# United States Patent [19]

## Dan et al.

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[54] **SUPPORT FOR PORTABLE TRUSTED SOFTWARE**

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[21] Appl. No.: **661,517**

[22] Filed: **Jun. 11, 1996**

[51] **Int. Cl.$^6$** ........................................................ **H04L 9/00**

[52] **U.S. Cl.** ................................... **380/4**; 380/23; 380/25

[58] **Field of Search** .................................... 380/23, 25, 4

[56] **References Cited**

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[57] **ABSTRACT**

A form of authentication is provided wherein a trusted third party signs a certificate to identify the author of a program and to secure its integrity. The program code is encapsulated or otherwise associated with the certificate and an access control list (ACL). The access control list describes the permissions and resources required by the code. An enforcement mechanism which allocates system permissions and resources in accordance with the ACL. In a preferred embodiment, a code production system communicates with a certification agency, which is a trusted third party. The certification agency issues a certificate for the code and a certificate for the access list of that code. Once the certificate is issued it is not possible for any party to modify the code or access list without invalidating the certificate. The code and its ACL, along with their certificates are stored on a server. A client downloading the code or access list can verify the integrity of the code/access list and the system can enforce the access list such that the permissions and resources are not exceeded.
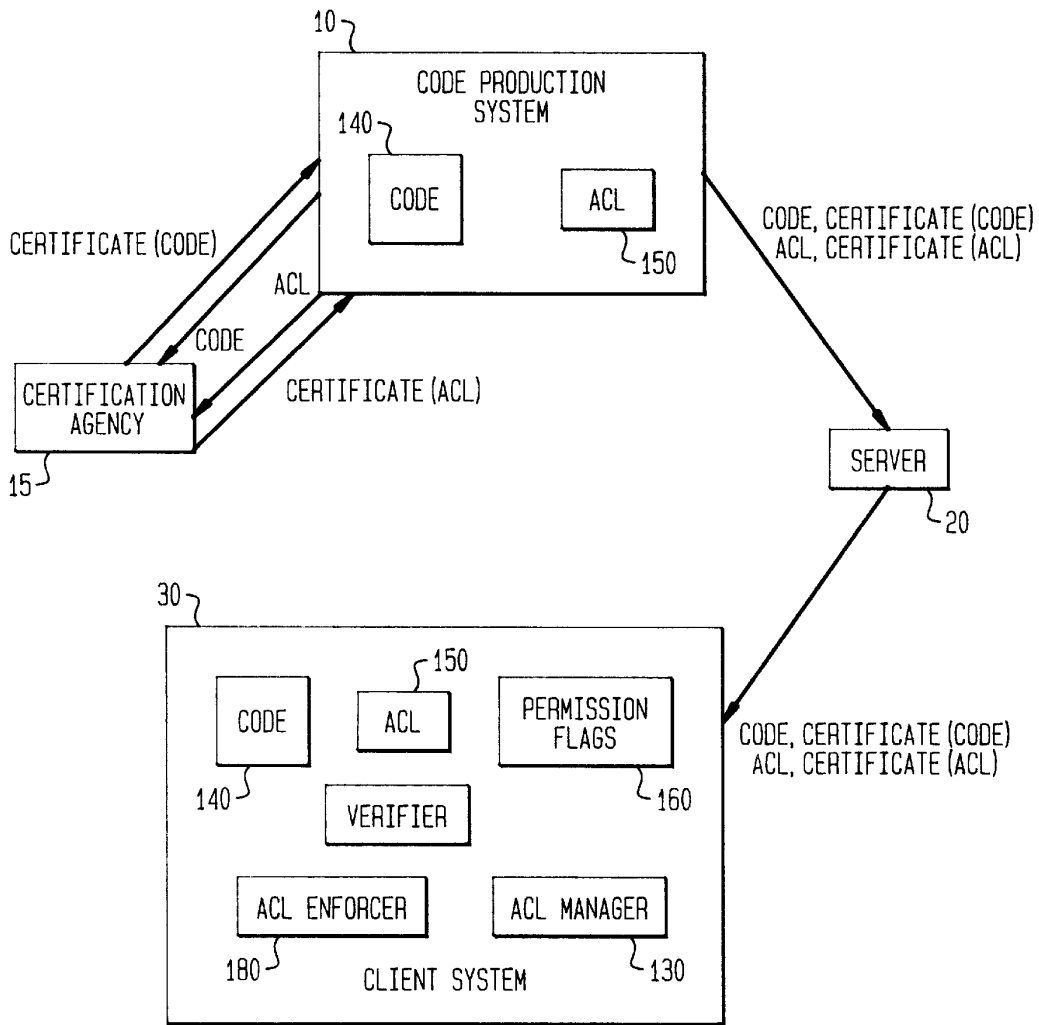
**20 Claims, 8 Drawing Sheets**
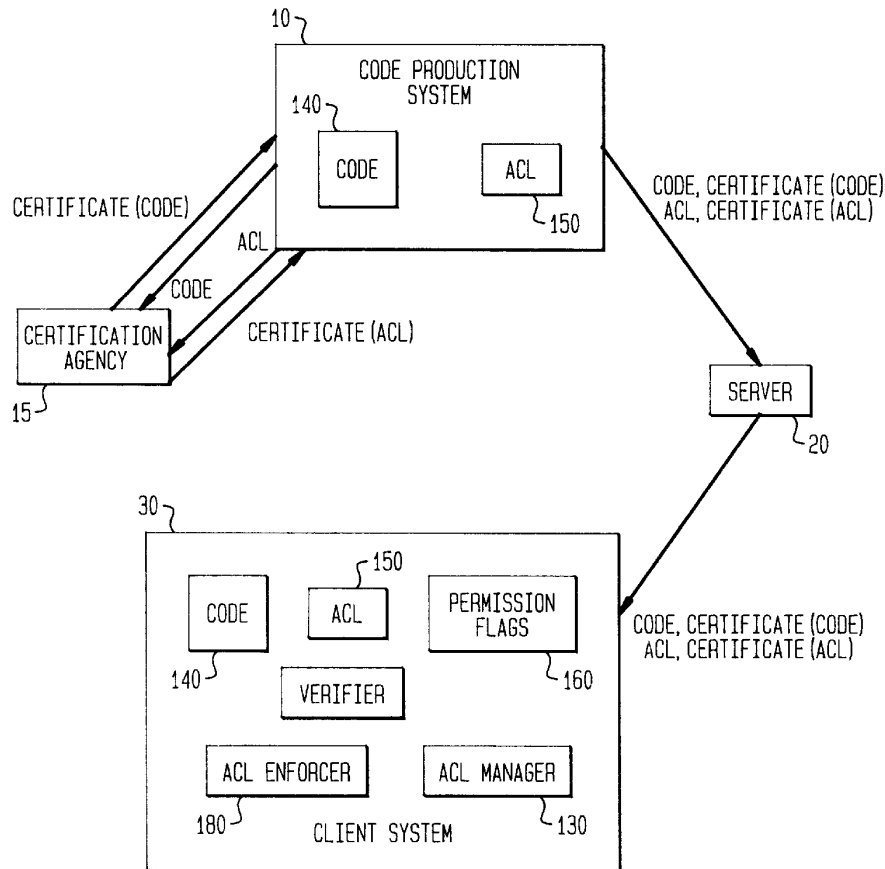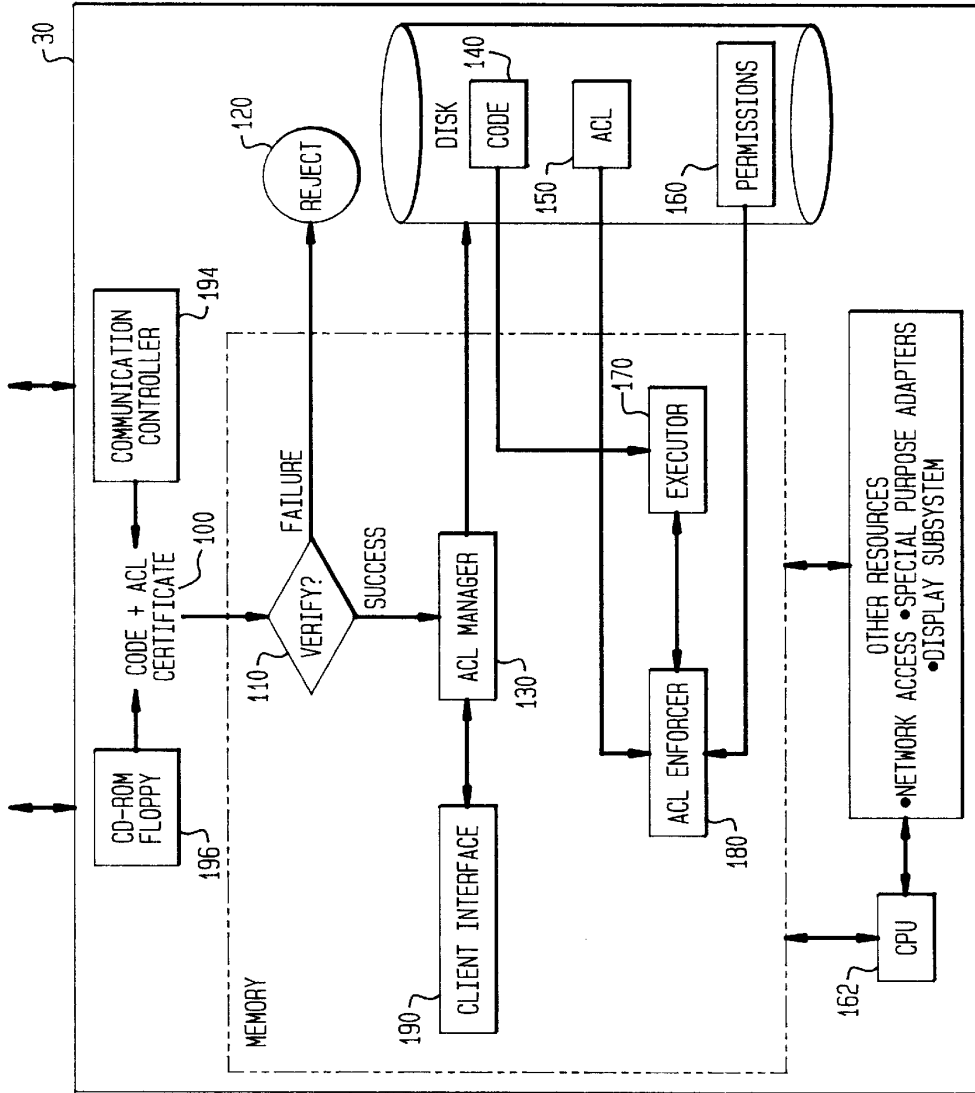
Symantec 1006
IPR of U.S. Pat. No. 6,154,844

