

AIX Hints & Tips - For AtoZ/SMA Customers



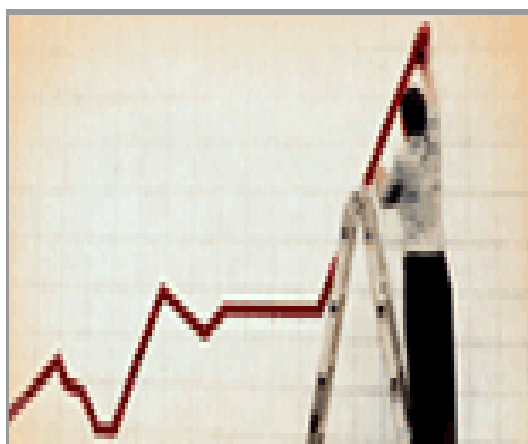
AIX Essential



Network & Security



Performance & Internal



skills

pSeries S/W Contact Center

IBM Global Services, Korea

54

I. IBM

II. AIX Essentials

【 】 National Language Support - Locale ----- 5 p

1. Introduction
2. Locale
3. Code set
4. Locale (Environment Variables)
5. Locale Environment Variables Rule
6. Locale & locale

III. AIX Network

【 】 socket ----- 12 p

1. Socket ?
2. socket
3. socket

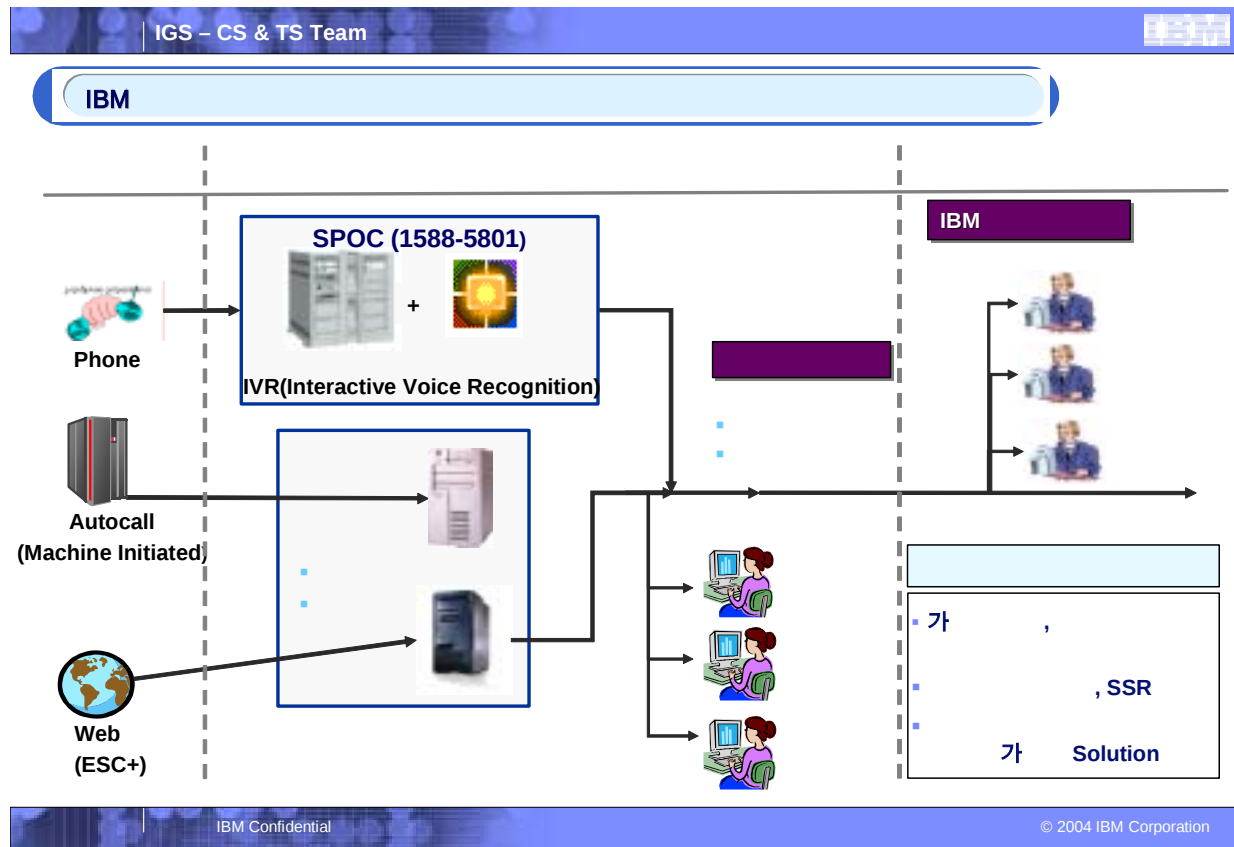
IV. AIX Internal

【 】 MODS ----- 20 p

1. MODS ?
2. MODS enable ?
3. Kernel Memory
4. MODS enable
5. MODS 가
6. MODS enable
7. MODS

I. IBM

: 1588-5801



IBM HW

SW

(SMA)

