Technologies for Construction and Management of the Service Infrastructure for Ubiquitous Computing

(C.S. Kim)
(J.M. Kim)
(S.J. Bae)
(S.M. Woo)
(H.Y. Kim)   ,

.

.   ,

.

.

I

(ubiquitous computing)

,   ,   IT
[1]- [3].

(seamless)
(context- aware)   (context- aware)   .

,   ,
[1]- [3].   ,

(,   (contextual information)

)   .

.

.

(Location Based   .

Services: LBS)

[4]-[6].   "

.   ?"   .

"seamless & invisible personal computing

[4],[5].   environment"

,

.

"   [5],[6].

,   ,

"   .

[7],[8].

.

,

,

.

[7],[9],[10].

. ,

(any-service, any-device)

(anytime, anywhere, anyone)

[5].

.

.

IT

[2],[3],[9].

10

II

III

.

II.

1.

(Power Line Communication: PLC),   ,
LAN, IEEE1394,   ,   1394

(Plug & Play: PnP)   HAVi,
Jini, UPnP(Universal Plug and Play)

,

[8],[11],[12].

UPnP, Jini, HAVi

.

OSGi   .

. UPnP

UPnP[13]

TCP/IP   HTTP

automatic private IP addressing, multicast
name resolution, simple service discovery protocol
3   .

IV

UPnP   ,
UPnP   SDK
.

UPnP   A/V
UPnP A/V   , VCR/
CD/DVD   ,   ,   , PC,
MediaServer   TV,   ,   Media-
Render   control point   .
UPnP   control point   UPnP

, UPnP A/V
A/V   .
control point
,   A/V   HTTP, MPEG
.
control point
.

UPnP
TCP/IP
,
.

TCP/IP
CPU   .

. Jini

Jini[14]
JVM, RMI   ,

. UPnP
, UPnP   lookup server
.
Jini   lookup service
(discovery), lookup service
(join),
(lookup)   (invocation),
timeout   (lease)
. Java

JVM, RMI   ,
,   HTTP
    .   .

                        Jini Surrogate   .

                                                                                          . 2001   10   R2
. HAVi   ,   ,
                                                                                                      .
    HAVi[15]   Jini, UPnP   2003   3   R3
        , A/V   , Jini   , UPnP   .
                                          .   HAVi   3   OSGi   SOHO
                    UPnP   Jini
        . HAVi   .
      IEEE 1394   ,   OSGi
      IEEE 1394   SOAP   .
        . HAVi   A/V   OSGi
                                                      .   .

UPnP, Jini   IP
                        IP   ## 2
                          . HAVi
                                      API
                                          .

    . OSGi   .

      OSGi   WAN
                                                                                              (context)

                                                              OSGi
(Alliance)   . OSGi   .

                                        ,
                                                      1999
    Ericsson, SUN, IBM   15
              .   OSGi R3   .
OSGi R1   OSGi   .
                , HTTP   .
                    .   . RCSM

                        ,   ,   ,   RCSM(Reconfigurable Context- Sensitive Middle-
                    ,   ware)
                                          .   ,

ad- hoc

FPGA(Field
Programmable Gate Arrays)

·

RCSM   ·   ·

,   . GAIA

RCSM   PDA

  PDA   .

Gaia

·

RCSM   PDA

·

[16],[17].

RCSM

ad- hoc

·

·

RCSM

CORBA   . RCSM   , Gaia

·

·   PDA   . ,

PDA

(Context- Aware Interface Definition Language: [18],[19].
CA- IDL)   .

Gaia   5

(Adaptive   (,   , presence
object Container: ADC)   . ADC   , space repository,   )

·

·

, ORB(Object Request Broker)

RCSM ORB(R- ORB)   Gaia

,   , ,

CORBA

·

·

CORBA

RCSM

CORBA, COM   ,

·

, RCSM   ·

ad- hoc   presence

.   ,   ,   ,

[20],[21].

. Presence   Aura   -   (task)-
space repository   -   /   -

XML

.   proactivity   ,

/   ,

.   ,

(self- tuning)   .

.   ,

, Gaia

, Aura

.

MVC(Model, View, Controller)   '

.   ,

.   . Gaia

[20],[21].

/
MPCC(Model,   Aura   Prism, Coda, Odys-
Presentation, Controller, Coordinator)   sey, Spectra   .

