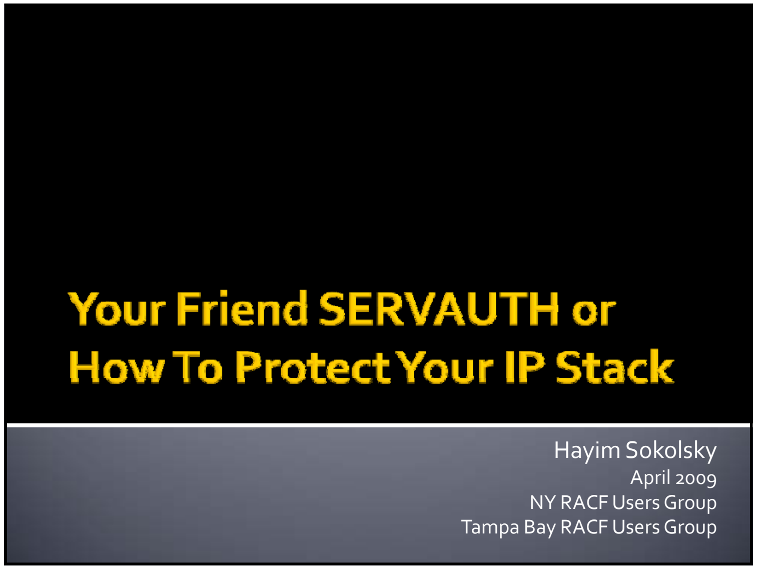
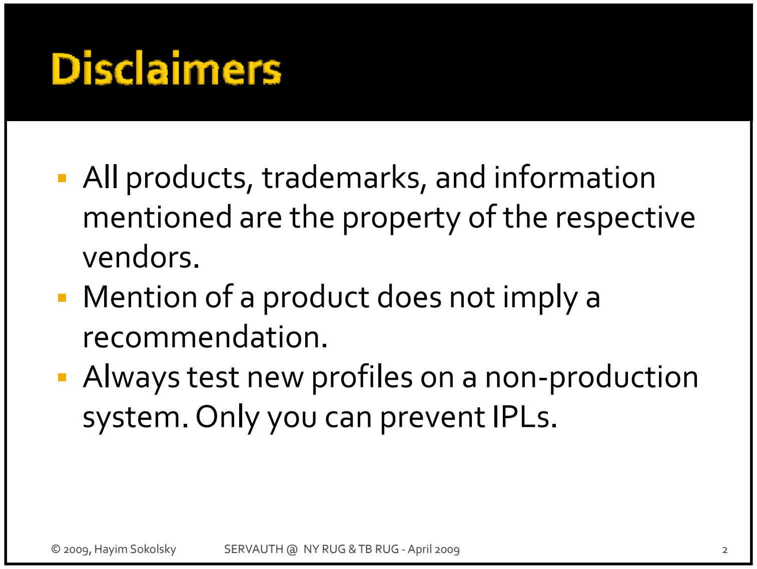


Your Friend SERVAUTH or How To Protect Your IP Stack

Hayim Sokolsky
April 2009
NY RACF Users Group
Tampa Bay RACF Users Group



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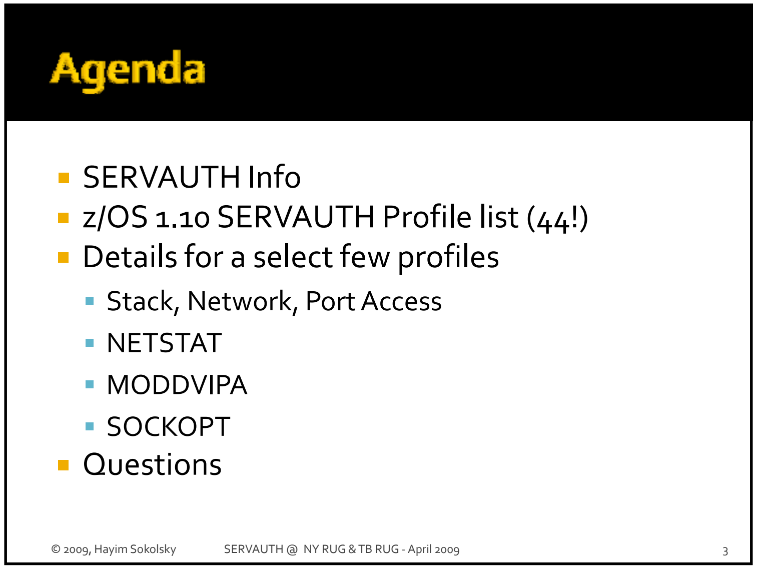
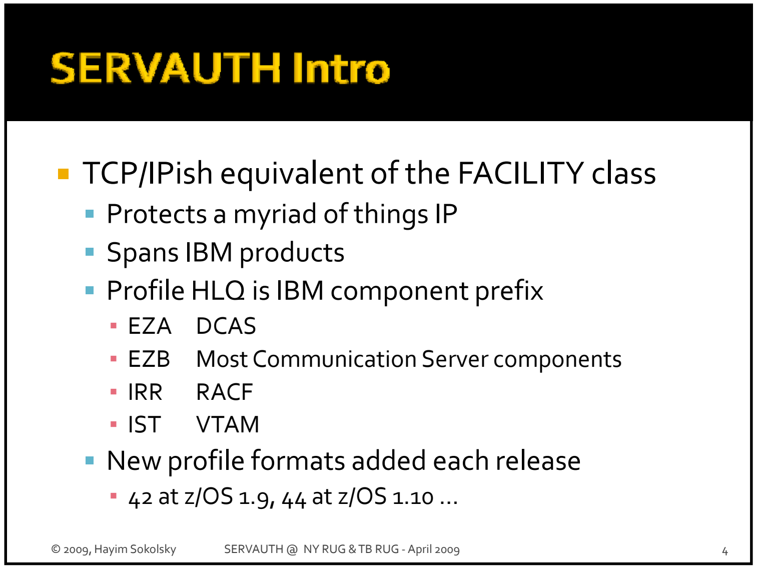
- Mention of a product does not imply a recommendation.
- Always test new profiles on a non-production system. Only you can prevent IPLs.



