

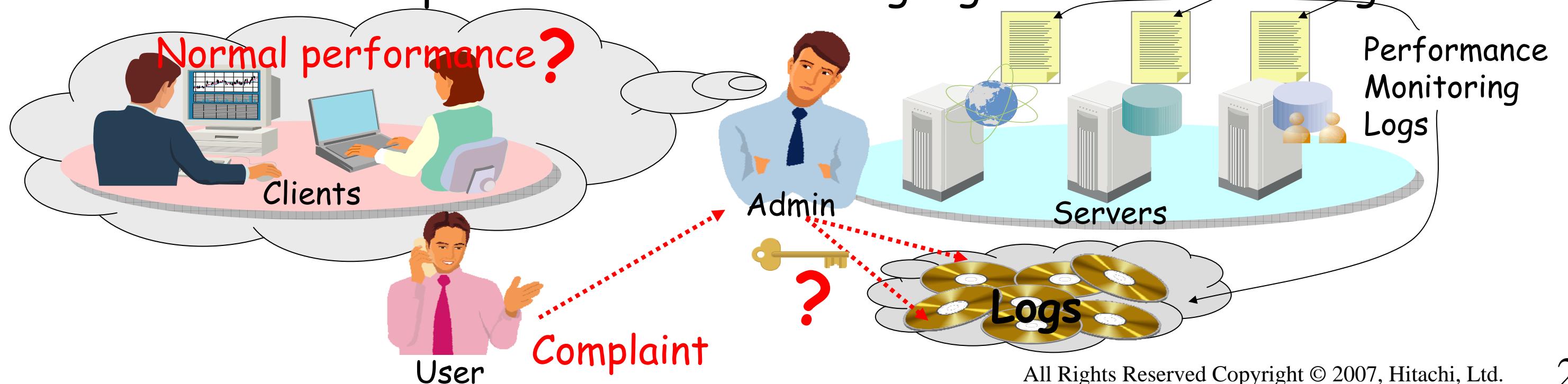
Ajax Logger

Client Monitoring Technique
with High Installability & Scalability

November 2007

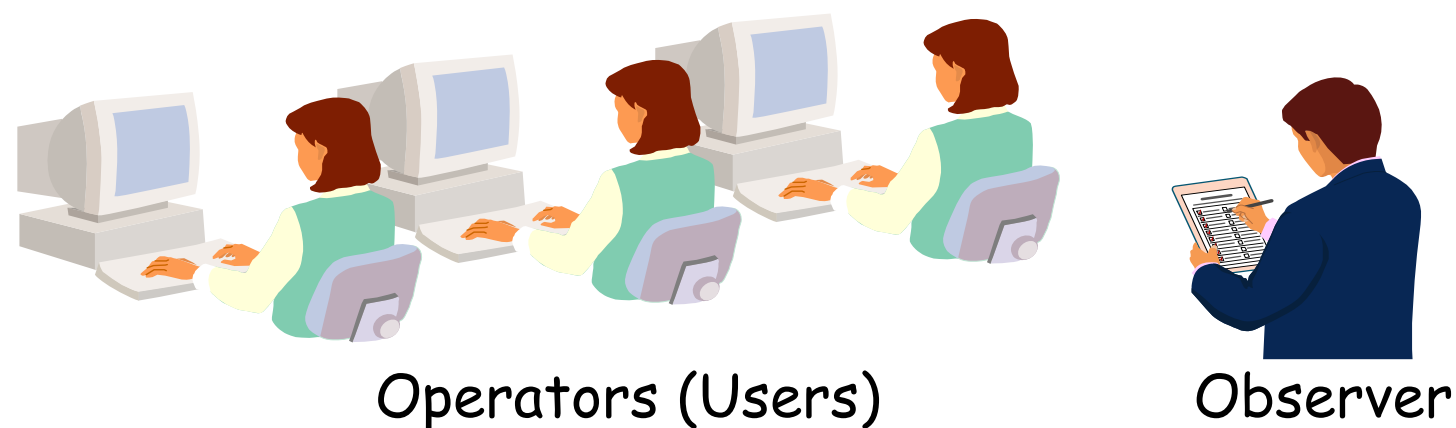
 Hitachi Ltd., Central Research Laboratory
Tomohiro Nakamura

