

Contest Environment Using Wireless
Networks:
A Case Study from Japan

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Introduction

- Japan could not send delegates between 1998 and 2005 for financial reasons.
- Japan resumed to send in 2006.
- I work in domestic contests as an alumnus. (I was a contestant in IOI 2006 Mexico)

Domestic Contests in Japan

First Round

- Online, output only
- 714 contestants (Dec., 2010)

Second Round

- Onsite, IOI-style (2011~)
- 61 contestants (Feb., 2011)

Final Round

- Onsite, IOI-style
- 18 contestants (May, 2011)

Details of Second Round Contest

- About 60 contestants compete in a conference room.

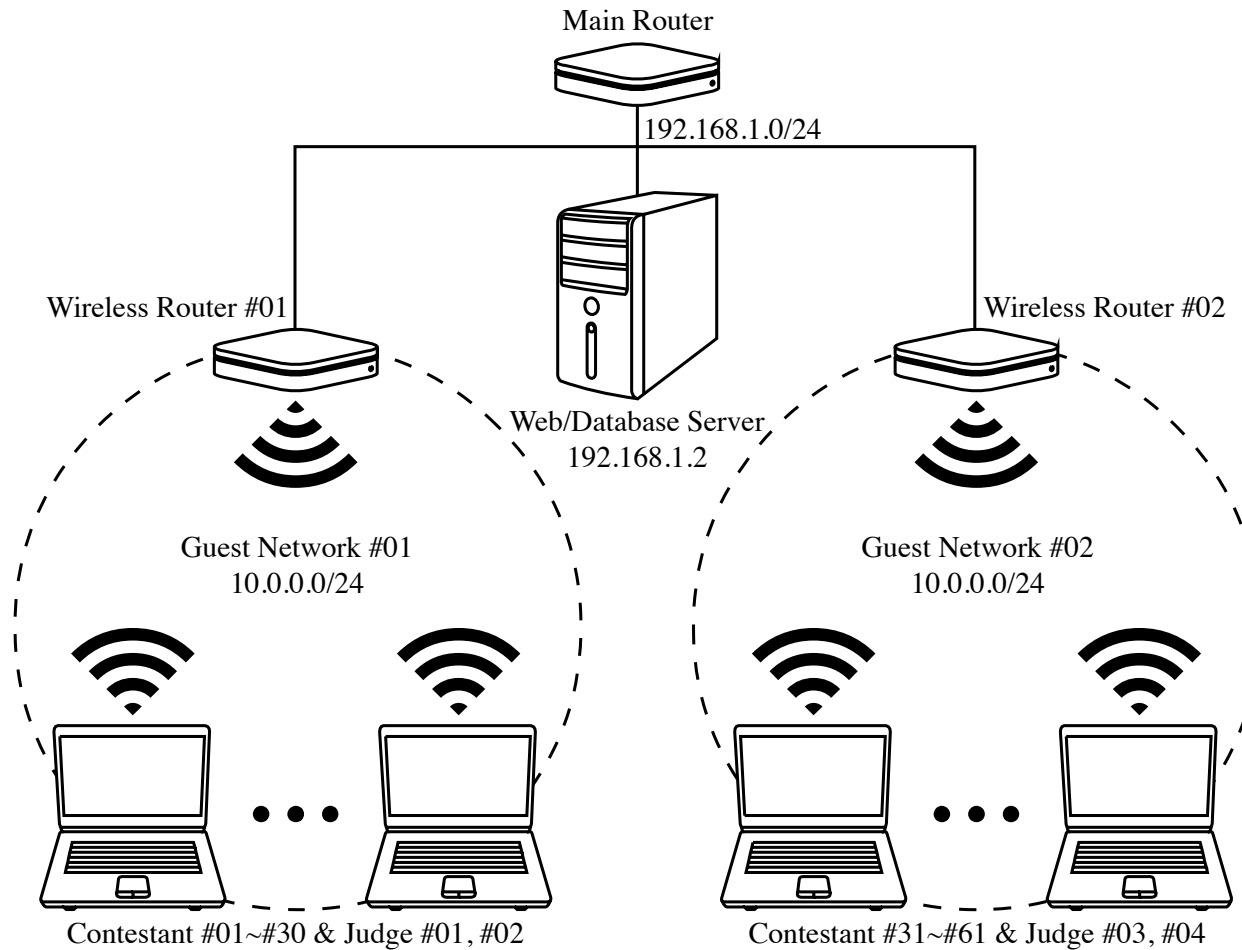


Details of Second Round Contest

- The object is to measure the ability to estimate computational time.
- Judging procedure:
 - Manually collect programs, and execute them later (~2009)
 - Set up an web system to collect programs, and execute them later (2010)
 - Set up an IOI-style judge system (2011)

Using Wireless Network

Network Structure



Result

- Successfully managed with wireless routers:
 - We used “AirPort Extreme” this time, because it can officially hold 50 users at once. (Some wireless routers cannot hold such a large number of users at once.)
- No wires between laptops and routers:
 - We can easily set up the network.
 - We do no longer stumble over network wires.

Experience in Judging System

- Developing Imo Judge System for:
 - Japanese Olympiad in Informatics, APIO 2012,
 - Practice contests for ICPC, and so on.
- Some interesting traps for an online judge system:
 - Hacking using temp directories,
 - Endless warnings, and etc.

Trap 1 – Hacking using /var/tmp

- Submit a source code to write a source code in /var/tmp/foobar.

```
#include <stdio.h>

int main() {
    freopen("/var/tmp/foobar", "w", stdout);
    printf("#include <stdio.h>");
    printf("int main() {");
    ...
    printf(")\n");
}
```

- Submit a source code that includes /var/tmp/foobar with include directive.

```
#include "/var/tmp/foobar"
```

Trap 2 - Endless Warnings

- This code invokes warnings over 10M times in compiling.

```
#include <stdio.h>
template<int a, int b, int c>
struct u { static int v() {
    printf("%d\n"); // a trigger of warning
    return u<a, b, c - 1>::v() + 1;
} };
template<int a, int b>
struct u<a, b, 0> { static int v() { return 0; } };
template<int a, int b>
struct t { static int v() { return u<a, b, b>::v() + t<a, b - 1>::v(); } };
template<int a>
struct t<a, 0> { static int v() { return 0; } };
template<int a>
struct s { static int v() { return t<a, a>::v() + s<a - 1>::v(); } };
template<>
struct s<0> { static int v() { return 0; } };
// Calculate Tetrahedral Numbers (n(n+1)(n+2)/6)
int main() { printf("%d\n", s<400>::v()); }
```

Conclusion

- I suggested to hold domestic contests using wireless networks reducing troubles.
- Please send e-mail to [ioi2011 at imoz.jp](mailto:ioi2011@imoz.jp) or talk to @imos on Twitter.
- Source code and manuals of Imo Judge will be released by APIO 2012.