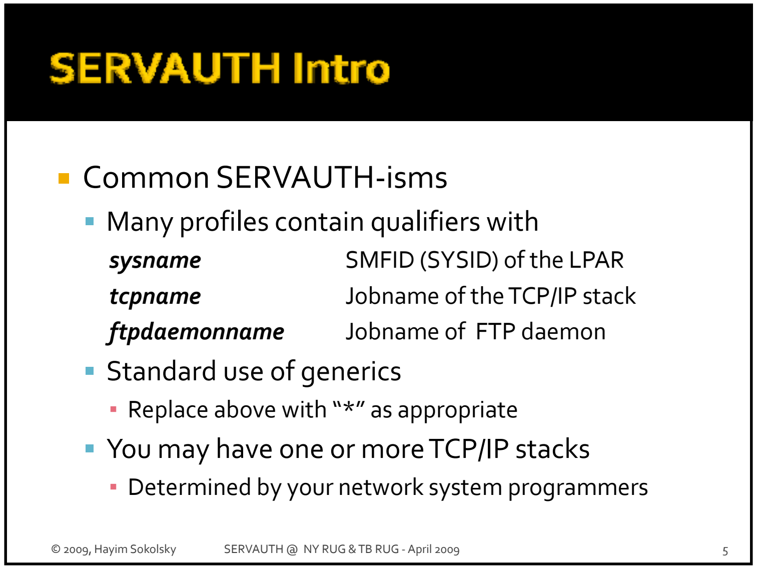
Agenda

- SERVAUTH Info
- z/OS 1.10 SERVAUTH Profile list (44!)
- Details for a select few profiles
  - Stack, Network, Port Access
  - NETSTAT
  - MODDVIPA
  - SOCKOPT
- Questions



SERVAUTH Intro

- TCP/IPish equivalent of the FACILITY class
  - Protects a myriad of things IP
  - Spans IBM products
  - Profile HLQ is IBM component prefix
    - EZA DCAS
    - EZB Most Communication Server components
    - IRR RACF
    - IST VTAM
  - New profile formats added each release
    - 42 at z/OS 1.9, 44 at z/OS 1.10 …

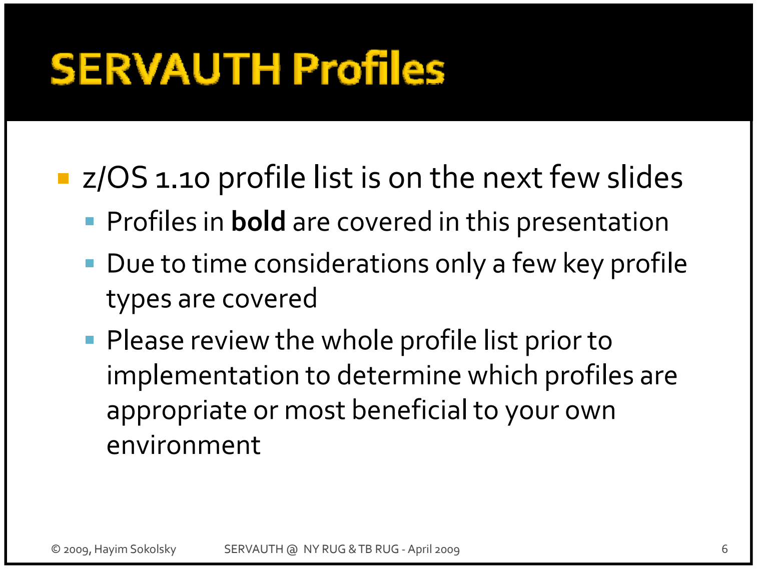


SERVAUTH Intro

- Common SERVAUTH-isms
  - Many profiles contain qualifiers with

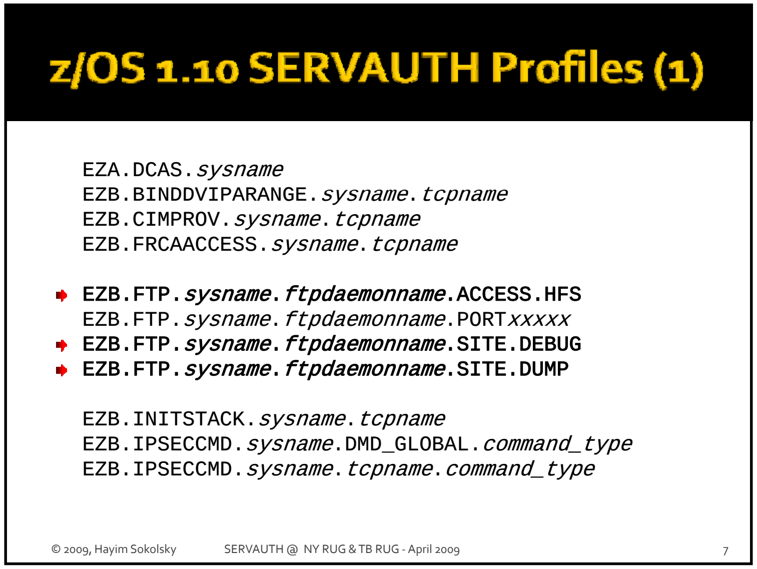
sysname	SMFID (SYSID) of the LPAR
tcpname	Jobname of the TCP/IP stack
ftpdaemonname	Jobname of FTP daemon

  - Standard use of generics
    - Replace above with "*" as appropriate
  - You may have one or more TCP/IP stacks
    - Determined by your network system programmers



SERVAUTH Profiles

- z/OS 1.10 profile list is on the next few slides
  - Profiles in **bold** are covered in this presentation
  - Due to time considerations only a few key profile types are covered
  - Please review the whole profile list prior to implementation to determine which profiles are appropriate or most beneficial to your own environment

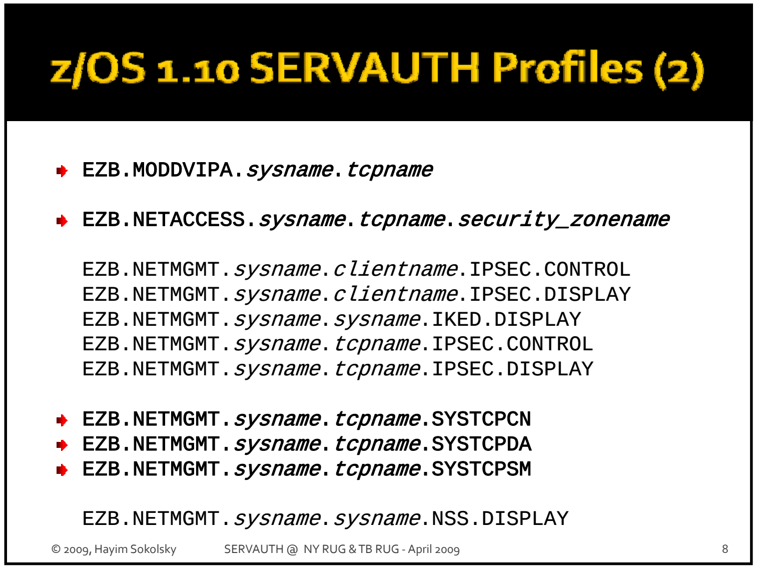


z/OS 1.10 SERVAUTH Profiles (1)