2004 8 1

IBM

가

가

, IBM

□ : 1588-5801

IBM , 1588-5801,
HW SW 가 .
1588-5801 , 가 .

□

가 Global standard .
, HW & SW IBM
가가 1 .
IBM ,
가 .

□

- 1.
2. IT 가
3. 가

II. AIX Essential

【 】 National Language Support - Locale

Overview

Introduction

Locale

Code set

Locale Categories Environment Variables

Locale Environment Variables Rule

Locale & locale

chapter AIX Locale

Introduction

World Wide

12/9/2004
2004 12 9 2004 9 12 가
\$ won

Language Environment

command, file, tool

National Language Support

가

locale

National Language Support

locale

- Code set
- Character classification
- Character comparison rules
- Character collation order
- Numeric and monetary formatting
- Date and time formatting
- Message – text language

Locale

가

. Locale language, territory code set

`language[_territory][.codeset][@modifier]`

test server

locale

```
root@srssvr: /> locale -a
C
POSIX
en_US
en_US.8859-15
en_US.ISO8859-1
ko_KR
ko_KR.IBM-eucKR
```

en_US.ISO8859-1

English

US

ISO8859-1 code set

locale

가

. ko_KR.IBM-eucKR

IBM-eucKR가 code set

ISO Code Set

ISO code set

(code set

.). ko_KR.IBM-eucKR

ko_KR

ko_KR, ko_KR.IBM-eucKR 가

Locale

locale definition source files

localedef commnad

locale

database

setlocale(SMIT)

. locale definition source files 6

(

) **usr/lib/nls/loc**

C

POSIX

default locale

가

locale

locale

setlocale command

●

locale locale

(:

" "

" "

.)

```

root@srssvr: /> locale
LANG=en_US
LC_COLLATE="en_US"
LC_CTYPE="en_US"
LC_MONETARY="en_US"
LC_NUMERIC="en_US"
LC_TIME="en_US"
LC_MESSAGES="en_US"
LC_ALL=

```

- `locale` # `/usr/lib/nls/lsmlc` or # `smitty mle_cc_cust_hdr`

- default locale AIX install

local “ “

Code set

Locale 가 code set
(character)

Code Set

7-bit alphabets multi-byte
code set

code set 가

- **ISO8859** – ISO8859 code set code set single-byte
Latin-1, Latin-2, Arabic, Cyrillic, Hebrew, Greek, Turkish
`ko_KR(ko_KR.IBM_eucKR ) IBM-eucJP ISO`
ISO8859 multi-byte
- **IBM-850 and IBM-943 (and IBM-932)** – PC code set IBM-850 single-byte
IBM-943 (and IBM-932) multi-byte
- **UTF-8** – Unicode code set

`KO_KR(KO_KR.UTF-8 )`

code code set

SMIT Language Environment menu, `iconv` (`iconv`, `chlang`, `chkdb` and
`chfont`), `setlocale` Web-base System management 가

Locale Categories Environment Variables

1. Locale Categories

locale

가 LC_TIME . usr/lib/nls/loc

Locale Categories

- **LC_COLLATE** - (multi-character , string ..)
- **LC_CTYPE** - (character classification – alpha, digit), case conversion(single-byte multi-byte characters),
- **LC_MESSAGES**- , ,
- **LC_MONETARY** -
- **LC_NUMERIC** – 가
- **LC_TIME** -

Note:

가 locale

Variables

locale

command

가

가 export LC_TIME=en_US

LC_TIME

가

path

locale

locale definition source file

locale definition

source file

localedef

locale

localedef

locale

definition source file

run-time

run-time

source file

en_US LC_TIME

%m/%d/%y

%y-%m-%d

locale definition source file

locale

2. Locale Environment Variables

National Language Support (NLS) locale

- **LANG** – default locale

Note: LANG

OS

LC_*

locale

SMIT

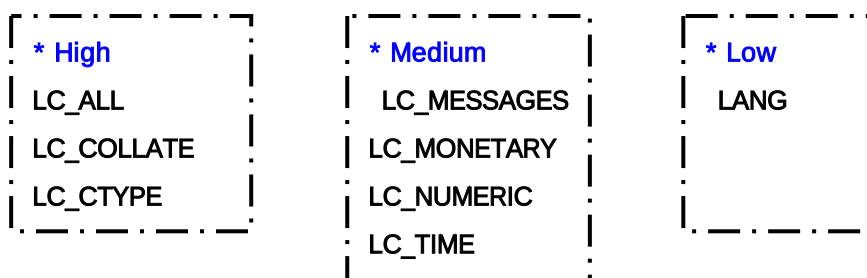
command

- LC_ALL - LANG LC_*
- LC_COLLATE - LC_COLLATE
- LC_CTYPE - LC_CTYPE
- LC_FASTMSG - C POSIX가 default
etc/environment LC_FASTMSG=true
- LC_MESSAGES- LC_MESSAGES
- LC_MONETARY - LC_MONETARY
- LC_NUMERIC - LC_NUMERIC
- LC_TIME - LC_TIME
- LOCPATH- binary locale files input methods, code set convert
locale path
Note: setuid setgid LOCPATH

Locale Environment Variables

Rule

class



가

가

- LC_ALL en_US LANG ko_KR locale en_US LC_ALL
- LC_ALL LANG ko_KR LC_TIME fr_FR (LC_ALL LC_TIME LANG .)
- LANG C locale

locale & locale

1. NLS

NLS	Web SM	SMIT	.
LANG	export LANG	.	default language
/etc/environment	"LANG = <name>"		relogin stopsrc -s
inetd;startsrc -s inetd		.	
LC_*	locale	export	가
FTP	data	locale	export
default language		가	.

2. locale

1)

```
v4:/> lspp -l | cut -f 3 -d ' ' | grep ko_KR
```

```
X11.help.ko_KR.Dt.helpinfo
```

```
X11.loc.ko_KR.Dt.rte
```

```
X11.loc.ko_KR.base.lib
```

```
X11.loc.ko_KR.base.rte
```

```
X11.msg.ko_KR.Dt.helpmin
```

```
X11.msg.ko_KR.apps.pm
```

```
bos.help.msg.ko_KR.com
```

```
bos.iconv.ko_KR
```

```
bos.loc.iso.ko_KR
```

```
bos.msg.ko_KR.diag.rte
```

```
bos.msg.ko_KR.docregister.com
```

```
bos.msg.ko_KR.docsearch.client.com
```

```
bos.msg.ko_KR.mp
```

```
bos.msg.ko_KR.net.tcp.client
```

```
bos.msg.ko_KR.rte
```

```
devices.msg.ko_KR.base.com
```

```
devices.msg.ko_KR.diag.rte
```

```
devices.msg.ko_KR.rspc.base.com
```

```
devices.msg.ko_KR.sys.mca.rte
```

```
ifor_ls.html.ko_KR.base.cli
```

```
ifor_ls.ipf.ko_KR.base.gui
```

```
ifor_ls.msg.ko_KR.base.cli
```

```
ipfx.msg.ko_KR.rte
```

```
X11.help.ko_KR.Dt.helpinfo
```

```
X11.loc.ko_KR.Dt.rte
```

2)

smitty mle_cc_cust_hdr

Change/Show Cultural Convention, Language, or Keyboard

Primary	CULTURAL	convention	IBM-eucKR	Korean
[ko_KR]				

Primary	LANGUAGE	translation	IBM-eucKR	Korean
[ko_KR]				

Primary	KEYBOARD	IBM-eucKR	Korean	keyboard.
[ko_KR]				

smitty mle_hier_cmd_hdr

Change/Show Language Hierarchy

1ST language translation choice	[IBM-eucKR Korean [ko_KR]]
---------------------------------	----------------------------

)