*FIG. 1*

**FIG. 2**

## FIG. 3

200

| PHYSICAL RESOURCE NAME 205 | RESOURCE ATTRIBUTE 210 | MAXIMUM CONSUMP. RATE 215 | MAXIMUM AMOUNT 220 |
|---|---|---|---|
| DISK | SPACE | | 100 MB |
| DISK | I/O | 100/s | 10 MB |
| MEMORY | | | 8 MB |
| CPU | | 50 MIPS | 1 SEC |

250                                               265

| LOGICAL RESOURCE NAME 255 | PARAMETER LIST 260 |
|---|---|
| OPEN | |
| BIND | |

| STR/tmp/*, $APPLET_DIR/* |
|---|
| STR rw |
| |

| STR$DB/* |
|---|
| STR r |
| |

| INT 1024-$MAXINT |
|---|
| |

| PARM.TYPE 270 | PARM.VAL.275 |
|---|---|
| nextPE 280 | |

## FIG. 4

300

| PHYSICAL RESOURCE NAME 305 | RESOURCE ATTRIBUTE 310 | MAXIMUM CONSUMP. RATE 315 | MAXIMUM AMOUNT 320 | ACTUAL CONSUMP. RATE 325 | ACTUAL USE 330 |
|---|---|---|---|---|---|
| DISK | SPACE | | 100 MB | | |
| DISK | I/O | 100/s | 10 MB | | |
| MEMORY | | | 8 MB | | |
| CPU | | 50 MIPS | 1 SEC | | |