EZA.DCAS.*sysname*
EZB.BINDDVIPARANGE.*sysname*.*tcpname*
EZB.CIMPROV.*sysname*.*tcpname*
EZB.FRCAACCESS.*sysname*.*tcpname*

➡ **EZB.FTP.*sysname*.*ftpdaemonname*.ACCESS.HFS**
EZB.FTP.*sysname*.*ftpdaemonname*.PORT*xxxxx*
➡ **EZB.FTP.*sysname*.*ftpdaemonname*.SITE.DEBUG**
➡ **EZB.FTP.*sysname*.*ftpdaemonname*.SITE.DUMP**

EZB.INITSTACK.*sysname*.*tcpname*
EZB.IPSECCMD.*sysname*.DMD_GLOBAL.*command_type*
EZB.IPSECCMD.*sysname*.*tcpname*.*command_type*



z/OS 1.10 SERVAUTH Profiles (2)

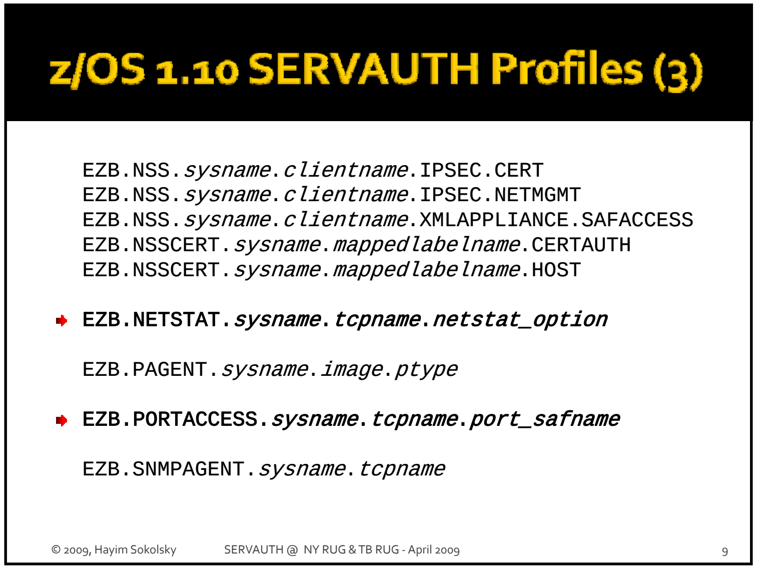
➡ **EZB.MODDVIPA.*sysname*.*tcpname***

➡ **EZB.NETACCESS.*sysname*.*tcpname*.*security_zonename***

EZB.NETMGMT.*sysname*.*clientname*.IPSEC.CONTROL
EZB.NETMGMT.*sysname*.*clientname*.IPSEC.DISPLAY
EZB.NETMGMT.*sysname*.*sysname*.IKED.DISPLAY
EZB.NETMGMT.*sysname*.*tcpname*.IPSEC.CONTROL
EZB.NETMGMT.*sysname*.*tcpname*.IPSEC.DISPLAY

➡ **EZB.NETMGMT.*sysname*.*tcpname*.SYSTCPCN**
➡ **EZB.NETMGMT.*sysname*.*tcpname*.SYSTCPDA**
➡ **EZB.NETMGMT.*sysname*.*tcpname*.SYSTCPSM**

EZB.NETMGMT.*sysname*.*sysname*.NSS.DISPLAY



z/OS 1.10 SERVAUTH Profiles (3)

EZB.NSS.*sysname*.*clientname*.IPSEC.CERT

EZB.NSS.*sysname*.*clientname*.IPSEC.NETMGMT

EZB.NSS.*sysname*.*clientname*.XMLAPPLIANCE.SAFACCESS

EZB.NSSCERT.*sysname*.*mappedlabelname*.CERTAUTH

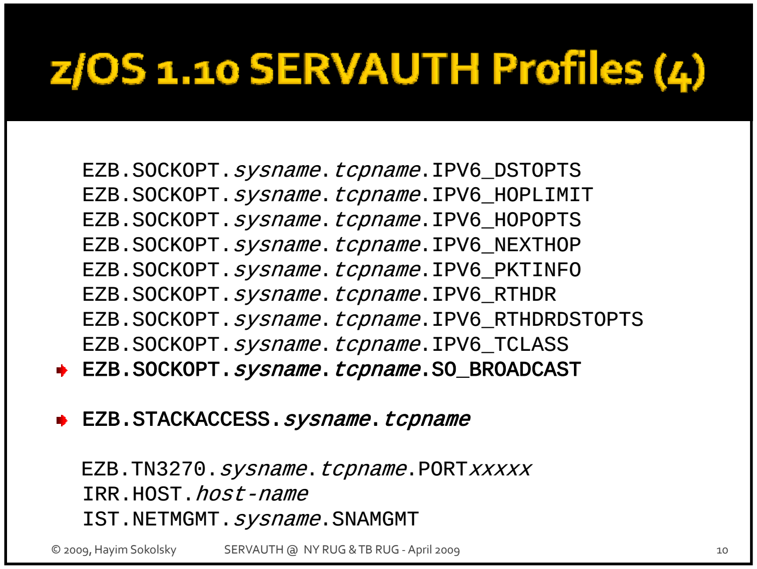
EZB.NSSCERT.*sysname*.*mappedlabelname*.HOST

➡ **EZB.NETSTAT.*sysname*.*tcpname*.*netstat_option***

EZB.PAGENT.*sysname*.*image*.*ptype*

➡ **EZB.PORTACCESS.*sysname*.*tcpname*.*port_safname***

EZB.SNMPAGENT.*sysname*.*tcpname*



z/OS 1.10 SERVAUTH Profiles (4)

