

## Relazione Laboratorio IncApache

In questo laboratorio abbiamo implementato un web server IncApache (is not comparable to Apache), una versione minimale del server web Apache. Il server supporta la versione 1.0 del protocollo http e la versione 1.1 che permette l'implementazione delle pipeline grazie all'utilizzo dei thread. Il nostro server implementa i metodi HEAD, GET e la gestione dei cookie. Oltre ad aver testato il server tramite browser web abbiamo effettuato dei test tramite il programma Apache Jmeter e con telnet, alleghiamo i risultati dei vari test da noi effettuati.

Effettuiamo un test per testare il metodo GET, il metodo HEAD e il funzionamento dei cookie tramite il protocollo http in versione 1.0. Abbiamo generato 50 richieste e il server ha risposto correttamente a tutte queste.

Alleghiamo le risposte del server alla prima richiesta e all'ultima, possiamo notare che gli identificatori dei cookie sono corretti:

1	HTTP/1.0 200 OK	1	HTTP/1.0 200 OK
2	Date: Fri, 21 Dec 2018 16:00:12 GMT	2	Date: Fri, 21 Dec 2018 16:00:22 GMT
3	Set-Cookie: id=0; Expires=Fri, 21 Dec 2019 16:00:12 GMT;	3	Set-Cookie: id=49; Expires=Fri, 21 Dec 2019 16:00:22 GMT;
4	Server: incApache for SET.	4	Server: incApache for SET.
5	Connection: close	5	Connection: close
6	Content-Length: 936	6	Content-Length: 936
7	Content-Type: text/html; charset=us-ascii	7	Content-Type: text/html; charset=us-ascii
8	Last-Modified: Fri Dec 7 10:21:16 2018	8	Last-Modified: Fri Dec 7 10:21:16 2018
9		9	
1	17:00:12.689 Thread Group 1-1 HTTP Request	9	1203 123 9 0
2	17:00:12.889 Thread Group 1-2 HTTP Request	4	1203 123 4 1
3	17:00:13.089 Thread Group 1-3 HTTP Request	4	1203 123 4 1
4	17:00:13.289 Thread Group 1-4 HTTP Request	4	1203 123 4 1
5	17:00:13.490 Thread Group 1-5 HTTP Request	4	1203 123 3 0
6	17:00:13.690 Thread Group 1-6 HTTP Request	5	1203 123 5 0
7	17:00:13.890 Thread Group 1-7 HTTP Request	3	1203 123 3 0
8	17:00:14.090 Thread Group 1-8 HTTP Request	6	1203 123 5 1
9	17:00:14.289 Thread Group 1-9 HTTP Request	6	1203 123 5 1
10	17:00:14.490 Thread Group 1-10 HTTP Request	6	1203 123 5 1
11	17:00:14.690 Thread Group 1-11 HTTP Request	6	1204 123 6 1
12	17:00:14.890 Thread Group 1-12 HTTP Request	5	1204 123 5 1
13	17:00:15.091 Thread Group 1-13 HTTP Request	4	1204 123 3 0
14	17:00:15.293 Thread Group 1-14 HTTP Request	4	1204 123 4 1
15	17:00:15.494 Thread Group 1-15 HTTP Request	4	1204 123 4 0
16	17:00:15.693 Thread Group 1-16 HTTP Request	6	1204 123 6 1
17	17:00:15.895 Thread Group 1-17 HTTP Request	5	1204 123 5 0
18	17:00:16.095 Thread Group 1-18 HTTP Request	4	1204 123 4 0
19	17:00:16.294 Thread Group 1-19 HTTP Request	4	1204 123 4 1
20	17:00:16.496 Thread Group 1-20 HTTP Request	5	1204 123 5 0
21	17:00:16.696 Thread Group 1-21 HTTP Request	5	1204 123 5 0
22	17:00:16.896 Thread Group 1-22 HTTP Request	3	1204 123 3 1
23	17:00:17.096 Thread Group 1-23 HTTP Request	5	1204 123 4 0
24	17:00:17.296 Thread Group 1-24 HTTP Request	5	1204 123 5 1
25	17:00:17.495 Thread Group 1-25 HTTP Request	5	1204 123 5 1
26	17:00:17.695 Thread Group 1-26 HTTP Request	3	1204 123 3 1
27	17:00:17.895 Thread Group 1-27 HTTP Request	2	1204 123 2 1
28	17:00:18.096 Thread Group 1-28 HTTP Request	4	1204 123 4 1
29	17:00:18.296 Thread Group 1-29 HTTP Request	5	1204 123 5 0
30	17:00:18.497 Thread Group 1-30 HTTP Request	5	1204 123 5 0
31	17:00:18.696 Thread Group 1-31 HTTP Request	4	1204 123 4 1
32	17:00:18.896 Thread Group 1-32 HTTP Request	3	1204 123 3 1
33	17:00:19.097 Thread Group 1-33 HTTP Request	7	1204 123 6 1
34	17:00:19.296 Thread Group 1-34 HTTP Request	4	1204 123 4 1
35	17:00:19.496 Thread Group 1-35 HTTP Request	4	1204 123 3 1
36	17:00:19.696 Thread Group 1-36 HTTP Request	3	1204 123 3 0
37	17:00:19.896 Thread Group 1-37 HTTP Request	3	1204 123 3 1
38	17:00:20.098 Thread Group 1-38 HTTP Request	5	1204 123 5 0
39	17:00:20.297 Thread Group 1-39 HTTP Request	4	1204 123 4 1
40	17:00:20.498 Thread Group 1-40 HTTP Request	5	1204 123 5 0
41	17:00:20.698 Thread Group 1-41 HTTP Request	2	1204 123 2 0
42	17:00:20.898 Thread Group 1-42 HTTP Request	5	1204 123 5 1
43	17:00:21.097 Thread Group 1-43 HTTP Request	3	1204 123 3 0
44	17:00:21.297 Thread Group 1-44 HTTP Request	3	1204 123 3 1
45	17:00:21.497 Thread Group 1-45 HTTP Request	5	1204 123 5 1
46	17:00:21.698 Thread Group 1-46 HTTP Request	5	1204 123 5 0
47	17:00:21.898 Thread Group 1-47 HTTP Request	3	1204 123 3 1
48	17:00:22.099 Thread Group 1-48 HTTP Request	5	1204 123 5 0
49	17:00:22.299 Thread Group 1-49 HTTP Request	5	1204 123 5 1
50	17:00:22.498 Thread Group 1-50 HTTP Request	6	1204 123 6 1