- The importance of Web system administration is growing
 - web applications everywhere
 - "mission critical web applications" are taking off
- Web system administrators having problems because
 - real user-side performance is uncertain
 - which server logs have a key to a complaint from users
- Defects are found everywhere from servers to clients
 - client monitoring is required (not only server monitoring)
 - link client-side performance monitoring logs to server-side logs



■ Stopwatch method

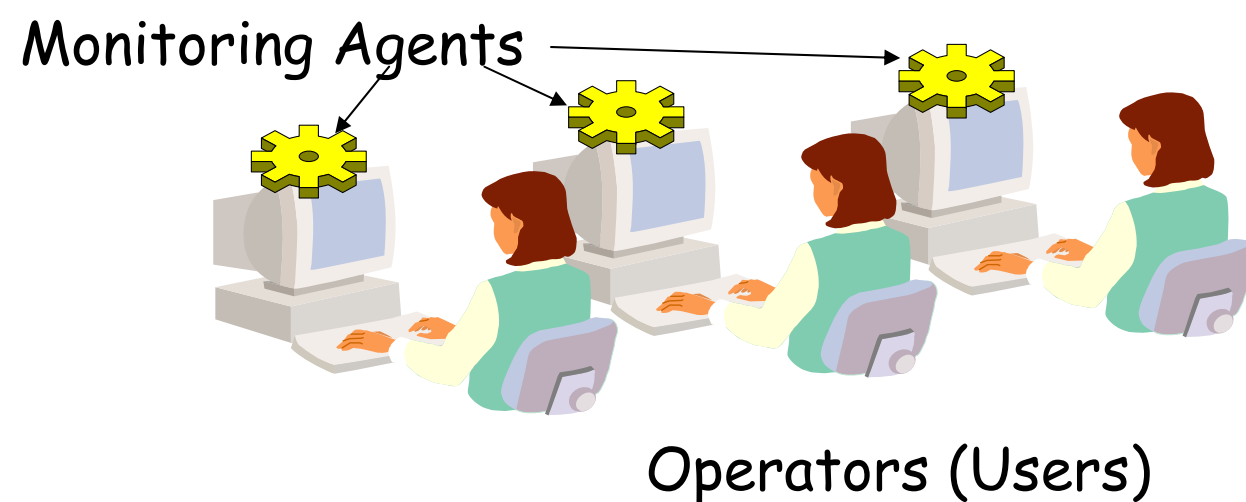
- observer measures user-side performance with stopwatch