EZB.SOCKOPT.*sysname*.*tcpname*.IPV6_DSTOPTS

EZB.SOCKOPT.*sysname*.*tcpname*.IPV6_HOPLIMIT

EZB.SOCKOPT.*sysname*.*tcpname*.IPV6_HOPOPTS

EZB.SOCKOPT.*sysname*.*tcpname*.IPV6_NEXTHOP

EZB.SOCKOPT.*sysname*.*tcpname*.IPV6_PKTINFO

EZB.SOCKOPT.*sysname*.*tcpname*.IPV6_RTHDR

EZB.SOCKOPT.*sysname*.*tcpname*.IPV6_RTHDRDSTOPTS

EZB.SOCKOPT.*sysname*.*tcpname*.IPV6_TCLASS

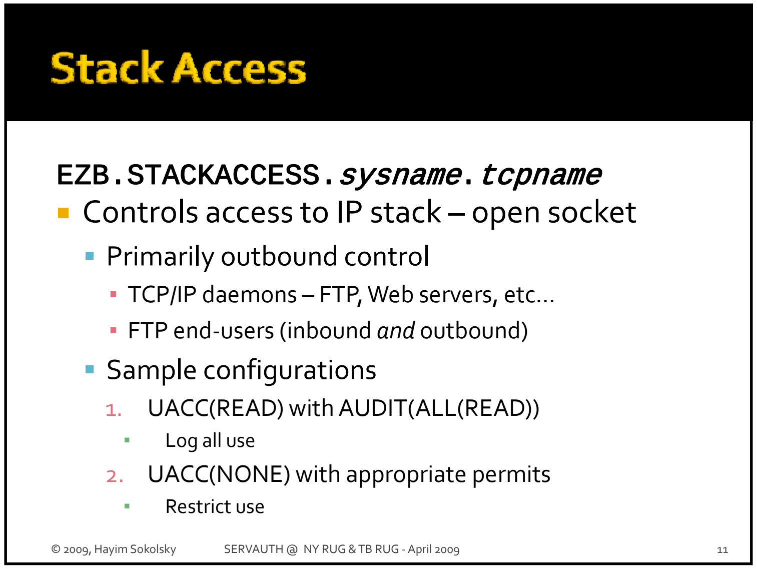
➡ **EZB.SOCKOPT.*sysname*.*tcpname*.SO_BROADCAST**

➡ **EZB.STACKACCESS.*sysname*.*tcpname***

EZB.TN3270.*sysname*.*tcpname*.PORT*xxxxx*

IRR.HOST.*host-name*

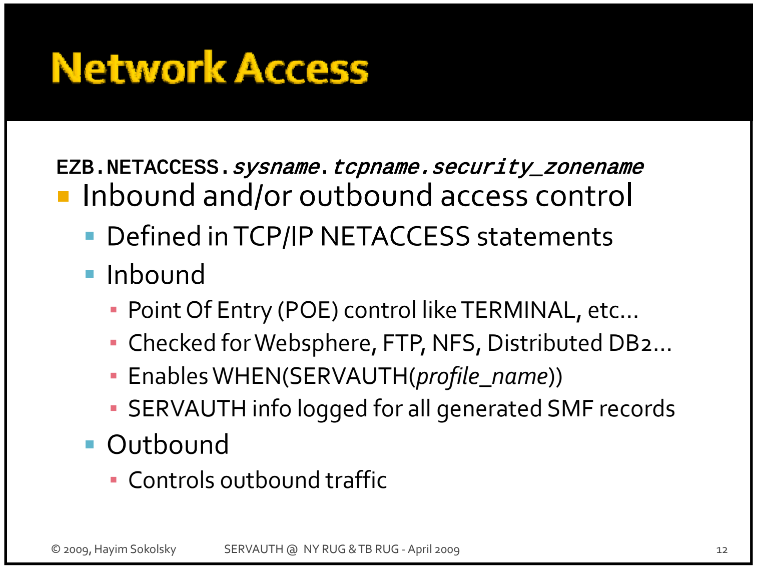
IST.NETMGMT.*sysname*.SNAMGMT



Stack Access

EZB.STACKACCESS.*sysname*.*tcpname*

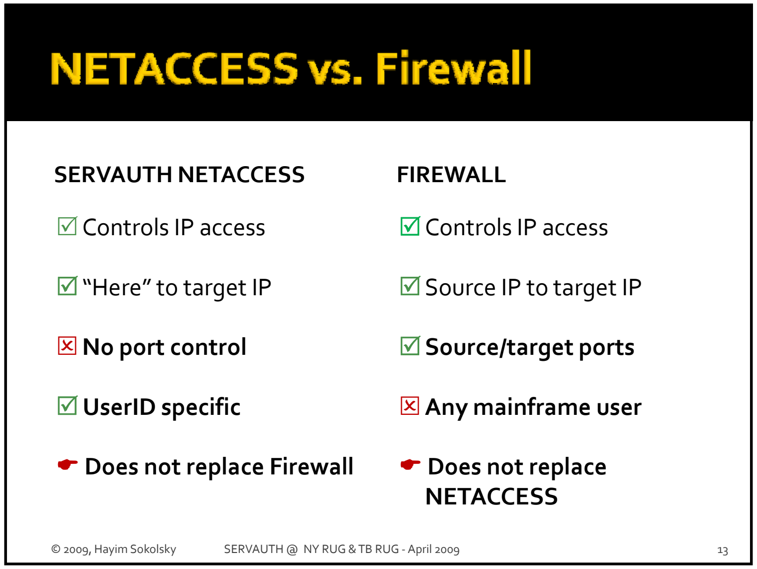
- Controls access to IP stack – open socket
  - Primarily outbound control
    - TCP/IP daemons – FTP, Web servers, etc…
    - FTP end-users (inbound *and* outbound)
  - Sample configurations
    1. UACC(READ) with AUDIT(ALL(READ))
       - Log all use
    2. UACC(NONE) with appropriate permits
       - Restrict use



Network Access

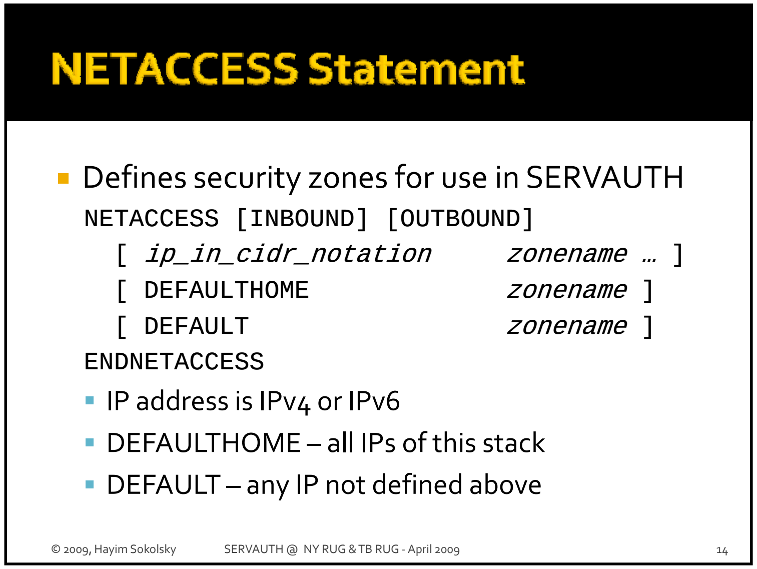
EZB.NETACCESS.*sysname*.*tcpname*.*security_zonename*

- Inbound and/or outbound access control
  - Defined in TCP/IP NETACCESS statements
  - Inbound
    - Point Of Entry (POE) control like TERMINAL, etc…
    - Checked for Websphere, FTP, NFS, Distributed DB2…
    - Enables WHEN(SERVAUTH(*profile_name*))
    - SERVAUTH info logged for all generated SMF records
  - Outbound
    - Controls outbound traffic