Abbiamo provato a effettuare la richiesta di un metodo da noi non implementato ottenendo questa risposta dal server:

```
1 HTTP/1.0 501 Method Not Implemented
2 Allow: HEAD,GET
3 Date: Fri, 21 Dec 2018 16:14:23 GMT
4 Set-Cookie: id=100; Expires=Fri, 21 Dec 2019 16:14:23 GMT;
5 Server: incApache for SET.
6 Connection: close
7 Content-Length: 311
8 Content-Type: text/html; charset=us-ascii
9 Last-Modified: Fri Dec 7 10:21:21 2018
10
```

Abbiamo poi effettuato una richiesta di GET su un file non presente nella cartella www-root:

```
1 HTTP/1.0 404 Not Found
2 Date: Fri, 21 Dec 2018 16:19:45 GMT
3 Set-Cookie: id=105; Expires=Fri, 21 Dec 2019 16:19:45 GMT;
4 Server: incApache for SET.
5 Connection: close
6 Content-Length: 250
7 Content-Type: text/html; charset=us-ascii
8 Last-Modified: Fri Dec 7 10:21:20 2018
9
```

Test if-modified-since:

```
GET / HTTP/1.1
If-Modified-Since: Fri, 21 Dec 2018 10:20:15 GMT

HTTP/1.1 304 Not Modified
Date: Fri, 21 Dec 2018 21:37:59 GMT
Set-Cookie: id=0; Expires=Fri, 21 Dec 2019 21:37:59 GMT;
Server: incApache for SET.
```

Infine abbiamo testato il server tramite l'utilizzo del protocollo http 1.1 e quindi abbiamo testato la ricezione di richieste e l'invio di risposte in pipeline. Abbiamo inviato 46 richieste di GET al server alcune di queste in pipeline ottenendo i seguenti risultati:

1	HTTP/1.1 200 OK	1	HTTP/1.1 200 OK
2	Date: Fri, 21 Dec 2018 16:36:02 GMT	2	Date: Fri, 21 Dec 2018 16:36:03 GMT
3	Set-Cookie: id=150; Expires=Fri, 21 Dec 2019 16:36:02 GMT;	3	Set-Cookie: id=198; Expires=Fri, 21 Dec 2019 16:36:03 GMT;
4	Server: incApache for SET.	4	Server: incApache for SET.
5	Content-Length: 936	5	Content-Length: 936
6	Content-Type: text/html; charset=us-ascii	6	Content-Type: text/html; charset=us-ascii
7	Last-Modified: Fri Dec 7 10:21:16 2018	7	Last-Modified: Fri Dec 7 10:21:16 2018
8		8	