✗ High cost
No scalability
No sustainability
Stressful
No server-side analysis

■ Monitoring agent

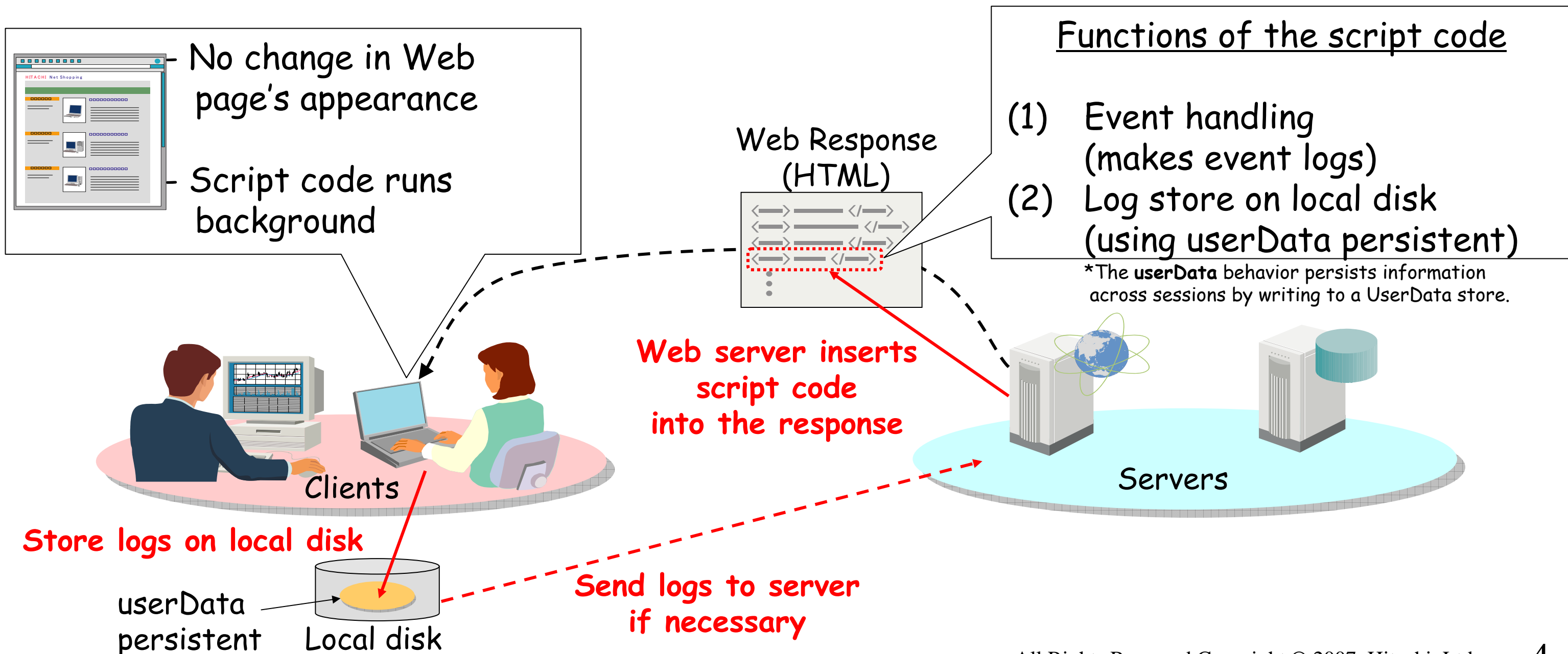
- client application to monitor user-side performance



