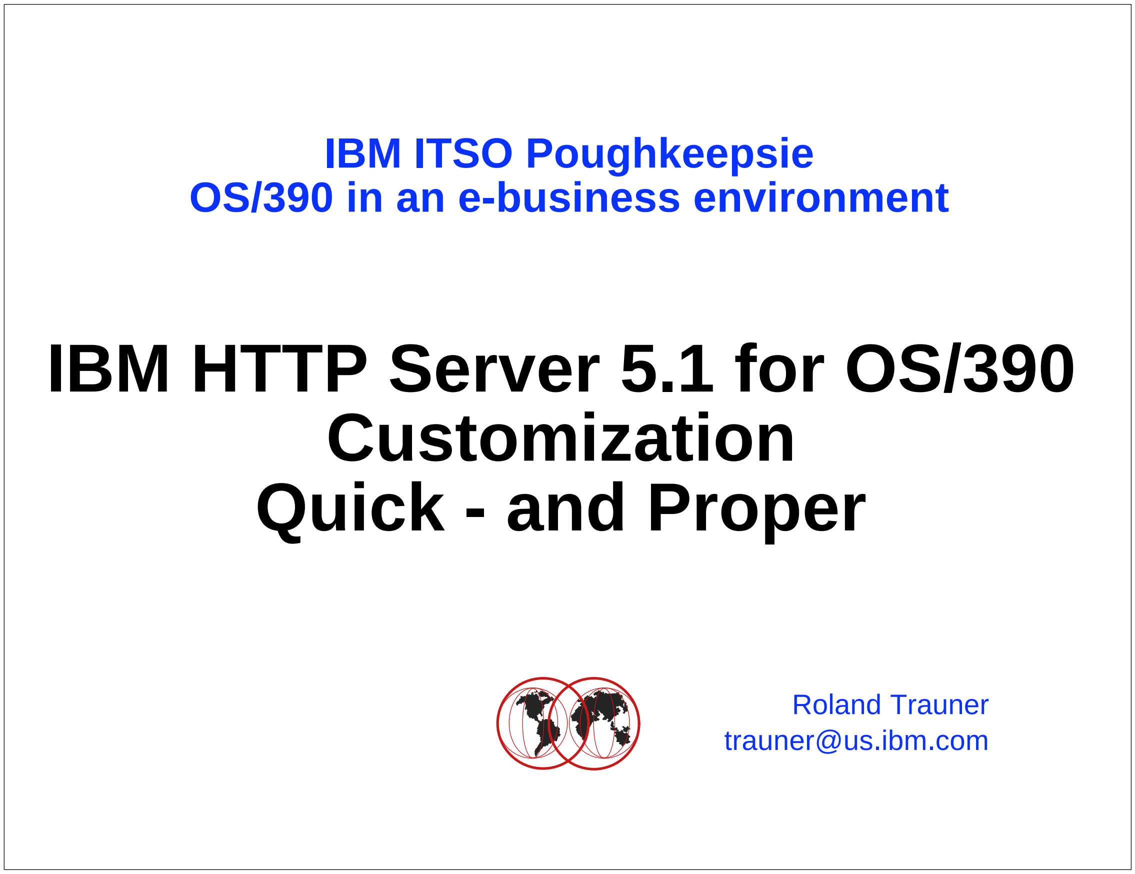

IBM ITSO Poughkeepsie
OS/390 in an e-business environment

IBM HTTP Server 5.1 for OS/390 Customization Quick - and Proper

Roland Trauner
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IBM HTTP Server 5.1 Quick Setup

The following procedure should help you to set up the IBM HTTP Server 5.1 on OS/390 R7 as a standard webserver quick - and proper.