Sample #	Start Time	Thread Name	Label	Sample Time(ms)	Status	Bytes	Sent Bytes	Latency	Connect Time(ms)
1	17:36:02.784	Thread Group 1-2	HTTP Request	3		1186	123	3	0
2	17:36:02.784	Thread Group 1-1	HTTP Request	5		1186	123	4	0
3	17:36:02.784	Thread Group 1-5	HTTP Request	7		1186	123	7	0
4	17:36:02.784	Thread Group 1-3	HTTP Request	8		1186	123	8	1
6	17:36:02.784	Thread Group 1-6	HTTP Request	14		1186	123	13	1
7	17:36:02.785	Thread Group 1-7	HTTP Request	18		1186	123	18	1
10	17:36:02.785	Thread Group 1-4	HTTP Request	22		1186	123	22	0
8	17:36:02.786	Thread Group 1-8	HTTP Request	17		1186	123	17	0
5	17:36:02.792	Thread Group 1-11	HTTP Request	2		1186	123	2	0
9	17:36:02.792	Thread Group 1-9	HTTP Request	13		1186	123	13	1
12	17:36:02.792	Thread Group 1-10	HTTP Request	18		1186	123	18	0
11	17:36:02.794	Thread Group 1-13	HTTP Request	14		1186	123	14	0
13	17:36:02.794	Thread Group 1-14	HTTP Request	17		1186	123	17	1
14	17:36:02.795	Thread Group 1-12	HTTP Request	18		1186	123	18	0
15	17:36:02.796	Thread Group 1-15	HTTP Request	19		1186	123	19	0
16	17:36:02.796	Thread Group 1-17	HTTP Request	20		1186	123	20	1
17	17:36:02.796	Thread Group 1-16	HTTP Request	22		1186	123	22	1
18	17:36:02.797	Thread Group 1-18	HTTP Request	23		1186	123	23	0
19	17:36:02.797	Thread Group 1-19	HTTP Request	24		1186	123	24	1
20	17:36:02.798	Thread Group 1-20	HTTP Request	26		1186	123	26	0
21	17:36:02.799	Thread Group 1-22	HTTP Request	25		1186	123	25	1
24	17:36:02.799	Thread Group 1-21	HTTP Request	32		1186	123	32	1
22	17:36:02.801	Thread Group 1-23	HTTP Request	26		1186	123	26	1
23	17:36:02.806	Thread Group 1-24	HTTP Request	23		1186	123	22	0
25	17:36:02.806	Thread Group 1-26	HTTP Request	27		1186	123	27	0
26	17:36:02.806	Thread Group 1-25	HTTP Request	29		1186	123	29	0
27	17:36:02.806	Thread Group 1-27	HTTP Request	31		1186	123	31	0
28	17:36:02.807	Thread Group 1-28	HTTP Request	32		1186	123	32	0
47	17:36:02.807	Thread Group 1-29	HTTP Request	1008		1186	123	1008	1005
49	17:36:02.807	Thread Group 1-30	HTTP Request	1012		1186	123	1012	1005
29	17:36:02.808	Thread Group 1-31	HTTP Request	32		1186	123	32	0
48	17:36:02.808	Thread Group 1-32	HTTP Request	1009		1186	123	1009	1004
50	17:36:02.808	Thread Group 1-33	HTTP Request	1013		1186	123	1013	1004
30	17:36:02.811	Thread Group 1-34	HTTP Request	31		1186	123	31	1
31	17:36:02.823	Thread Group 1-35	HTTP Request	20		1186	123	20	0
32	17:36:02.825	Thread Group 1-37	HTTP Request	20		1186	123	20	1
33	17:36:02.827	Thread Group 1-38	HTTP Request	19		1186	123	19	0
34	17:36:02.827	Thread Group 1-39	HTTP Request	21		1186	123	21	0
41	17:36:02.827	Thread Group 1-36	HTTP Request	31		1186	123	31	5
35	17:36:02.829	Thread Group 1-41	HTTP Request	20		1186	123	20	1
36	17:36:02.829	Thread Group 1-42	HTTP Request	22		1186	123	22	1
37	17:36:02.830	Thread Group 1-43	HTTP Request	22		1186	123	22	0
38	17:36:02.830	Thread Group 1-44	HTTP Request	24		1186	123	24	0
39	17:36:02.831	Thread Group 1-45	HTTP Request	24		1186	123	24	0
40	17:36:02.831	Thread Group 1-40	HTTP Request	26		1186	123	26	0
42	17:36:02.832	Thread Group 1-48	HTTP Request	28		1186	123	27	1
44	17:36:02.832	Thread Group 1-46	HTTP Request	31		1186	123	31	6
43	17:36:02.833	Thread Group 1-49	HTTP Request	28		1186	123	28	0
45	17:36:02.838	Thread Group 1-50	HTTP Request	27		1186	123	27	0
46	17:36:02.839	Thread Group 1-47	HTTP Request	28		1186	123	28	0