. Model   presen-
tation   controller   Prism,

.
Coda,

MVC
.   coordinator   Odyssey,

3

/   Spectra   .
.   Aura

. Aura
Spectra

Aura
Odyssey

,   .

III.

.
Aura

14

.

<표 생략>

	Distributed Computing	Systems Management & Optimization	Delivery of Capacity and Capability
Step 1	Multi-processor Servers	Manual Management by Components	Manual Setup, Dedicated Servers
Step 2	Clusters	Predictive Analysis and Correlation	Automated Setup and Shared Servers
Step 3	Grid Computing	Autonomic Computing	Utility Computing

< >: IBM, 2003.

(1)

,   IT
,

[22].

.

< >: IDC

(2)

.

,   ,
.

.

IT
,

,   . (2)
,   ,
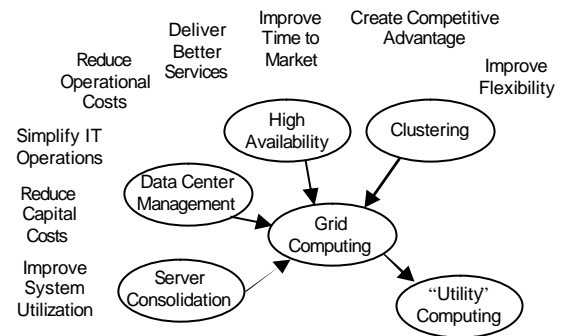
SOA(Service Oriented
Architecture)   IT
.

.   ,   < 1>   IDC

.   IT

(1)   [23], [24].

.   ,   ,

15

.

<   1>

	/ / /
1 :	• , • , • •
2 : /	• • • •
3 :	• • • , • , ,
4 : (or)	• • , , , : N • , , • :

<   >: IDC 2003.

[25].

.

,

.

1.

.

.

.

[26].

IBM, HP,

.

.

,

,

, ,

. GGF(Global
Grid Forum)

OGSA(Open Grid Service Architecture)

.

OGSI(Open Grid Service Infrastructure)
WSRF(Web Service Resource Framework)
WS‑resource
. OGSA

, , ,

.

WSRF Globus IBM   2004
1
IT

. IBM WSRF

[28]. (3)

2004   .

DMTF

WSRF   GT (Globus Toolkit) 4.0   GGF, OASIS   WSDM
[27].   (Web Services Distributed Management)

.

2

.   [29].

IBM,

,   HP,

CA, N1

.

.

.

[3].

IT

.

,   ,

2010   .

penetration

service- centric
computing

Internet
computing   utility
computing

networked personal
computing   information
utility/appliances

distributed
computing   open systems of
clients and servers

batch computing
and timesharing   micros

minis

mainframes

1960   1970   1980   1990   2000   2010

<   >: HP

(3)

IDC

,   [30]   -

. IDC   -   (

,   4)   .
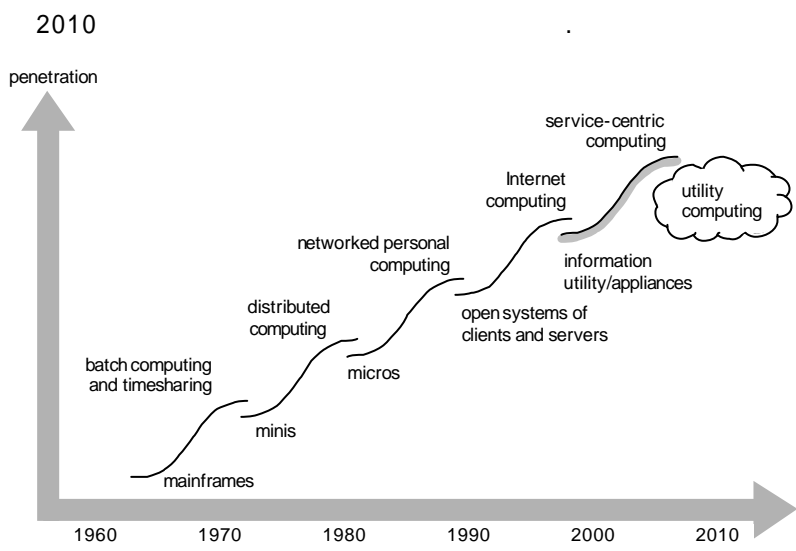
.   (virtual application en-

vironment)

.