/usr/lib/nls/lsmle -P -c

/usr/lib/nls/lsmle -P -l

/usr/lib/nls/lsmle -P -k

III. AIX Network

【 】 socket

Overview

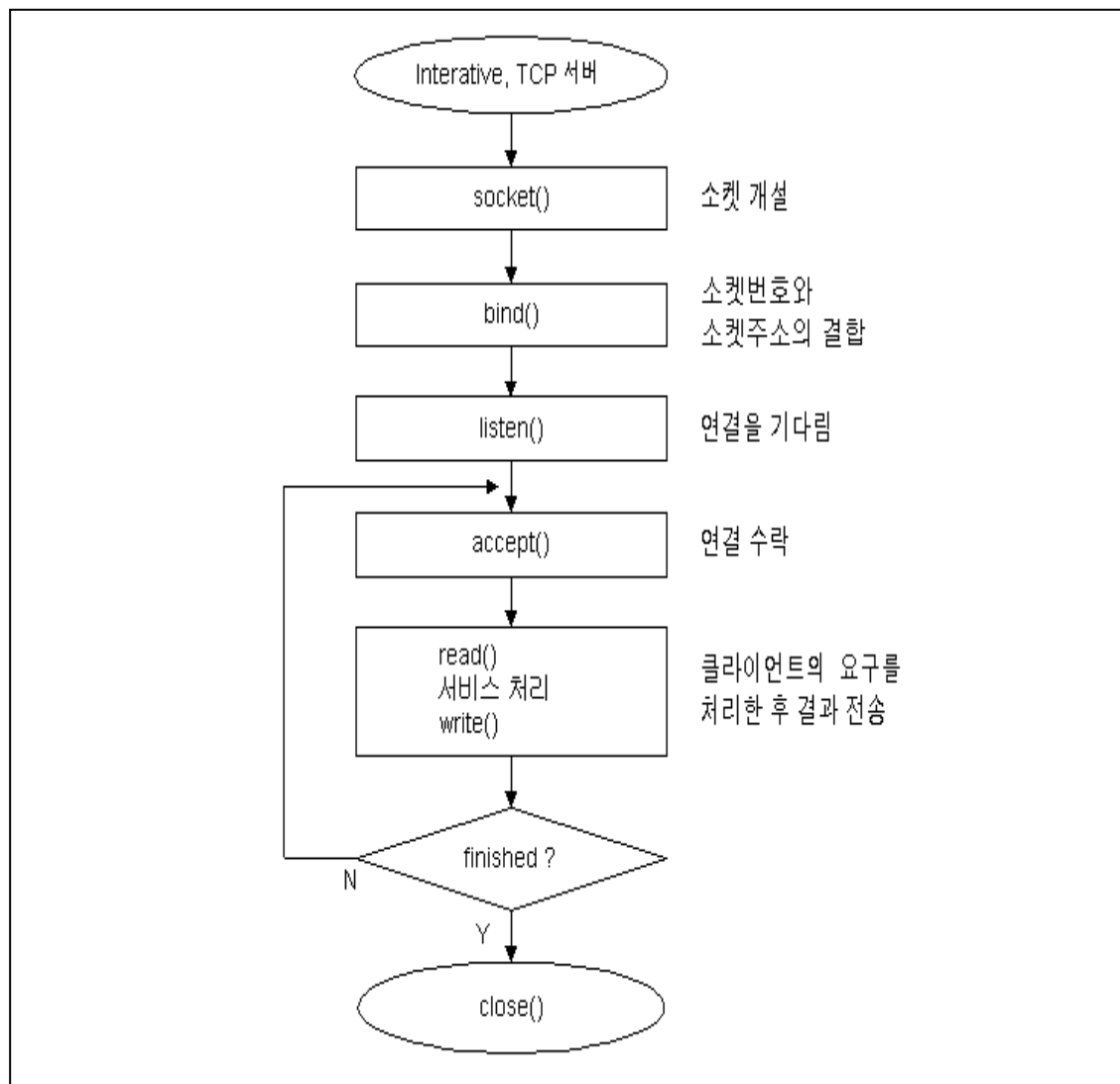
1. socket ?
2. socket
3. socket

socket ?

_____ “
 ” . TCP/IP API (application programming
 interface)
 “IP+Port” .

socket

1. socket() endpoint listen
2. bind() port IP .
- 가 .
3. listen() .
4. accept() 가 가
5. read()/write() .



< TCP

>

socket

1. sockt()