It assumes that OS/390 UNIX System Services are set up, TCP/IP is running and HTTP Server Code is SMP/E installed in `/usr/lpp/internet`

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IBM HTTP Server 5.1 Quick Setup

- Define the Web Server Directory Structure
- Copy the Web Server Configuration Files
- Prepare the Web Server Configuration Files
- Define the Security Environment (RACF etc.)
- Define the Started Procedure
- Authorize the Started Procedure to RACF
- Create a HOMEPAGE
- Start the Web Server

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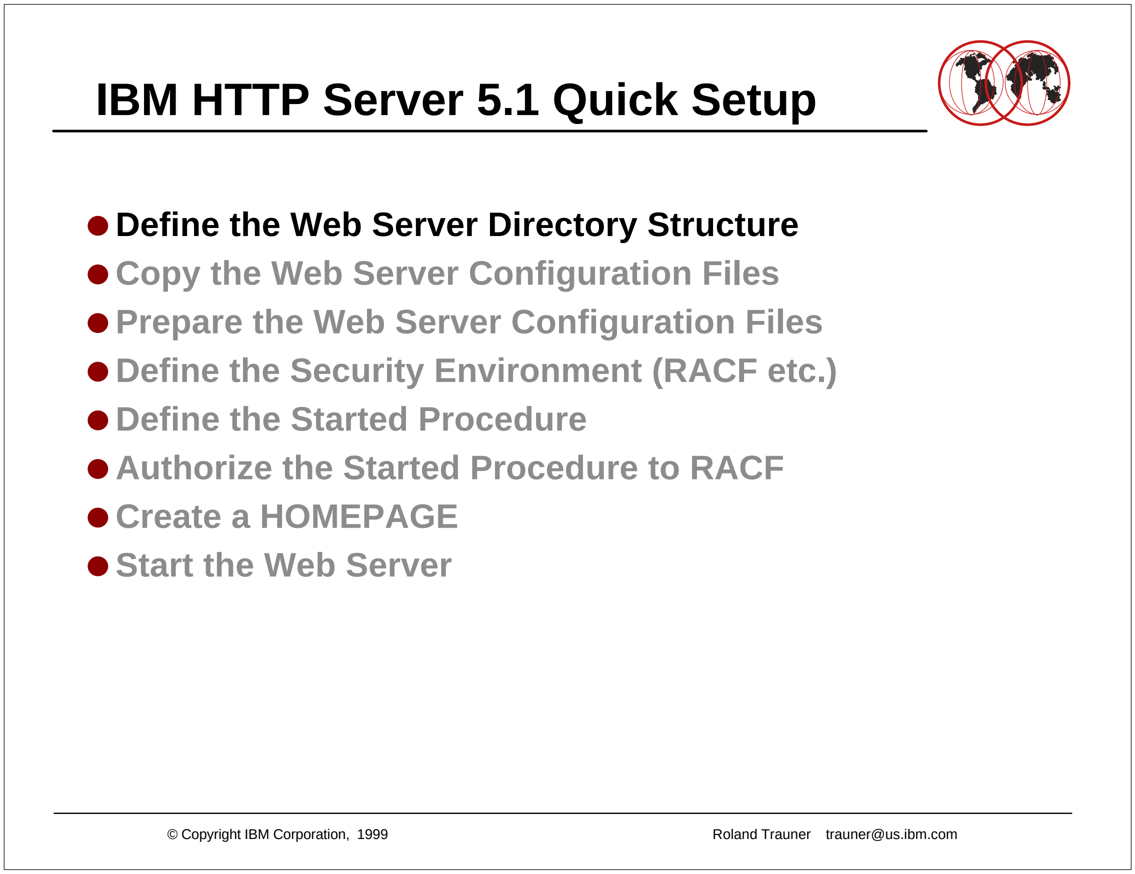

IBM HTTP Server 5.1 Quick Setup

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OS/390 Web Server Library Structure

ITSO Poughkeepsie Suggestion:

```
/web/server1/pub
            /sec
            /logs
            /reports
            /ocgi
            /servlets
            /rexx
    /server2/pub
             ...
```