✗ Messy installation
(low scalability)
Expensive
Unwilling users
No server-side analysis

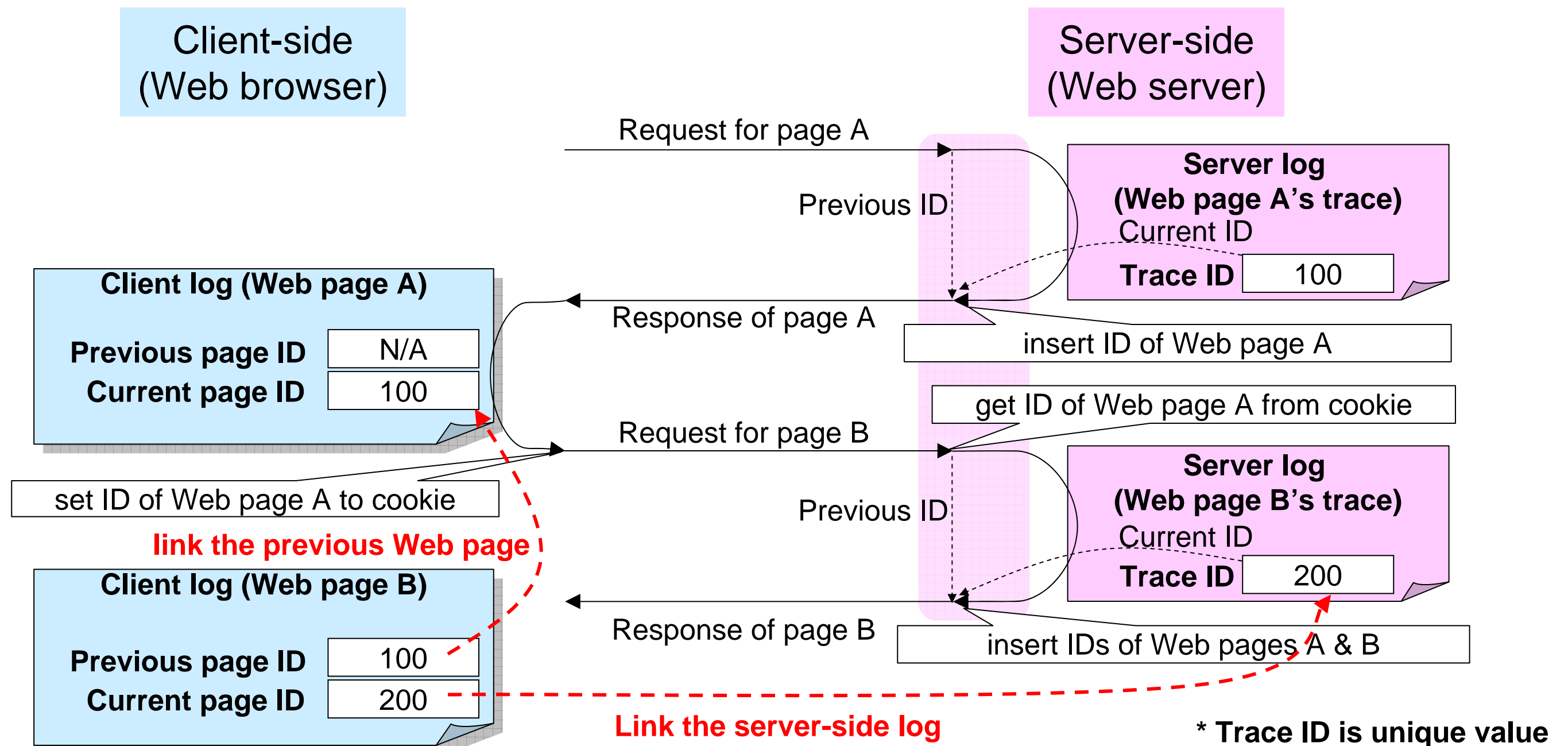
Client Monitoring Technique using Ajax Technology