NETACCESS vs. Firewall

SERVAUTH NETACCESS	FIREWALL
☑ Controls IP access	☑ Controls IP access
☑ "Here" to target IP	☑ Source IP to target IP
☒ **No port control**	☑ **Source/target ports**
☑ **UserID specific**	☒ **Any mainframe user**
☛ **Does not replace Firewall**	☛ **Does not replace NETACCESS**

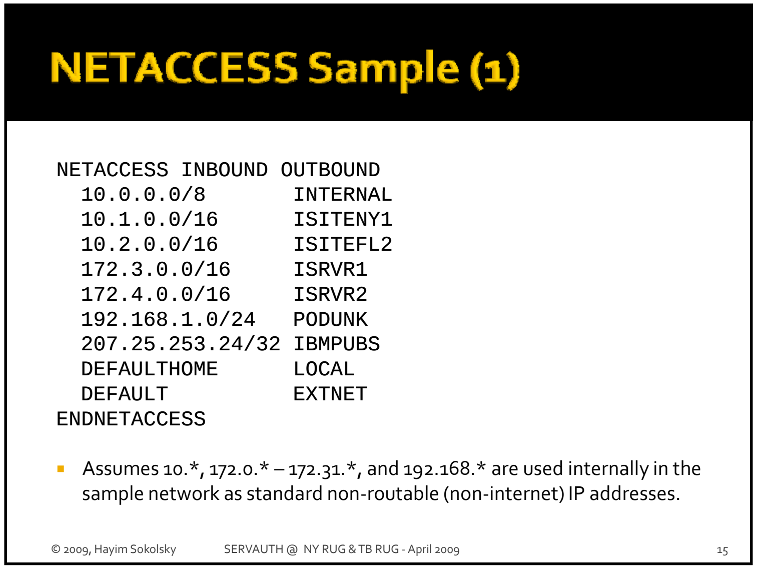


NETACCESS Statement

- Defines security zones for use in SERVAUTH

```
NETACCESS [INBOUND] [OUTBOUND]
  [ ip_in_cidr_notation      zonename … ]
  [ DEFAULTHOME              zonename ]
  [ DEFAULT                  zonename ]
ENDNETACCESS
```

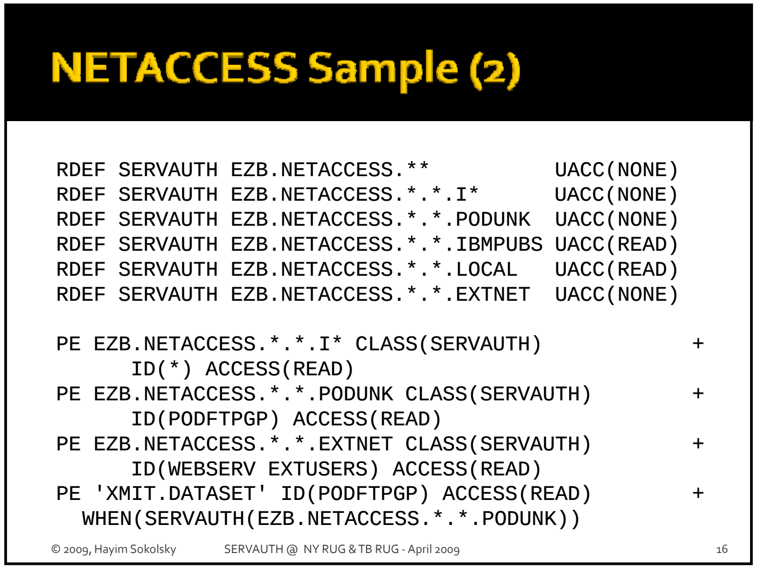
  - IP address is IPv4 or IPv6
  - DEFAULTHOME – all IPs of this stack
  - DEFAULT – any IP not defined above



NETACCESS Sample (1)

```
NETACCESS INBOUND OUTBOUND
  10.0.0.0/8       INTERNAL
  10.1.0.0/16      ISITENY1
  10.2.0.0/16      ISITEFL2
  172.3.0.0/16     ISRVR1
  172.4.0.0/16     ISRVR2
  192.168.1.0/24   PODUNK
  207.25.253.24/32 IBMPUBS
  DEFAULTHOME      LOCAL
  DEFAULT          EXTNET
ENDNETACCESS
```

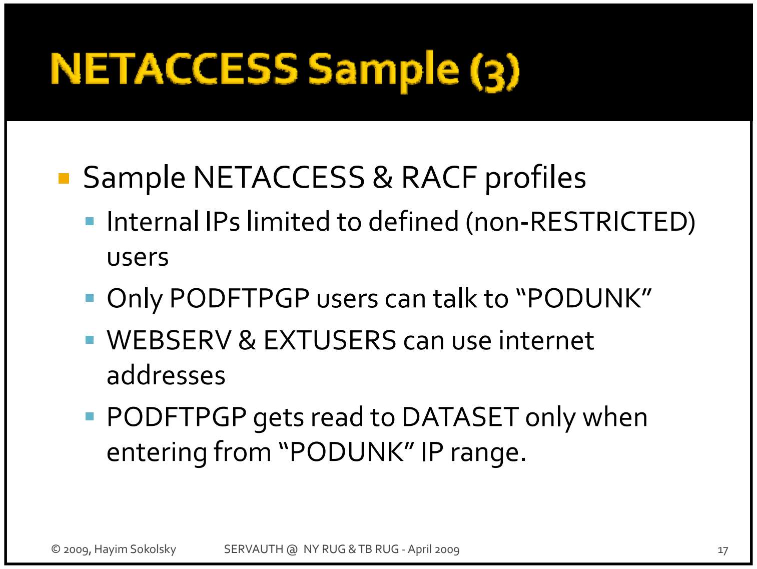
- Assumes 10.*, 172.0.* – 172.31.*, and 192.168.* are used internally in the sample network as standard non-routable (non-internet) IP addresses.