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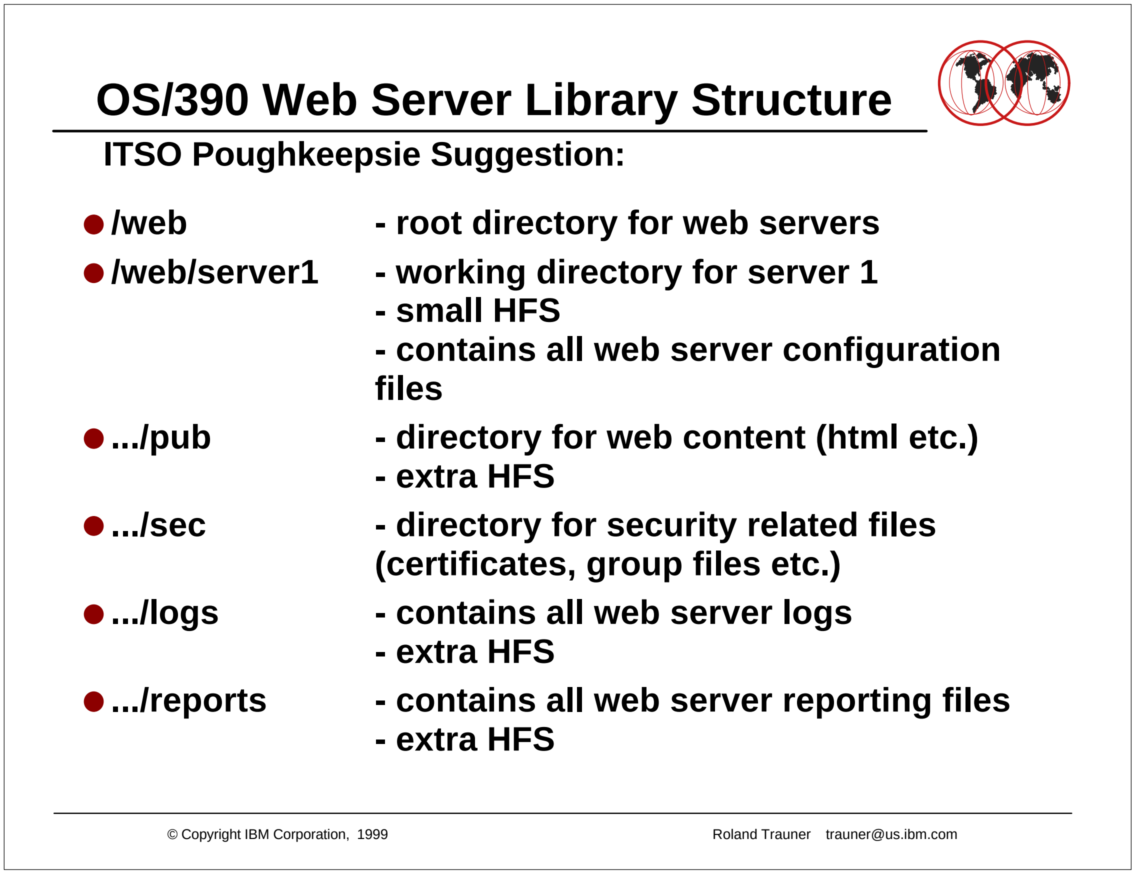

OS/390 Web Server Library Structure

ITSO Poughkeepsie Suggestion:

- **/web** **- root directory for web servers**
- **/web/server1** **- working directory for server 1**
- small HFS
- contains all web server configuration files
- **.../pub** **- directory for web content (html etc.)**
- extra HFS
- **.../sec** **- directory for security related files (certificates, group files etc.)**
- **.../logs** **- contains all web server logs**
- extra HFS
- **.../reports** **- contains all web server reporting files**
- extra HFS

