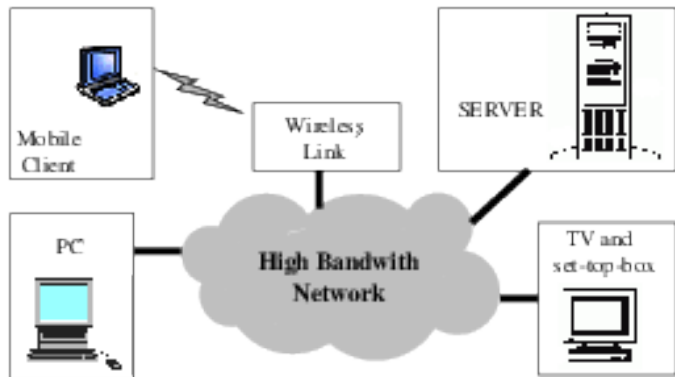


Automatic Verification — Model Checking

Sérgio Campos
Edmund Clarke, Ken McMillan

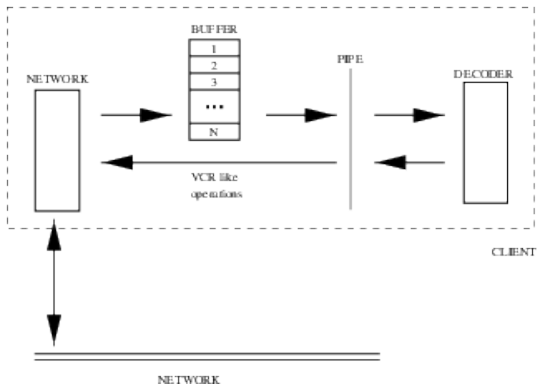
Verification Examples — VoD Server

Example: VoD



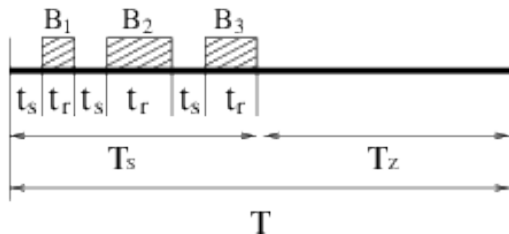
The Almadem VoD Server

Example: VoD



The Almadem VoD Server

Example: VoD



The Almadem VoD Server

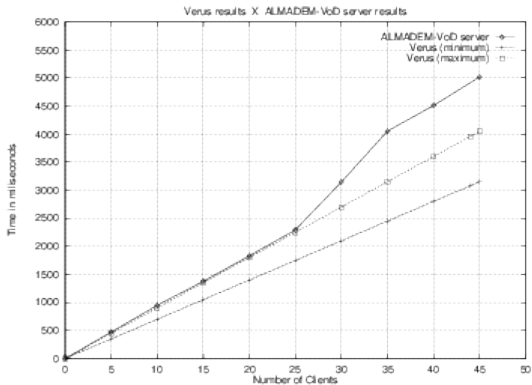
```
while (true) {
  seekTime = select {2,3,4}; /* valid seek time */
  while (seekTime > 0) {
    wait (1); /* passage of seek time */
    seekTime = seekTime - 1;
  }
  readingTime = select {12,14}; /* valid disk time */
  while (readingTime > 0) {
    wait (1); /* passage disk transfer time */
    readingTime = readingTime - 1;
  }
}
...

/* minimum and maximum service time in a cycle */
MIN (beginningOfService, endOfService);
MAX (beginningOfService, endOfService);
```

Example: VoD

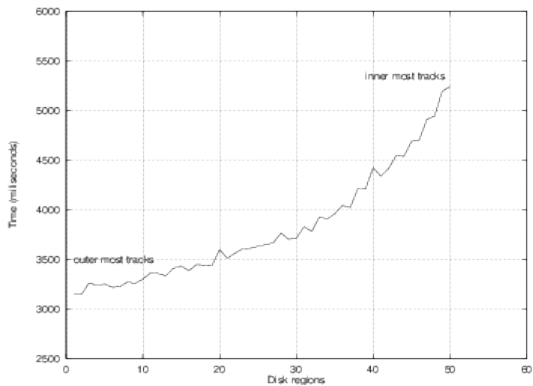
Comparison Execution × Model

Example: VoD



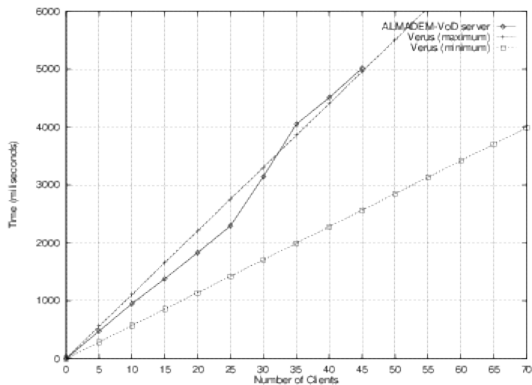
Comparison Execution \times Model

Example: VoD



Comparison Execution \times Model

Example: VoD



Comparison Execution × Model

Produtor

```
while (true) {  
    ...  
    send(c, buf[i]);  
  
    ...  
}
```

Consumidor

```
while (true) {  
    ...  
    receive(p, buf[i]);  
  
    ...  
}
```

Example: VoD

Comparison Execution × Model

Produtor

```
while (true) {  
    ...  
    send(c, buf[i]);  
    wait(m);  
    ...  
}
```

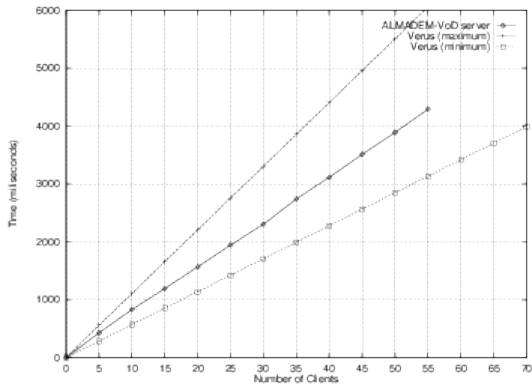
Consumidor

```
while (true) {  
    ...  
    receive(p, buf[i]);  
    signal(m);  
    ...  
}
```

Example: VoD

Comparison Execution × Model

Example: VoD



Results

- ▶ Number of clients served before: 35
- ▶ Number of clients served after: 52

Gain of more than 40% !!!