NETACCESS Sample (2)

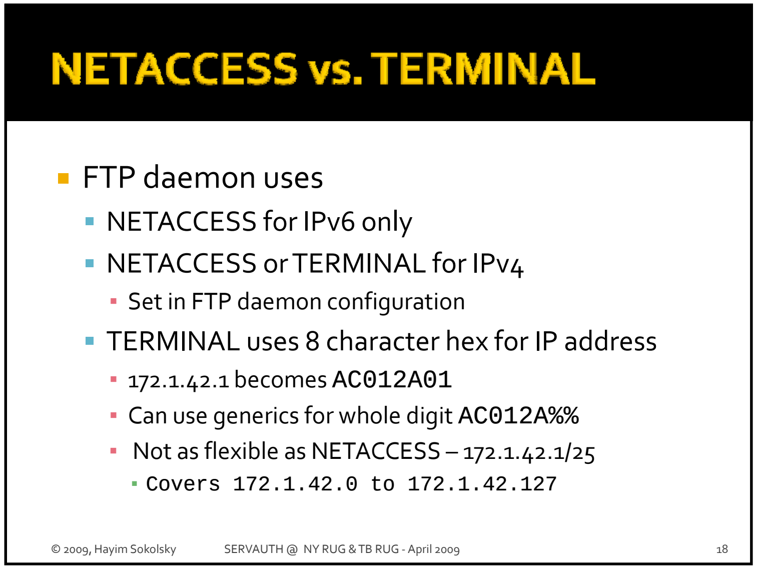
```
RDEF SERVAUTH EZB.NETACCESS.**          UACC(NONE)
RDEF SERVAUTH EZB.NETACCESS.*.*.I*      UACC(NONE)
RDEF SERVAUTH EZB.NETACCESS.*.*.PODUNK  UACC(NONE)
RDEF SERVAUTH EZB.NETACCESS.*.*.IBMPUBS UACC(READ)
RDEF SERVAUTH EZB.NETACCESS.*.*.LOCAL   UACC(READ)
RDEF SERVAUTH EZB.NETACCESS.*.*.EXTNET  UACC(NONE)

PE EZB.NETACCESS.*.*.I* CLASS(SERVAUTH)          +
      ID(*) ACCESS(READ)
PE EZB.NETACCESS.*.*.PODUNK CLASS(SERVAUTH)      +
      ID(PODFTPGP) ACCESS(READ)
PE EZB.NETACCESS.*.*.EXTNET CLASS(SERVAUTH)      +
      ID(WEBSERV EXTUSERS) ACCESS(READ)
PE 'XMIT.DATASET' ID(PODFTPGP) ACCESS(READ)      +
  WHEN(SERVAUTH(EZB.NETACCESS.*.*.PODUNK))
```



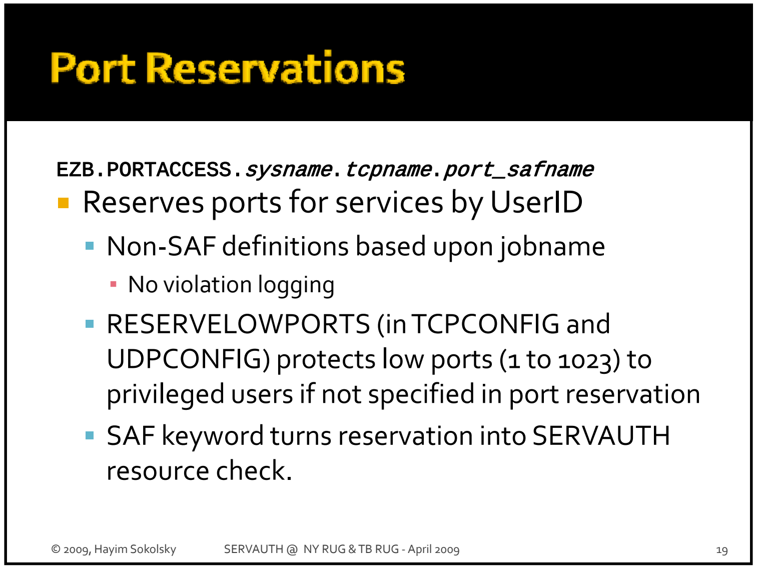
NETACCESS Sample (3)

- Sample NETACCESS & RACF profiles
  - Internal IPs limited to defined (non-RESTRICTED) users
  - Only PODFTPGP users can talk to "PODUNK"
  - WEBSERV & EXTUSERS can use internet addresses
  - PODFTPGP gets read to DATASET only when entering from "PODUNK" IP range.



NETACCESS vs. TERMINAL

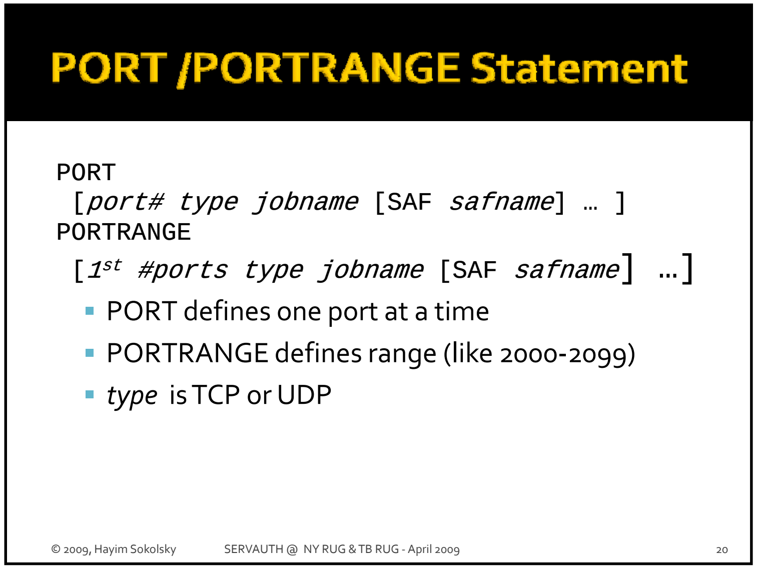
- FTP daemon uses
  - NETACCESS for IPv6 only
  - NETACCESS or TERMINAL for IPv4
    - Set in FTP daemon configuration
  - TERMINAL uses 8 character hex for IP address
    - 172.1.42.1 becomes `AC012A01`
    - Can use generics for whole digit `AC012A%%`
    - Not as flexible as NETACCESS – 172.1.42.1/25
      - `Covers 172.1.42.0 to 172.1.42.127`



Port Reservations

`EZB.PORTACCESS.`*`sysname.tcpname.port_safname`*

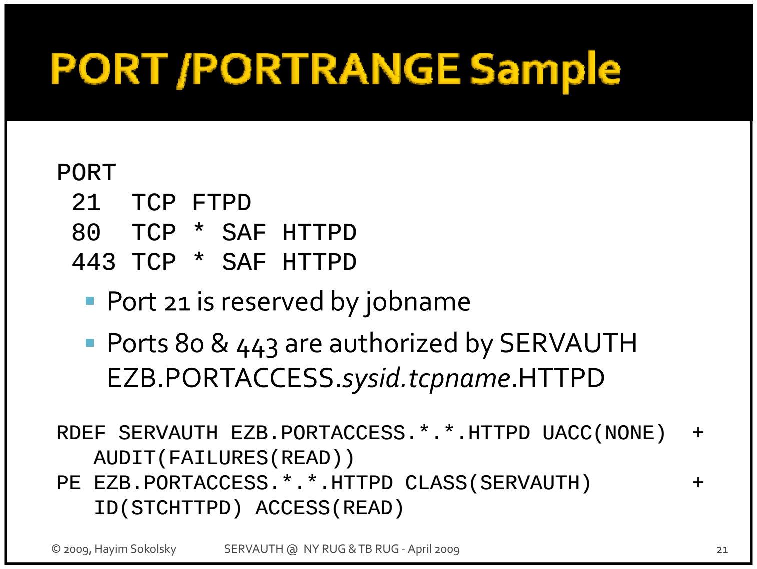
- Reserves ports for services by UserID
  - Non-SAF definitions based upon jobname
    - No violation logging
  - RESERVELOWPORTS (in TCPCONFIG and UDPCONFIG) protects low ports (1 to 1023) to privileged users if not specified in port reservation
  - SAF keyword turns reservation into SERVAUTH resource check.