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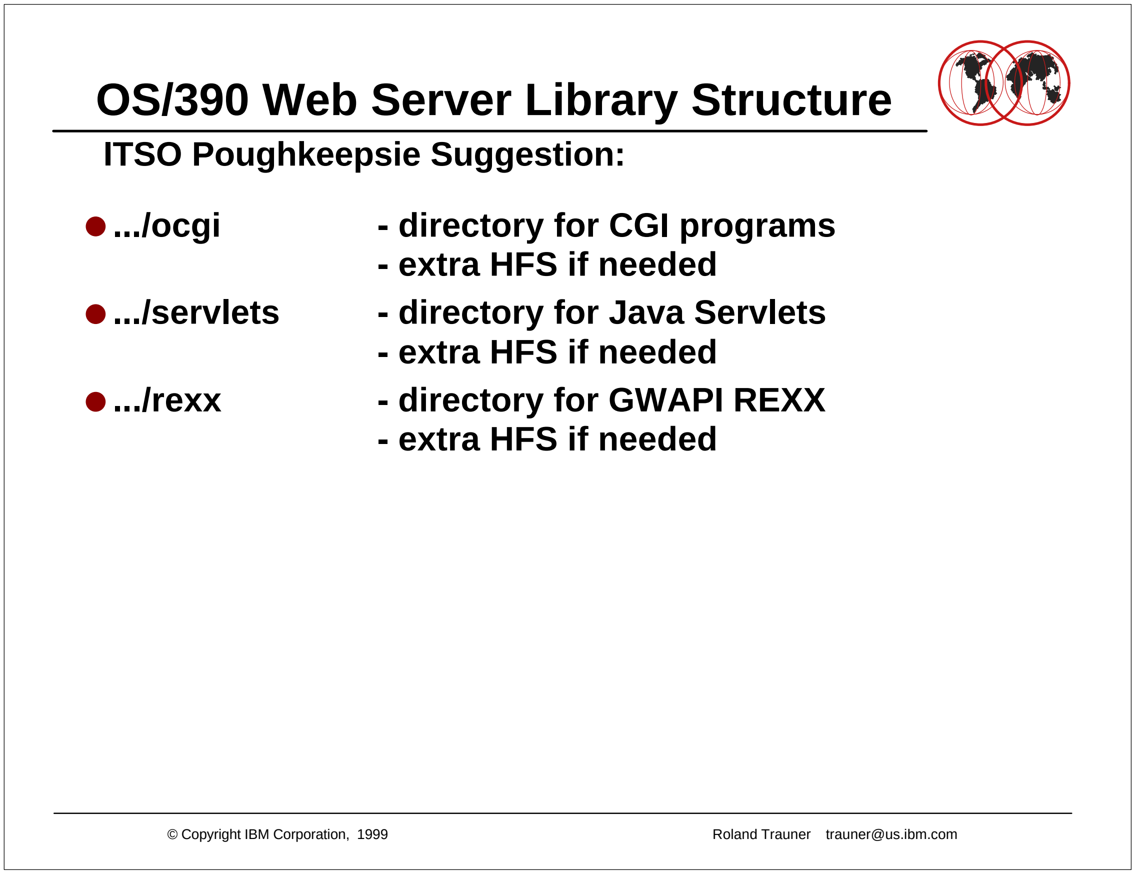

OS/390 Web Server Library Structure

ITSO Poughkeepsie Suggestion:

- **.../ocgi** - directory for CGI programs
- extra HFS if needed
- **.../servlets** - directory for Java Servlets
- extra HFS if needed
- **.../rexx** - directory for GWAPI REXX
- extra HFS if needed