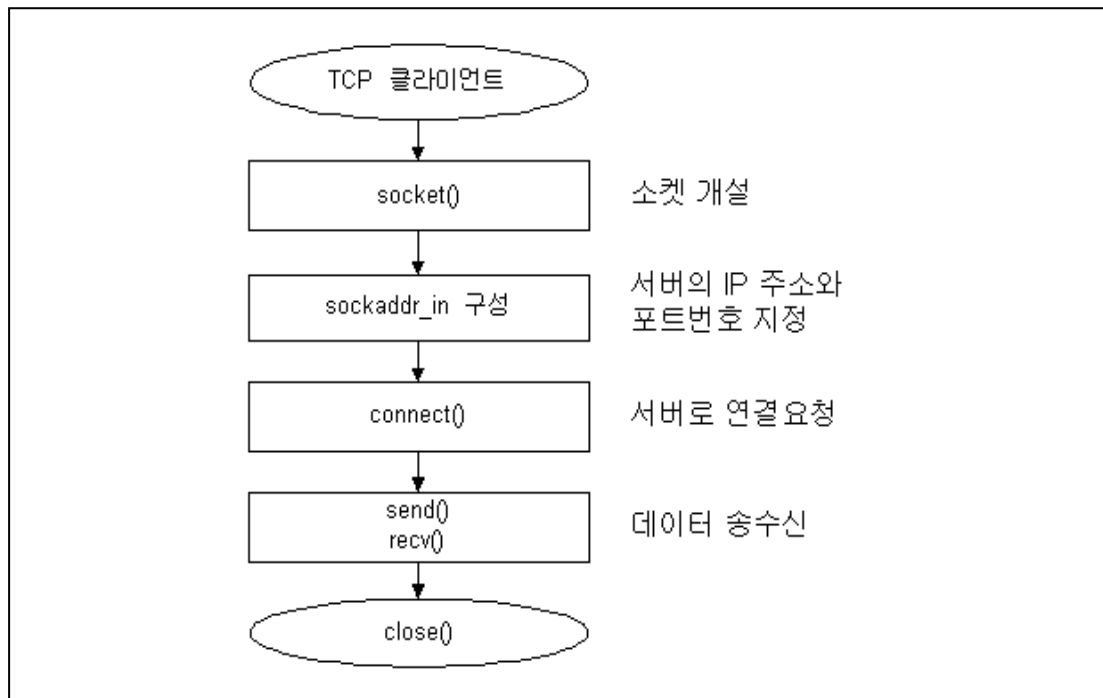
endpoint

listen

2. connect()

send() recv()

close()



< TCP >

socket

, () 가
 . ((10.10.11.210) 15000
 (10.10.11.233) .)

1. . ip
 가 listen .

```

root@v5:/home/msjung> ./server
The socket was created
Binding Socket
  
```

2. . ip
 . accept .

```

root@v4:/home> ./client 10.10.11.210
The Socket was created
The connection was accepted with the server 10.10.11.210..
  
```

client connect() accept()

가

The socket was created
 Binding Socket
 The Client 10.10.11.233 is connected...
 Message to send:

가

가

가

. AIX V4.3.3

lsof

AIX 5L

lsof

rmsock

kdb

root@v5:/>ps aux | grep server

```
root    503916  0.0  0.0  212  224 pts/6 A   23:19:58  0:00 grep server
root    438462  0.0  0.0   92   96 pts/1 A   23:19:31  0:00 ./server
```

root@v5:/>netstat -an | grep 15000

```
tcp4      0      0 *.15000          *.*              LISTEN
tcp4      0      0 10.10.11.210.15000 10.10.11.233.32794 ESTABLISHED
```

netstat -Aan

PCB process control block

PCB pid, gid, open

process

가 OS

가

3가

가

root@v5:/>netstat -Aan | grep 15000

```
f100061000619b80 tcp4      0      0 *.15000          *.*              LISTEN
f100061000462b80 tcp4      0      0 10.10.11.210.15000 10.10.11.233.32794 ESTABLISHED
```

1. rmsoc

TCP

가 pid

(usage : # rmsoc <PCBAddress> <TypeofAddress>)

```
root@v5:/>rmsoc f100061000462b80 tcpcb
The socket 0x462800 is being held by proccess 438462 (server).
```

2. kdb

pid

가

```
root@v5:/>kdb
(0)> sockinfo f100061000462b80 tcpcb
---- TCPCB ----(@ F100061000462B80)----
  seg_next.....@F100061000462B80  seg_prev.....@F100061000462B80
  t_softerror... 00000000 t_state..... 00000004 (ESTABLISHED) <- listen      1
  t_timer..... 00000000 (TCPT_REXMT)
  t_timer..... 00000000 (TCPT_PERSIST)
....
....
rcvlen.. 0000000000000000  frcaback@0000000000000000
  frcassoc@0000000000000000  frcabckt 0000000000000000
  iodone.. 00000000          iodonefl 00000000 ()
  ioarg...@0000000000000000  refcnt.. 0000000000000000
....
....

SLOT NAME      STATE      PID      PPID      ADSPACE  CL #THS
pvproc+01EC00  123*server  ACTIVE  006B0BE  0063022  000000002001D5DA  0
0001

(0)> hcal 006B0BE <- 16                                subcommand      .
Value hexa: 006B0BE      Value decimal: 438462
```