- no need to install tools on client PCs, only Web browser
- no need to modify web applications, only to change server settings



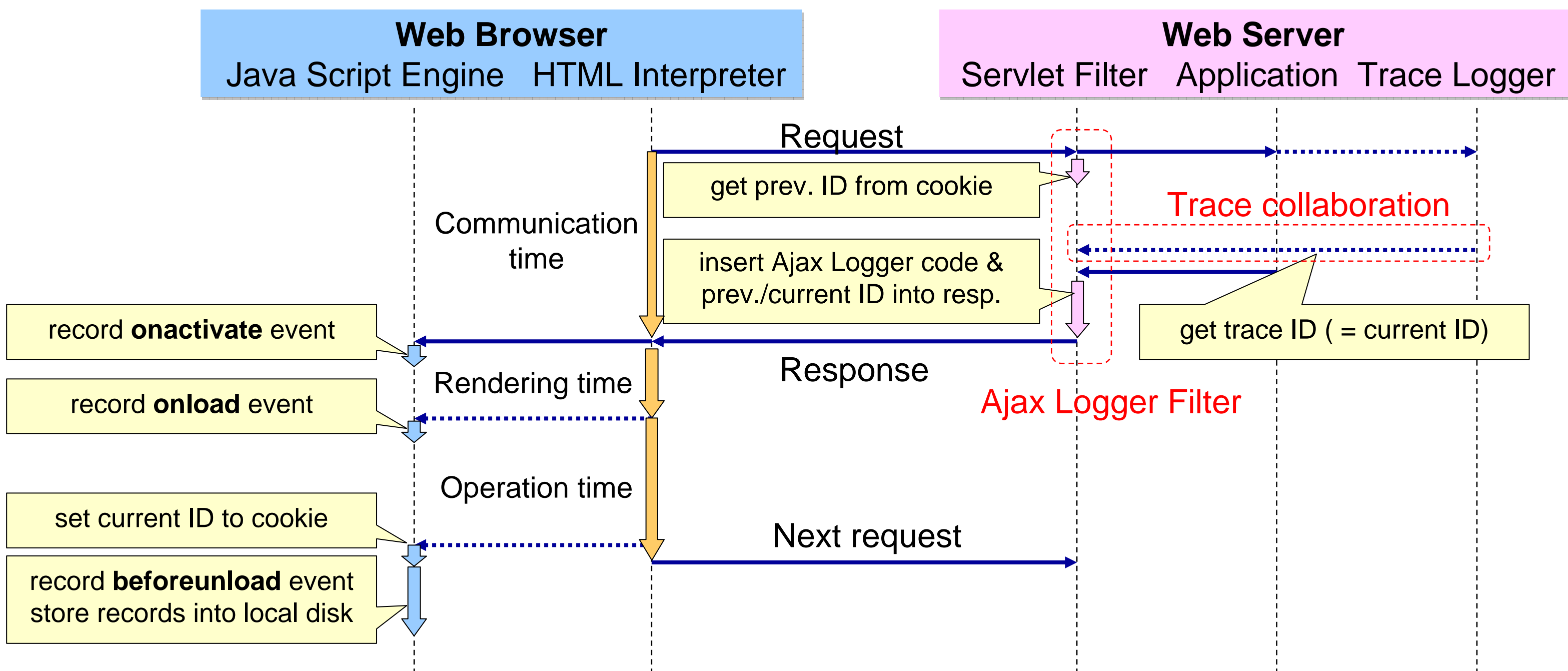
■ ID Associates Logs

- can retrieve server log from client log & Web page access history



Client-Side Performance Monitoring

- break performance problem down into communication, rendering, etc.



Prototype Log Monitoring

- user-side performance monitoring

Monitor UserData - Microsoft Internet Explorer

Monitor userData

| # | Time | Comm. | Rend. | Resp. | Oper. | URL | IDNO |
|----|--------------|-------|-------|-------|---------|--|------------------|
| 1 | 22:46:52.156 | 438 | 78 | 516 | - | http://ajdemo:8080/Home.jsp | 1194526613921000 |
| 2 | 22:46:44.843 | 32 | 1968 | 2000 | 6797 | http://ajdemo:8080/SearchResults.jsp?C_ID=0 | 1194529596500000 |
| 3 | 22:46:41.468 | 515 | 125 | 640 | 1375 | http://ajdemo:8080/SearchRequest.jsp?C_ID=0 | 1194529592234000 |
| 4 | 22:46:38.828 | 1157 | 1953 | 3110 | 2000 | http://ajdemo:8080/SearchResults.jsp?C_ID=0 | 1194529596500900 |
| 5 | 22:46:32.500 | 359 | 235 | 594 | 3218 | http://ajdemo:8080/SearchRequest.jsp?C_ID=0 | 1194529592234900 |
| 6 | 22:46:30.328 | 219 | 1938 | 2157 | 1578 | http://ajdemo:8080/ProductDetail.jsp?BookInfo=2361&C_ID=0 | 1194529588343900 |
| 7 | 22:46:26.875 | 921 | 204 | 1125 | 1296 | http://ajdemo:8080/NewProducts.jsp?subject=BUSINESS&C_ID=0 | 1194529586593900 |
| 8 | 22:46:22.812 | 265 | 141 | 406 | 2938 | http://ajdemo:8080/Home.jsp?C_ID=0 | 1194529582625900 |
| 9 | 22:45:18.937 | 266 | 187 | 453 | 63469 | http://ajdemo:8080/ProductDetail.jsp?BookInfo=3950&C_ID=0 | 1194529518703900 |
| 10 | 22:45:14.468 | 453 | 78 | 531 | 4016 | http://ajdemo:8080/ProductDetail.jsp?BookInfo=3950&C_ID=0 | 1194529514328900 |
| 11 | 22:44:50.390 | 250 | 265 | 515 | 23547 | http://ajdemo:8080/Home.jsp?C_ID=0 | 1194529490046900 |
| 12 | 22:22:49.812 | 344 | 125 | 469 | 1320063 | http://ajdemo:8080/Home.jsp?C_ID=0 | 1194528169531900 |
| 13 | 22:22:47.484 | - | 47 | - | 1859 | http://ajdemo:8080/ProductDetail.jsp?BookInfo=8372&C_ID=0 | 1194528167375900 |