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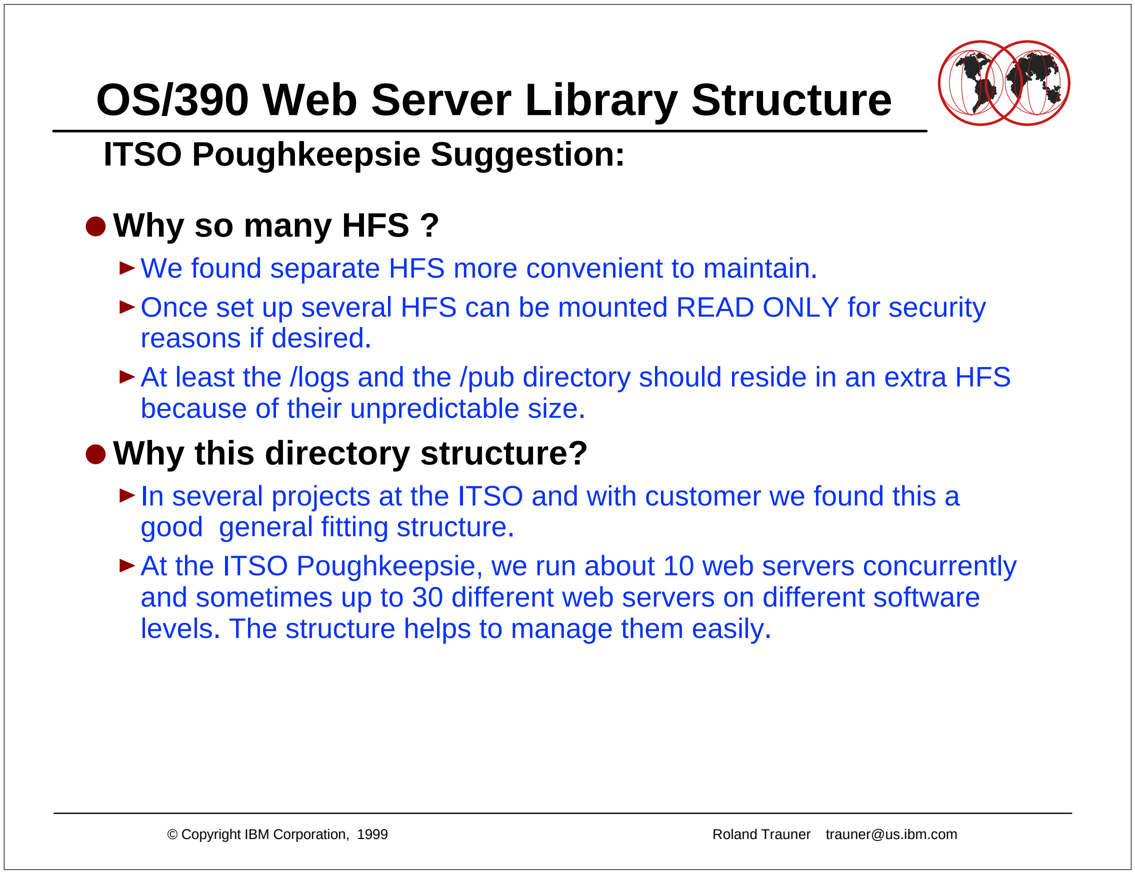

OS/390 Web Server Library Structure

ITSO Poughkeepsie Suggestion:

- **Why so many HFS ?**
  - We found separate HFS more convenient to maintain.
  - Once set up several HFS can be mounted READ ONLY for security reasons if desired.
  - At least the /logs and the /pub directory should reside in an extra HFS because of their unpredictable size.
- **Why this directory structure?**
  - In several projects at the ITSO and with customer we found this a good general fitting structure.
  - At the ITSO Poughkeepsie, we run about 10 web servers concurrently and sometimes up to 30 different web servers on different software levels. The structure helps to manage them easily.