3. freeware Isof

```
# Isof | grep f100061000462b80
server 438462 root 4u IPv4 0x70046edc 0t0 TCP v5.kr.ibm.com:15
000->v4.kr.ibm.com:32794 (ESTABLISHED)
```

Isof

Download Isof in AIX Toolbox for Linux Applications

<http://www-1.ibm.com/servers/aix/products/aixos/linux/download.html>

<ftp://ftp.software.ibm.com/aix/freeSoftware/aixtoolbox/RPMS/ppc/Isof/Isof-4.61-3.aix5.1.ppc.rpm>

Installing the RPM Package Manager

<http://www-1.ibm.com/servers/aix/products/aixos/linux/altlic.html>

Pre-requisite: rpm.rte (RPM Package Manager)

server.c ()

```
#include<sys/types.h>
#include<sys/socket.h>
#include<netinet/in.h>
#include<unistd.h>
#include<stdlib.h>
#include<stdio.h>
main()
{   int cont,create_socket,new_socket;
    unsigned long addrlen; /* modified by BCG */
    int bufsz = 1024;
    char *buffer = malloc(bufsz);
    struct sockaddr_in address;
    printf("\x1B[2J");
    if ((create_socket = socket(AF_INET,SOCK_STREAM,0)) > 0)
        printf("The socket was created\n");
    address.sin_family = AF_INET;
    address.sin_addr.s_addr = INADDR_ANY;
    address.sin_port = htons(15000);
    if (bind(create_socket,(struct sockaddr *)&address,sizeof(address)) == 0)
        printf("Binding Socket\n");
    listen(create_socket,3);
    addrlen = sizeof(struct sockaddr_in);
    new_socket = accept(create_socket,(struct sockaddr *)&address,&addrlen);
    if (new_socket > 0){
        printf("The Client %s is connected...\n",inet_ntoa(address.sin_addr));
        for(cont=1;cont<5000;cont++)
            printf("\x7");   }
    do{ printf("Message to send: ");
        gets(buffer);
        recv(new_socket,buffer,bufsz,0);
        send(new_socket,buffer,bufsz,0);
        printf("Message recieved: %s\n",buffer);
    }while(strcmp(buffer,"q")); /* user 'q' to quit */
    close(new_socket);
```

```
close(create_socket);
}
```

client.c ()

```
#include<sys/socket.h>
#include<sys/types.h>
#include<netinet/in.h>
#include<unistd.h>
#include<stdlib.h>
#include<stdio.h>
main(int argc,char *argv[])
{
    int create_socket;
    int bufsize = 1024;
    char *buffer = malloc(bufsize);
    struct sockaddr_in address;
    printf("\nx1B[2J");
    if ((create_socket = socket(AF_INET,SOCK_STREAM,0)) > 0)
        printf("The Socket was created\n");
    address.sin_family = AF_INET;
    address.sin_port = htons(15000);
    inet_pton(AF_INET,argv[1],&address.sin_addr);
    if (connect(create_socket,(struct sockaddr *)&address,sizeof(address)) == 0)
        printf("The connection was accepted with the server %s...\n",inet_ntoa(addr
ess.sin_addr));
    do{ recv(create_socket,buffer,bufsize,0);
        printf("Message recieved: %s\n",buffer);
        if (strcmp(buffer,"/q")){
            printf("Message to send: ");
            gets(buffer);
            send(create_socket,buffer,bufsize,0);    }
    }while (strcmp(buffer,"/q"));
    close(create_socket);
}
```

IV. AIX Internal

【 】 MODS

□ Overview

1. MODS ?
2. MODS enable ?
3. Kernel Memory
4. MODS enable
5. MODS 가
6. MODS enable
7. MODS

1. MODS ?

MODS Memory Overlay Detection System . MODS
 Memory Overlay 가 .
 Memory Overlay Memory Usage Error , Memory User
 Memory , Kernel Memory .
 Memory Overlay Detection System (MODS) , Kernel Memory Usage Error Debugging
 가 .
 MODS AIX 4.2.1 Kernel, Kernel Extension, Device Driver 가
 Memory Usage Error Debugging .

2. MODS enable ?

MODS enable Memory Usage Error .
 - Free Memory
 - Free Memory Free
 - Memory
 - Routine Memory
 - Parameter Condition 가 Memory Allocation Routine
 - Garbage Collection Memory Allocation Free 가
 - Kernel Memory Leak

 Dump Memory Usage Error 가 , Kernel Extension 가

, MODS enable

Debugging

3. Kernel Memory

Kernel Memory Kernel Heap Memory, Pinned Heap Memory, Network Memory
 . Kernel Memory Kernel Heap Memory, Pinned Heap Memory
 xmalloc() Memory xfree() Memory .
 Network Memory net_malloc () Memory net_free()
 .
 Network Memory 가 , “netm “ Kernel Thread 가 가
 Network Memory .