3

.

IT

,

IBM   WepSphere

,   ,   ,   .

(virtual access)

.

IT

.   Citrix, Microsoft,

Aspelle, GraphOn, Tarantella   .

.   (virtual processing)   OS

OGSA   .

CPU,   ,

,   ,   ,   ,

,   .

,

.

(weak)-

(strong)-   .

.

-

.   IBM   z/VM,

-                          Vmware   GSX, HP MC/Serviceguard, Sun

-                          SunCluster, Microsoft   cluster services, Veritas

.   ClusterServer,

.

Virtual application environment	Management	Security
Virtual access software		
Virtual processing software		
Virtual storage		

<   >: IDC, 2003.

(4)

.

(virtual storage)

,
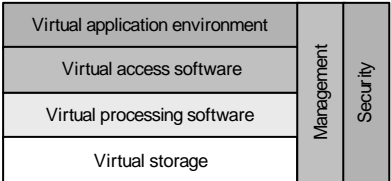
. Veritas Volume
Manager/Volume Replicator, DataCore, FalconStor,
Pirus Networks, Fujitsu Softek
.

IV.

.

. ,

.

.

.

[1]   ,   ,   ,   ,   ,   ,   ,

, "
,"   , 10
4 , 2003. 7.

[2]   , "   IT   ,"
http://justit.gigaro.net, 2003. 12.

[3]   , "   :
,"   , 2003. 12.

[4]   ,   ,   ,   , "
,"   , 1142   , 2004. 4, pp.1- 15.

[5]   , "   ,"
, 2003. 9.

[6] M. Satyanarayanan, "Research Challenges in Project
Aura- Distraction- free Ubiquitous Computing," HPDC,
Aug. 2000.

[7]   , "   ," TTA   ,
88   , 2003. 8, pp.20- 29.

[8]   , "Digital Life   Digital Home
," 2003. 5.

[9]   , "   ,"   ,   49
, 2003. 7.- 8.

[10]   , "   ," TTA   , 88 ,
2003. 8, pp.20- 29.

[11]   ,   , "   ," TTA
, 88   , pp.92- 98.

[12]   ,   , "   ,"   , 2003. 8.

[13] http://www.upnp.org/, "UPnP Device Architecture 1.0"

[14] http://wwws.sun.com/software/jini/whitepapers/
technologies.html

[15] http://www.icrosstech.com/~icross/havi.htm

[16] http://www.eas.asu.edu/~rcsm/

[17] S.S. Yau, F. Karim, Y. Wang, B. Wang, and S.K.S. Gupta,
"Reconfigurable Context- Sensitive Middleware for Per-
vasive Computing," *IEEE Pervasive Computing, IEEE
Computer Society Press*, July- Sep. 2002, pp.33- 40.

[18] http://choices.cs.uiuc.edu/gaia/

[19] Manuel Romn, Christopher K. Hess, Renato Cer-
queira, Anand Ranganathan, Roy H. Campbell, and
Klara Nahrstedt, "Gaia: A Middleware Infrastructure
to Enable Active Spaces," *IEEE Pervasive Compu-
ting*, Oct.- Dec. 2002, pp.74- 83.

[20] http://www- 2.cs.cmu.edu/~aura/

[21] D. Garlan, D. Siewiorek, A. Smailagic, and P. Steen-
kiste, "Project Aura: Towards Distraction- Free Per-
vasive Computing," *IEEE Pervasive Computing*, Vol.1,
No.2, April- June 2002, pp.22- 31.

[22]   ,   ,   ,   , "
,"   , 1158   , 2004.
8, pp.1- 15.

[23] C.W. Olofson and D. Kusnetzky, "Competing Visions

of Grid Computing," IDC, Oct. 2003.

[24] Dan Kusnetzky, "Utility Computing Line of Business Study," IDC, Apr. 2004.

[25] The Future of the Server, Garther Research, July 2003.

[26]   , "2004
              ,   ,"   , 2003. 12. 13.

[27] http://www.globus.org

[28] The Future of Server Virtualization, Garther Research, July 2003.

[29] http://www.dmtf.org, DMTF Announces New Working Group for Utility Computing, Feb. 2004.

[30] Paul Mason and Dan Kusnetzky, "Server Provisioning, Virtualization, and the On-demand Model of Computing: Addressing Market Confusion," IDC, June 2003.