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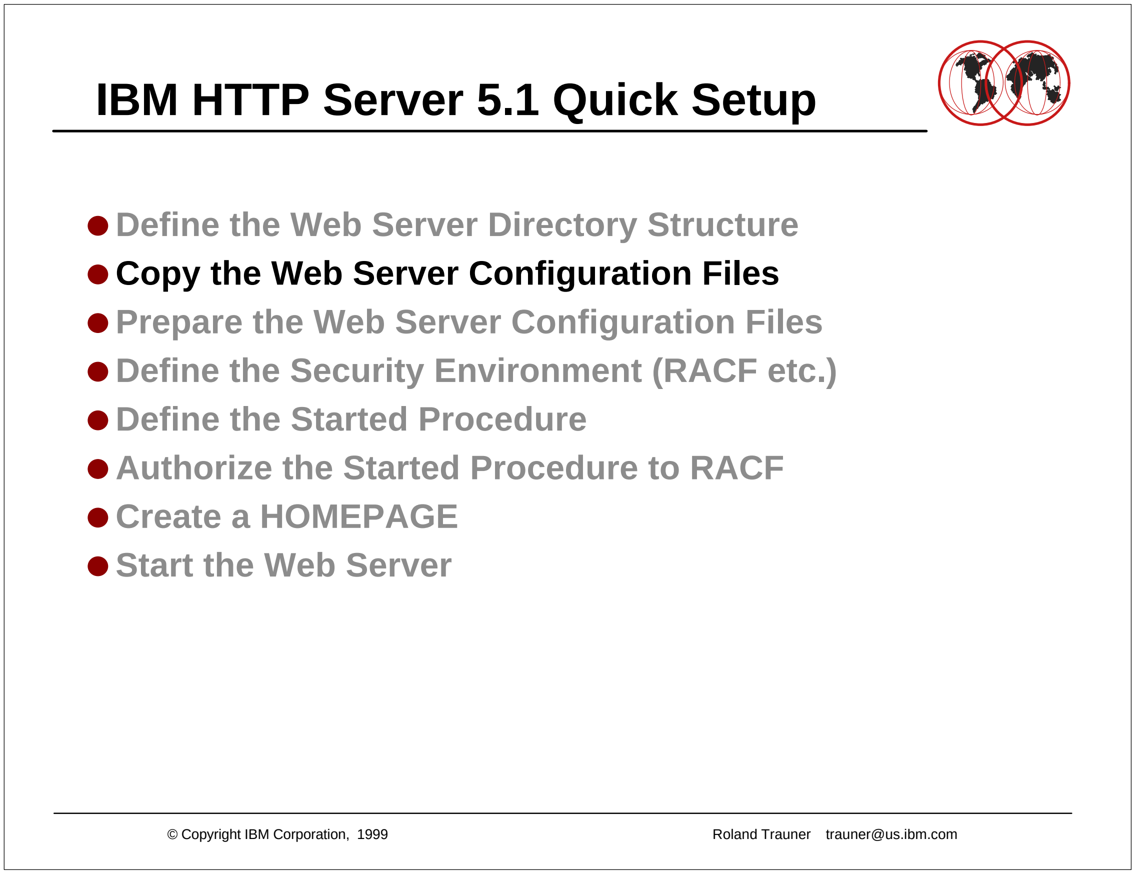
- At the ITSO Residency for SG24-2074-01, we defined /web/apple , /web/bean , /web/candy etc..
- Funny names to easy identify the web servers.
- The procedures have been named WEBAPPLE, WEBBEAN, WEBCANDY etc. accordingly and we then spoke about the "APPLE" Server etc.