350

365

| LOGICAL RESOURCE NAME 355 | PARAMETER LIST 360 |
|---|---|
| OPEN | |
| BIND | |

| STR/tmp/*, $APPLET_DIR/* | |
|---|---|
| STR rw | |
| | YES |

| STR$DB/* | |
|---|---|
| STR r | |
| | NO |

| INT 1024-$MAXINT | |
|---|---|
| | YES |

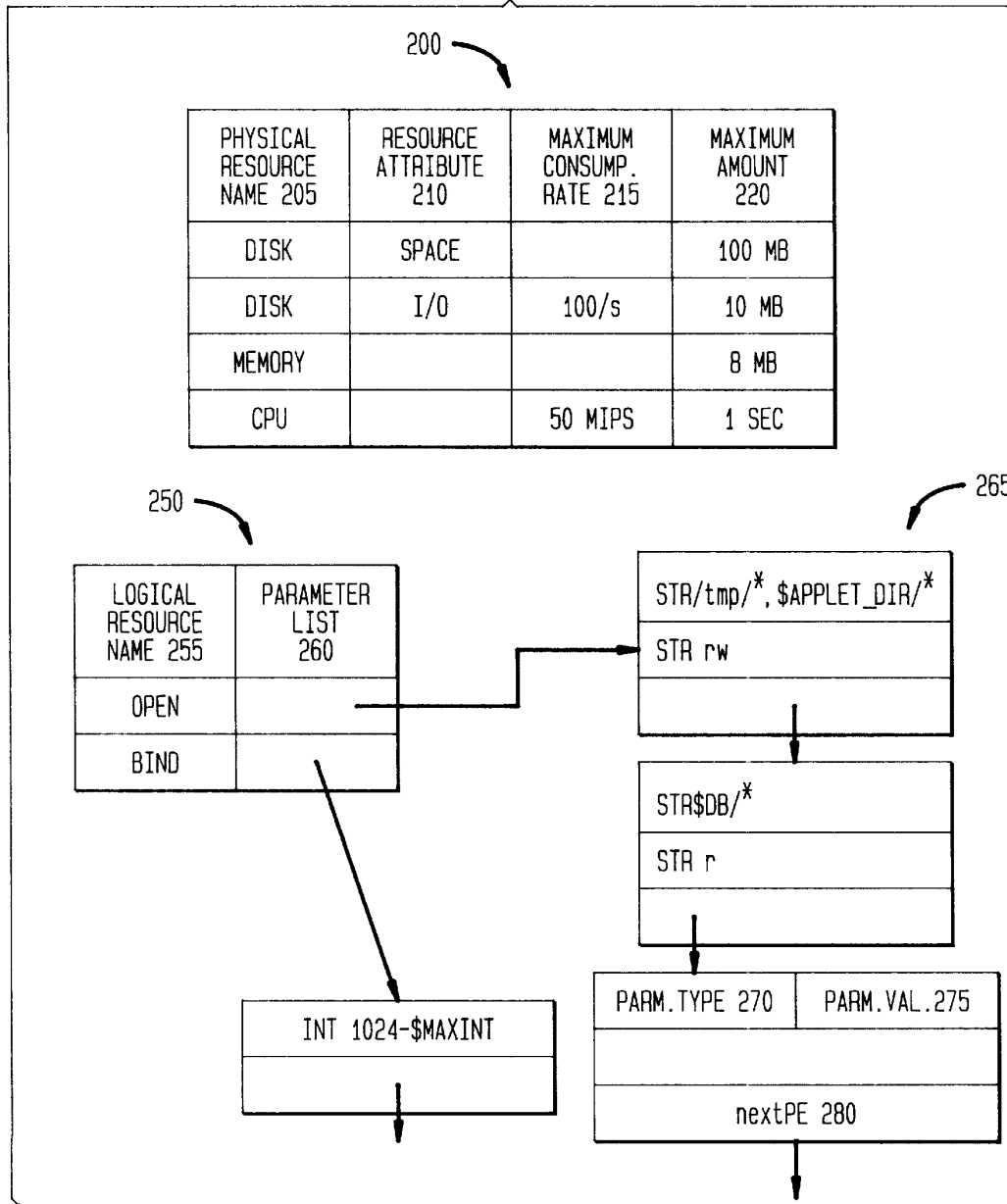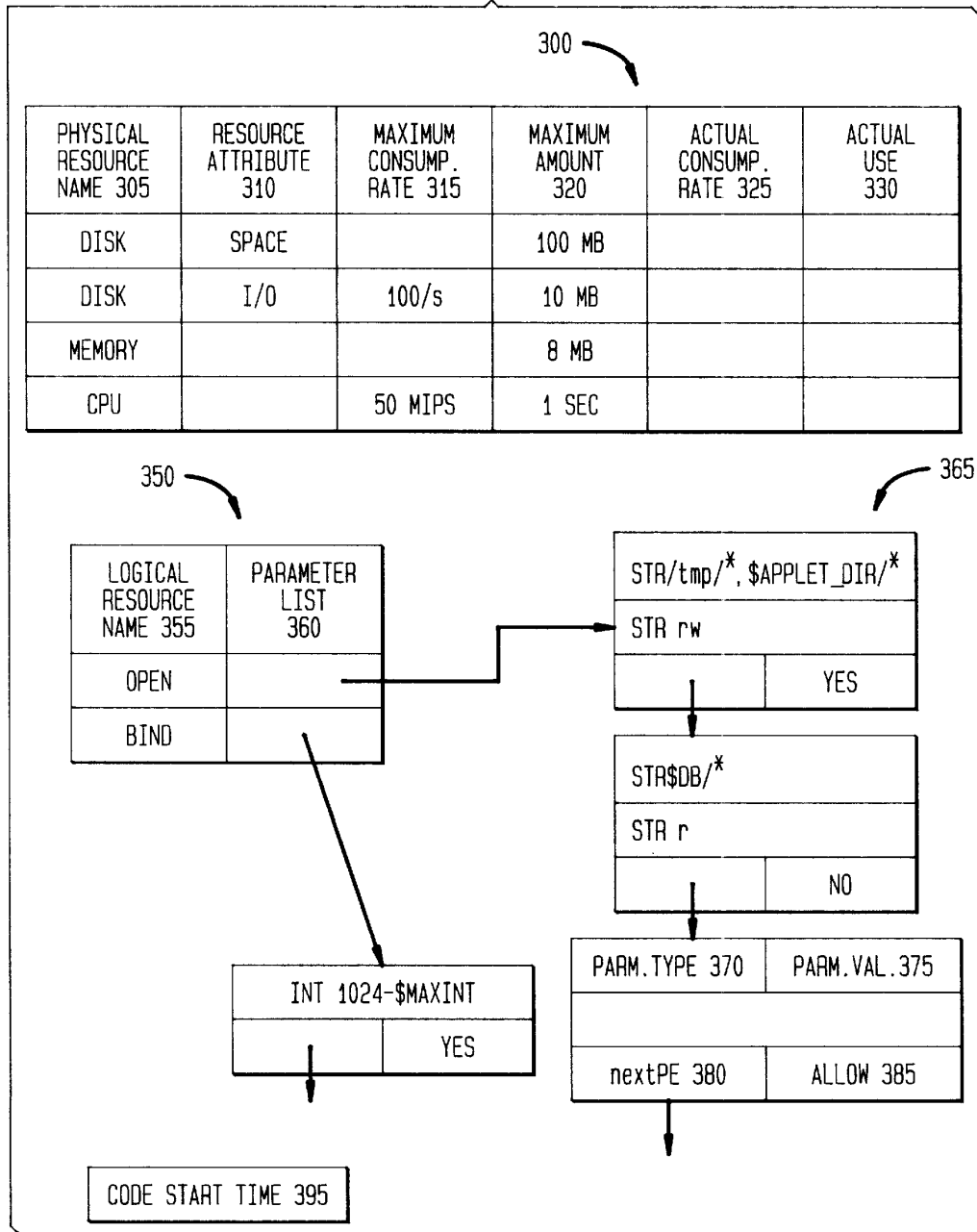| PARM.TYPE 370 | PARM.VAL.375 |
|---|---|
| | |
| nextPE 380 | ALLOW 385 |

CODE START TIME 395

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