4. MODS enable

1) MODS – Kernel Memory
 xmalloc(), xfree() Kernel Memory , bosdebug
 MODS enable .

```
# bosdebug -M
# bosboot -ad /dev/lpldevice
# shutdown -Fr
```

MODS enable .
 MODS enable -M 가 .

2) MODS - Network Memory
 Network Memory no net_malloc_police MODS enable .

```
# no -o net_malloc_police=1
```

net_malloc_police 가 0 , Network Memory MODS enable
 . 1 <= net_malloc_police <=1024 , 1024 net_malloc()/net_free()
 . 1024 < net_malloc_police net_malloc()/
 net_free() .

3) MODS - Page Promotion & Guard Page
 가 Memory Allocation Size , size

Debugging .
 xmalloc() Kernel Memory , -s
 16,32,64,128,256,512,1024,2048 size .
 net_malloc() Network Memory -n

32,64,128,256,512,1024,2048 size .

```
# bosdebug -M -s 32,128,512 -n 32,128
# bosboot -ad /dev/ipldevice
# shutdown -Fr
```

Kernel Memory	Size	16,32,64,128,256,512,1024,2048
가 size	-s -n	size
Page Size(4KB)	Kernel Memory	Page Size
Kernel Memory	"Page Promotion"	Page
	Page	가 Page
"Guard Page"	"Guard Page"	가 System Crash 가

, -S	size	가 n*Page
Size(4KB) (, n=1,2,3,...)	"Page Promotion"	"Guard Page"

```
# bosdebug -M -S
# bosboot -ad /dev/ipldevice
# shutdown -Fr
```

4) MODS disable

Kernel Memory MODS disable .

```
# bosdebug -o
# bosboot -ad /dev/ipldevice
# shutdown -Fr
```

Network Memory MODS disable .

```
# no -o net_malloc_police=0
```

5. MODS 가

MODS enable , Kernel Memory .

- MODS	xmalloc()	Kernel Memory	,	Kernel Memory	, Process
ID	Process Name				
- MODS	xmfree()	Free	2048	Kernel Memory	Holding
- MODS	net_free()	Free	1024	Kernel Memory	Holding
(no	net_malloc_police	Holding		Kernel Memory	.)
- xmalloc()	Kernel Memory				0x66
				0xAA	

- xmfree() Kernel Memory Free , 0x77 .
 - bosdebug -s, -n, -S "Page Promotion" . -s, -n
 "Guard Page" .

6. MODS enable

"Page Promotion" "Guard Page" bosdebug -M MODS enable System
 Performance . Kernel Memory 10-Page
 가
 .
 , bosdebug -s, -n, -S 가
 .
 32 , bosdebug -S MODS enable Kernel Memory 가
 240 MB 가 가 . 64
 , Kernel Memory 가 가 .

7. MODS

kdb MODS .

1) MODS : bosdebug -M & no -o net_malloc_police=16384

```
(0)> stat
<      >
xmalloc debug: enabled ← MODS enabled ← bosdebug -M.
(0)> dw xmdbg_frag_to_page
xmdbg_frag_to_page+000000: 00000000
(0)> dw xmdbg_frag_mask
xmdbg_frag_mask+000000: 00000000
(0)> dd net_malloc_frag_mask
net_malloc_frag_mask+000000: 0000000000000000
(0)> dd net_malloc_police
net_malloc_police+000000: 00000000000000400
← 0x400 = 16384 no -o net_malloc_police=16384
(0)> xm -lf
F100058D400FB400: addr..... F10006000E495A40 freed pinned
req_size..... 56 act_size..... 64
F100058D400FB400: pid..... 00039086 comm..... smitty
Trace during xmalloc() on CPU 02      Trace during xfree() on CPU 02
003BEBBC(.fifo_select+000120)          00388144(.poll_cleanup+000254)
002E0AC0(.vnode_select+000024)         00388640(.fp_poll+00046C)
00347608(.selpoll+00016C)              00387D70(._poll+000278)
←                size 가 56-Byte      ,      가 가 64-Byte
F100058D400CCC00: addr..... F10006000E63EF00 freed pinned
req_size..... 128 act_size..... 256
F100058D400CCC00: pid..... 000610C0 comm..... putlvcb
Trace during xmalloc() on CPU 03      Trace during xfree() on CPU 01
002D7EA0(.groupsetalloc+0000F4)        002D7D50(.groupsetfree+00007C)
002D7C70(.groupsetcopy+000074)         002D4C18(._crfree+0000A0)
002D58D4(.crcopy_30_25+0000A4)         002D57F8(.crfree+000060)
←                size 가 128-Byte     ,      가 가 256-Byte
```