IBM HTTP Server 5.1 Quick Setup

- Define the Web Server Directory Structure
- **Copy the Web Server Configuration Files**
- Prepare the Web Server Configuration Files
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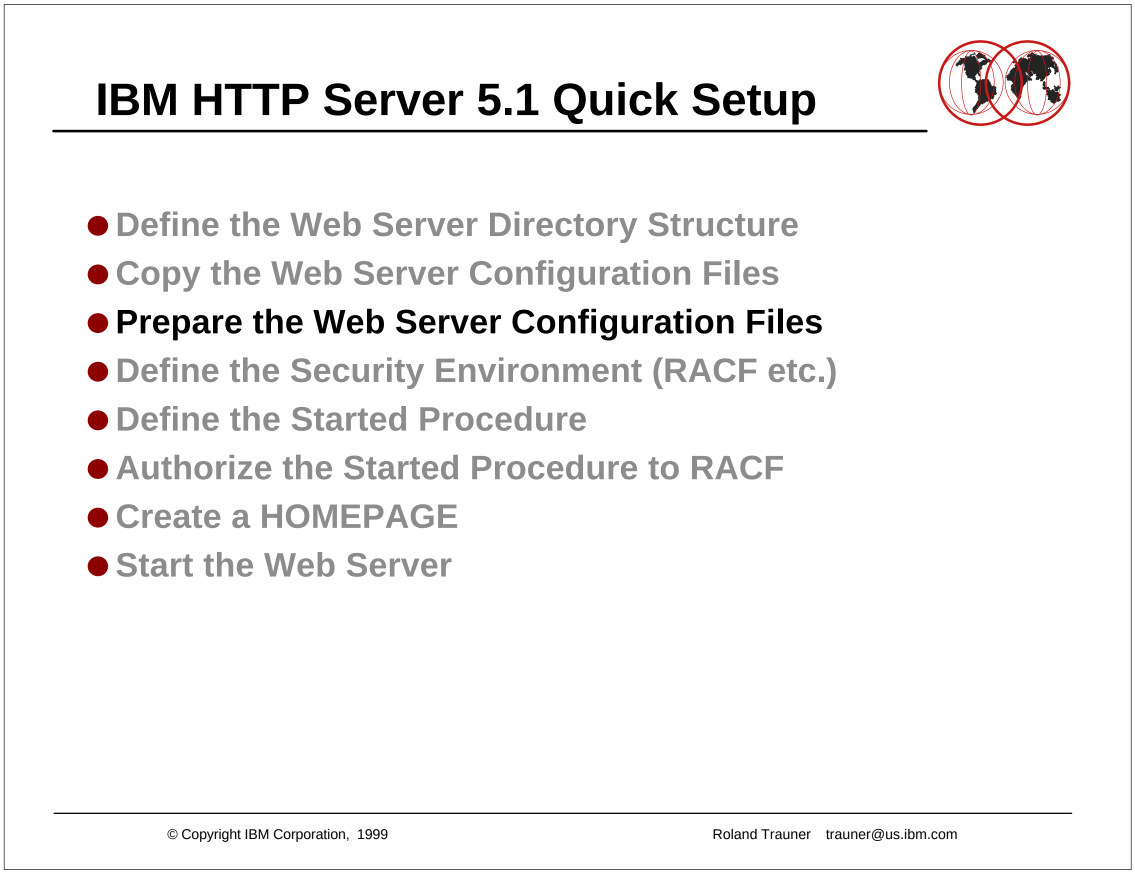
IBM HTTP Server 5.1 Quick Setup

- **Copy the Web Server configuration files into the Web Server working directory**
  - From /usr/lpp/internet/samples/config to /web/apple
- **httpd.conf** - **Web Server main configuration files**
- **httpd.envvars** - **Web Server environment variables**
- **mvsds.conf** - **MVSDS function config file**
- **ics_pics.conf** - **PICS Rating file**
- **javelin.conf** - **Web Traffic Express (Proxy) config file**
- **socks.conf** - **another Proxy config file**
- **lgw_fcgi.conf** - **Fast CGI config file**
- **IMWSendMail.cfg** - **"old" SendMail config file**



IBM HTTP Server 5.1 Quick Setup

- Define the Web Server Directory Structure
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Configure httpd.conf

- httpd.conf is the web server main configuration file. You may choose to modify it by using the Remote Server Configuration Dialog or you may modify the file using OEDIT, like we did.
  - Remote Server Configuration allows you to modify your web server by using a web connection and java applet enhanced web pages.
- The following httpd.conf configuration example prepares for a global accessible web server.
- Details about the configuration directives can be found in the httpd.conf itself (as a comment and most exactly) or the webmasters guide.

