containing the response (a Response object).

- The `fetch()` method can optionally accept a second parameter, an `init` object that allows you to control a number of different settings:

```
// Example POST method implementation:
async function postData(url = "", data = {}) {
  // Default options are marked with *
  const response = await fetch(url, {
    method: 'POST', // *GET, POST, PUT, DELETE, etc.
    mode: 'cors', // no-cors, *cors, same-origin
    cache: 'no-cache', // *default, no-cache, reload, force-cache, only-if-cached
    credentials: 'same-origin', // include, *same-origin, omit.
    headers: {
      'Content-Type': 'application/json'
      // 'Content-Type': 'application/x-www-form-urlencoded',
    },
    redirect: 'follow', // manual, *follow, error
    referrerPolicy: 'no-referrer', // no-referrer, *client
    body: JSON.stringify(data) // body data type must match "Content-Type" header
  });
  return response.json(); // parses JSON response into native JavaScript objects
}
postData('https://example.com/answer', { answer: 42 })
  .then((data) => {
    console.log(data); // JSON data parsed by `response.json()` call
  });
```

- Uploading JSON data

```
const data = { username: 'example' };

fetch('https://example.com/profile', {
  method: 'POST', // or 'PUT'
  headers: {
    'Content-Type': 'application/json',
  },
  body: JSON.stringify(data),
})
.then((response) => response.json())
.then((data) => {
  console.log('Success:', data);
})
.catch((error) => {
  console.error('Error:', error);
});
```

- Uploading a file

```
const formData = new FormData();
const fileField = document.querySelector('input[type="file"]');

formData.append('username', 'abc123');
formData.append('avatar', fileField.files[0]);

fetch('https://example.com/profile/avatar', {
  method: 'PUT',
  body: formData
})
.then((response) => response.json())
.then((result) => {
  console.log('Success:', result);
})
.catch((error) => {
  console.error('Error:', error);
});
```

- Uploading multiple files
  - Files can be uploaded using an HTML `<input type="file" multiple/>` input element, `FormData()` and `fetch()`.

```
const formData = new FormData();
const photos = document.querySelector('input[type="file"][multiple]');

formData.append('title', 'My Vegas Vacation');
for (let i = 0; i < photos.files.length; i++) {
  formData.append('photos', photos.files[i]);
}

fetch('https://example.com/posts', {
  method: 'POST',
  body: formData,
})
.then((response) => response.json())
.then((result) => { console.log('Success:', result); })
.catch((error) => { console.error('Error:', error); });
```

- Checking that the fetch was successful

```
fetch('flowers.jpg')
  .then((response) => {
    if (!response.ok) { 这里检查的是response本身是否出错
      throw new Error('Network response was not ok');
    }
    return response.blob();
  })
  .then((myBlob) => {
    myImage.src = URL.createObjectURL(myBlob);
  })
  .catch((error) => {
    console.error('There has been a problem with your fetch operation:', error);
  });
```

这里检查的是返回回来的data/blob数据是否出错，而能够在response.json()中正确返回出data(虽然可能data本身不对)的前提是response的status是OK的



- Supplying your own request object

```
const myHeaders = new Headers();
const myRequest = new Request('flowers.jpg', {
  method: 'GET',
  headers: myHeaders,
  mode: 'cors',
  cache: 'default',
});

fetch(myRequest)
  .then((response) => response.blob())
  .then((myBlob) => {
    myImage.src = URL.createObjectURL(myBlob);
  });
```

- Response objects
  - The most common response properties you'll use are:
    - **Response.status** — An integer (default value 200) containing the response status code.
    - **Response.statusText** — A string (default value "OK"), which corresponds to the HTTP status code message.
    - **Response.ok** — seen in use above, this is a shorthand for checking that status is in the range 200-299 inclusive. This returns a **Boolean**.

```
const myBody = new Blob();

addEventListener('fetch', function(event) {
  // ServiceWorker intercepting a fetch
  event.respondWith(
    new Response(myBody, {
      headers: { 'Content-Type': 'text/plain' }
    })
  );
});
```

- Body
  - Both requests and responses may contain body data.

```
const form = new FormData(document.getElementById('login-form'));

fetch('/login', {
  method: 'POST',
  body: form
});
```

- Cross-Origin Resource Sharing (CORS)
  - <https://developer.mozilla.org/en-US/docs/Web/HTTP/CORS>
- 你所需要的跨域问题的全套解决方案都在这里啦！（前后端都有）
  - <https://zhuanlan.zhihu.com/p/120764119>
- Fetch API
  - [https://developer.mozilla.org/en-US/docs/Web/API/Fetch\\_API](https://developer.mozilla.org/en-US/docs/Web/API/Fetch_API)
  - [https://www.w3cschool.cn/fetch\\_api/](https://www.w3cschool.cn/fetch_api/)



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Thank You!