2) MODS : bosdebug -M -s 32,128,512 -n 32,128,512 & no -o net_malloc_police=1

```
(0)> stat
<          >
xmalloc debug: enabled ( MODS enabled ( bosdebug -M
(0)> dw xmdbg_frag_to_page
xmdbg_frag_to_page+000000: 00000000
(0)> dw xmdbg_frag_mask
xmdbg_frag_mask+000000: 000002A0 ( 672 = (32+128+512) ( bosdebug -s 32,128,512
(0)> dd net_malloc_frag_mask
net_malloc_frag_mask+000000: 00000000000002A0 ( bosdebug -n 32,128,512
(0)> dd net_malloc_police
net_malloc_police+000000: 0000000000000001 ( no -o net_malloc_police=1
(0)> xm -lf
F100058D400D0880: addr..... 0E30DF80 freed unpinned
req_size..... 67 act_size..... 4096
F100058D400D0880: pid..... 0004D0C8 comm..... ksh
Trace during xmalloc() on CPU 02      Trace during xfree() on CPU 02
0031C584(.ld_pathopen+000728)          0031C820(.ld_pathclear+00006C)
0031C0F0(.ld_pathopen+000294)          003EBF4C(.ld_execload+0012A0)
0039828C(.ld_getlib+000084)            00138A64(.execvex_common+001348)
(          size 가 67-Byte      ,      가      128-Byte
Page Promotion      , 4096-Byte 가      . ( bosdebug -s 32,128,512
F100058D401DAF00: addr..... 0E324080 freed unpinned
req_size..... 45 act_size..... 64
F100058D401DAF00: pid..... 0004D0C8 comm..... smitty
Trace during xmalloc() on CPU 02      Trace during xfree() on CPU 02
0039A9B4(.get_libpath+000128)          0031C864(.ld_pathclear+0000B0)
0039B464(.ld_read+0000F0)              003EEB28(.ld_loadmodule+0005A0)
0039B6DC(.ld_getmod0+000040)           003EF0C0(.ld_proc_load+00051C)
(          size 가 45-Byte      ,      가      64-Byte      . 64-
Byte Page Promotion      . ( bosdebug -s 32,128,512
(0)> netm -e
      Address      SIZE  CPU   TYPE
F100061005DC8C00      256   3   mblk
F100061000334C00      1024  1   strqueue
<          >
← SIZE 32, 128, 512   Page Promotion      .
```

3) MODS : bosdebug -M -S & no -o net_malloc_police=1

```
(0)> stat
<          >
xmalloc debug: enabled ( MODS enabled ( bosdebug -M
Debug kernel error message: No debug cause was specified.
(0)> dw xmdbg_frag_to_page
xmdbg_frag_to_page+000000: 00000001 ← bosdebug -S
(0)> dw xmdbg_frag_mask
xmdbg_frag_mask+000000: 00000000
(0)> dd net_malloc_frag_mask
net_malloc_frag_mask+000000: 0000000000000000
(0)> dd net_malloc_police
net_malloc_police+000000: 0000000000000001 ← no -o net_malloc_police=1
(0)> xm -lf
F100058D401E0400: addr..... F100060009E0D000 freed pinned
req_size..... 56 act_size..... 4096
F100058D401E0400: pid..... 00014046 comm..... dtgreet
Trace during xmalloc() on CPU 03      Trace during xfree() on CPU 03
003BEBBC(.fifo_select+000120)          00388144(.poll_cleanup+000254)
002E0AC0(.vnode_select+000024)         00388640(.fp_poll+00046C)
00347608(.selpoll+00016C)              00387D70(._poll+000278)

F100058D40156700: addr..... F100060009E10000 freed pinned
req_size..... 72 act_size..... 4096
F100058D40156700: pid..... 00014046 comm..... dtgreet
Trace during xmalloc() on CPU 03      Trace during xfree() on CPU 03
00347A48(.selreg+0001AC)              00388088(.poll_cleanup+000198)
05B4D28C(05B4D28C)                   00388640(.fp_poll+00046C)
00347608(.selpoll+00016C)              00387D70(._poll+000278)
<          >
←      Memory      Page Promotion      . ← bosdebug -S
```

8.

MODS 가 ? ? enable ?

CPU MODS enable , Kernel Memory
Kernel Memory 가
MODS