User-side performance break down

Each page access has unique ID linked to server-side log
→ easy inquiry using ID

Access history

Mail Form - Microsoft Internet Explorer

Inquiry Form

| | |
|---------------------|---|
| IDNO | 1194529596500900 |
| Time | 22:46:38.828 |
| Communication Time | 1157 |
| Rendering Time | 1953 |
| Total Response Time | 3110 |
| Operation Time | 2000 |
| URL | http://ajdemo:8080/SearchResults.jsp?C_ID=0 |

Comments:

Submit Clear

7

Application Example

Ajax Logger - Log Monitoring (2) -

Prototype Log Monitoring

- statistics analysis

Statistics Report - Microsoft Internet Explorer

ファイル(E) 編集(E) 表示(V) お気に入り(A) ツール(T) ヘルプ(H) 戻る 検索 お気に入り

Statistics Report

| # | URL | Count | Time | | Communication | | | Rendering | | | Response | | | Operation | | |
|---|---|-------|--------------|--------------|---------------|-----|-----|-----------|------|------|----------|------|------|-----------|------|--------|
| | | | Initial | Latest | Max | Min | Ave | Max | Min | Ave | Max | Min | Ave | Max | Min | Ave |
| 1 | http://ajdemo:8080/Home.jsp?C_ID=0 | 3 | 22:22:49.812 | 22:46:22.812 | 344 | 250 | 286 | 265 | 125 | 177 | 515 | 406 | 463 | 1320063 | 3828 | 449286 |
| 2 | http://ajdemo:8080/SearchResults.jsp?C_ID=0 | 2 | 22:46:38.828 | 22:46:44.843 | 1157 | 32 | 594 | 1968 | 1953 | 1960 | 3110 | 2000 | 2555 | 7000 | 2265 | 4632 |
| 3 | http://ajdemo:8080/SearchRequest.jsp?C_ID=0 | 2 | 22:46:32.500 | 22:46:41.468 | 515 | 359 | 437 | 235 | 125 | 180 | 640 | 594 | 617 | 4359 | 1391 | 2875 |
| 4 | http://ajdemo:8080/ProductDetail.jsp?BookInfo=3950&C_ID=0 | 2 | 22:45:14.468 | 22:45:18.937 | 453 | 266 | 359 | 187 | 78 | 132 | 531 | 453 | 492 | 63719 | 4063 | 33891 |
| 5 | http://ajdemo:8080/Home.jsp | 1 | 22:46:52.156 | 22:46:52.156 | 438 | 438 | 438 | 78 | 78 | 78 | 516 | 516 | 516 | - | - | - |
| 6 | http://ajdemo:8080/ProductDetail.jsp?BookInfo=2361&C_ID=0 | 1 | 22:46:30.328 | 22:46:30.328 | 219 | 219 | 219 | 1938 | 1938 | 1938 | 2157 | 2157 | 2157 | 1922 | 1922 | 1922 |
| 7 | http://ajdemo:8080/NewProducts.jsp?subject=BUSINESS&C_ID=0 | 1 | 22:46:26.875 | 22:46:26.875 | 921 | 921 | 921 | 204 | 204 | 204 | 1125 | 1125 | 1125 | 1484 | 1484 | 1484 |
| 8 | http://ajdemo:8080/ProductDetail.jsp?BookInfo=8372&C_ID=0 | 1 | 22:22:47.484 | 22:22:47.484 | - | - | - | 47 | 47 | 47 | - | - | - | 2187 | 2187 | 2187 |

Best, worst, average performance

Sort by page access count
→ analyze page access trends

→ analyze each page's features
(detect heavy pages, tricky pages, etc...)

■ Ajax Logger

- **Client Monitoring** Technique using Ajax Technology
- High Installability:
 - no need to install tools on client PCs
 - no need to modify web applications
- High Scalability:
 - store logs on local disk, no server-side additional loading
- Application Example - Client-side Performance Monitoring -
 - break performance problems down, easy inquiry using log ID

■ Future Work

- More types of applications (ex: collaboration with anomaly detection)
- Apply for usability evaluation