PORT /PORTRANGE Statement

```
PORT
 [port# type jobname [SAF safname] … ]
PORTRANGE
 [1st #ports type jobname [SAF safname] …]
```

- PORT defines one port at a time
- PORTRANGE defines range (like 2000-2099)
- *type* is TCP or UDP



PORT /PORTRANGE Sample

```
PORT
 21  TCP FTPD
 80  TCP * SAF HTTPD
 443 TCP * SAF HTTPD
```

- Port 21 is reserved by jobname
- Ports 80 & 443 are authorized by SERVAUTH EZB.PORTACCESS.*sysid*.*tcpname*.HTTPD

```
RDEF SERVAUTH EZB.PORTACCESS.*.*.HTTPD UACC(NONE)  +
   AUDIT(FAILURES(READ))
PE EZB.PORTACCESS.*.*.HTTPD CLASS(SERVAUTH)        +
   ID(STCHTTPD) ACCESS(READ)
```

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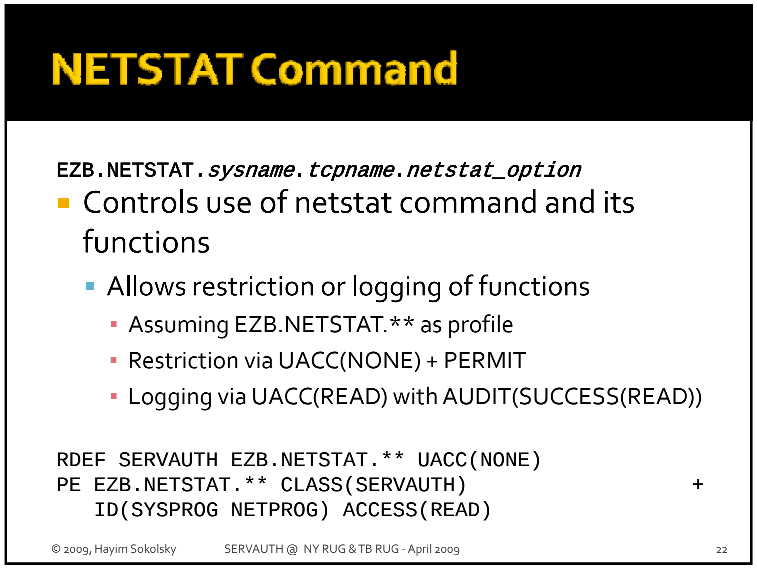

NETSTAT Command

EZB.NETSTAT.*sysname*.*tcpname*.*netstat_option*

- Controls use of netstat command and its functions
  - Allows restriction or logging of functions
    - Assuming EZB.NETSTAT.** as profile
    - Restriction via UACC(NONE) + PERMIT
    - Logging via UACC(READ) with AUDIT(SUCCESS(READ))

```
RDEF SERVAUTH EZB.NETSTAT.** UACC(NONE)
PE EZB.NETSTAT.** CLASS(SERVAUTH)                  +
   ID(SYSPROG NETPROG) ACCESS(READ)
```

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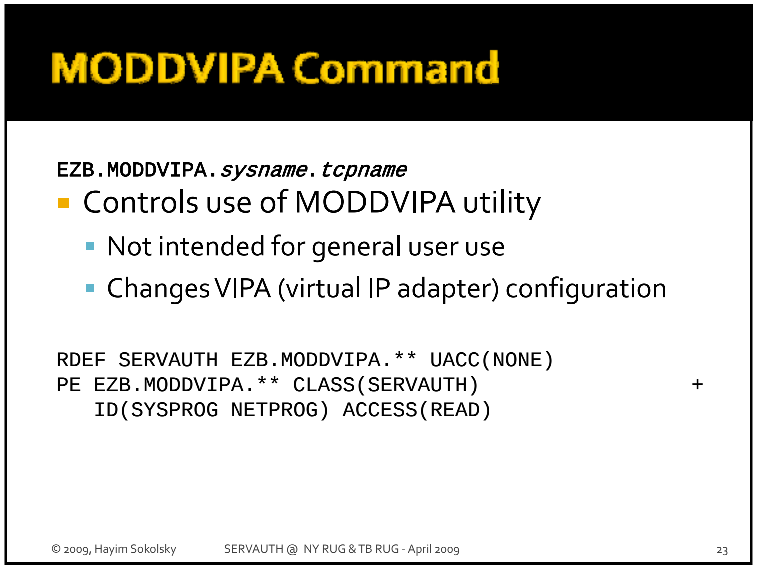

MODDVIPA Command

EZB.MODDVIPA.*sysname*.*tcpname*

- Controls use of MODDVIPA utility
  - Not intended for general user use
  - Changes VIPA (virtual IP adapter) configuration

```
RDEF SERVAUTH EZB.MODDVIPA.** UACC(NONE)
PE EZB.MODDVIPA.** CLASS(SERVAUTH)                 +
   ID(SYSPROG NETPROG) ACCESS(READ)
```

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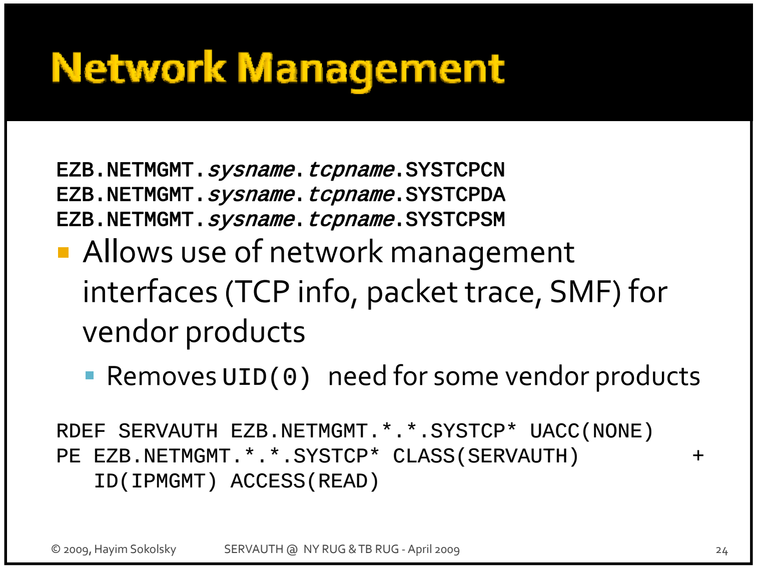

Network Management

EZB.NETMGMT.*sysname*.*tcpname*.SYSTCPCN
EZB.NETMGMT.*sysname*.*tcpname*.SYSTCPDA
EZB.NETMGMT.*sysname*.*tcpname*.SYSTCPSM

- Allows use of network management interfaces (TCP info, packet trace, SMF) for vendor products
  - Removes `UID(0)` need for some vendor products

```
RDEF SERVAUTH EZB.NETMGMT.*.*.SYSTCP* UACC(NONE)
PE EZB.NETMGMT.*.*.SYSTCP* CLASS(SERVAUTH)         +
   ID(IPMGMT) ACCESS(READ)
```

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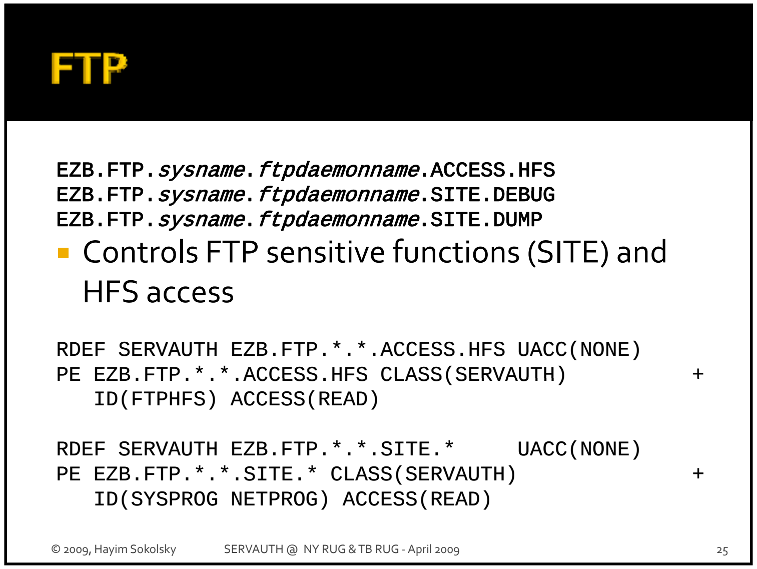


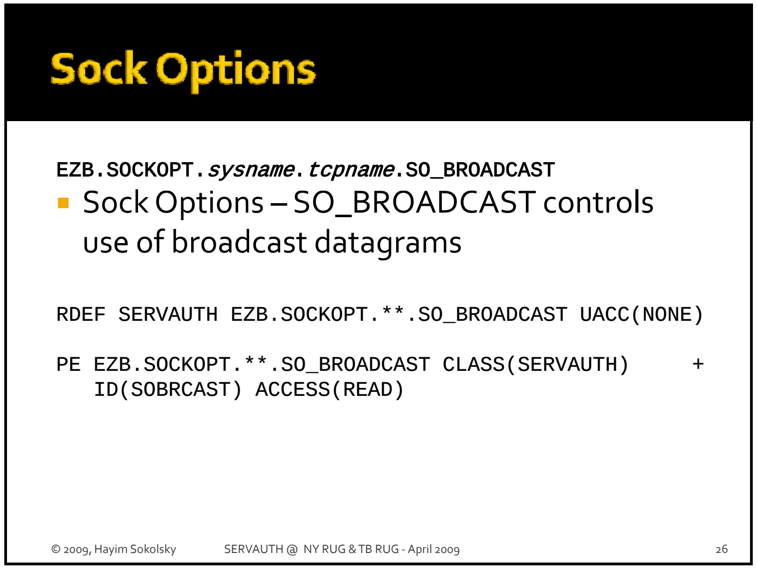
FTP

```
EZB.FTP.sysname.ftpdaemonname.ACCESS.HFS
EZB.FTP.sysname.ftpdaemonname.SITE.DEBUG
EZB.FTP.sysname.ftpdaemonname.SITE.DUMP
```

- Controls FTP sensitive functions (SITE) and HFS access

```
RDEF SERVAUTH EZB.FTP.*.*.ACCESS.HFS UACC(NONE)
PE EZB.FTP.*.*.ACCESS.HFS CLASS(SERVAUTH)          +
   ID(FTPHFS) ACCESS(READ)

RDEF SERVAUTH EZB.FTP.*.*.SITE.*     UACC(NONE)
PE EZB.FTP.*.*.SITE.* CLASS(SERVAUTH)              +
   ID(SYSPROG NETPROG) ACCESS(READ)
```



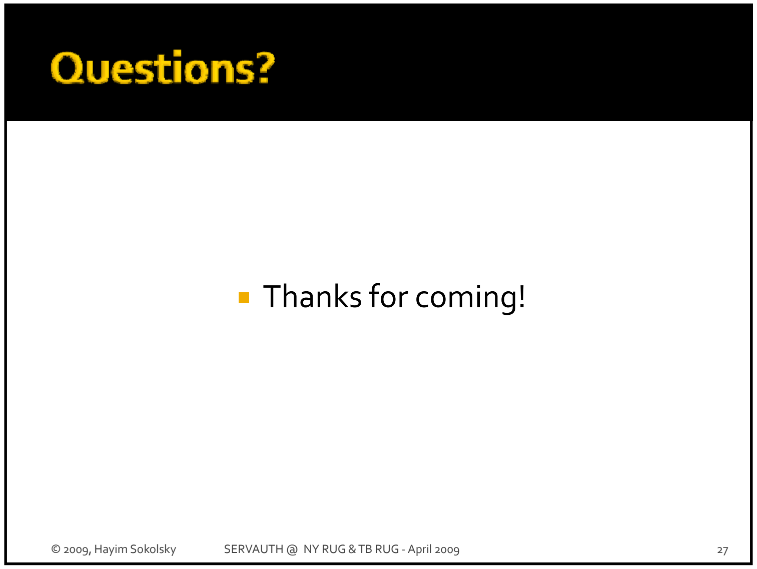
Sock Options

```
EZB.SOCKOPT.sysname.tcpname.SO_BROADCAST
```

- Sock Options – SO_BROADCAST controls use of broadcast datagrams

```
RDEF SERVAUTH EZB.SOCKOPT.**.SO_BROADCAST UACC(NONE)

PE EZB.SOCKOPT.**.SO_BROADCAST CLASS(SERVAUTH)     +
   ID(SOBRCAST) ACCESS(READ)
```



Questions?

- Thanks for coming!