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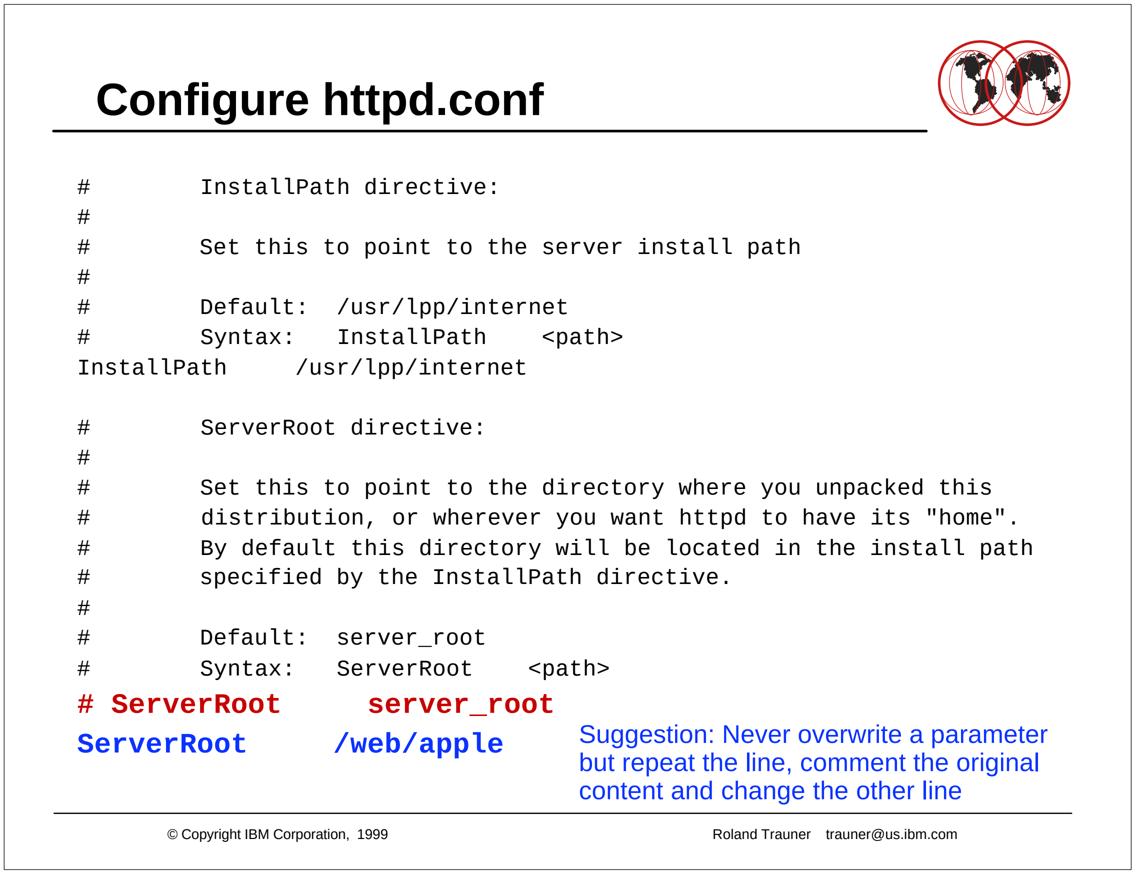

Configure httpd.conf

```
#       InstallPath directive:
#
#       Set this to point to the server install path
#
#       Default:  /usr/lpp/internet
#       Syntax:   InstallPath    <path>
InstallPath     /usr/lpp/internet

#       ServerRoot directive:
#
#       Set this to point to the directory where you unpacked this
#       distribution, or wherever you want httpd to have its "home".
#       By default this directory will be located in the install path
#       specified by the InstallPath directive.
#
#       Default:  server_root
#       Syntax:   ServerRoot    <path>
# ServerRoot     server_root
ServerRoot     /web/apple
```

Suggestion: Never overwrite a parameter but repeat the line, comment the original content and change the other line

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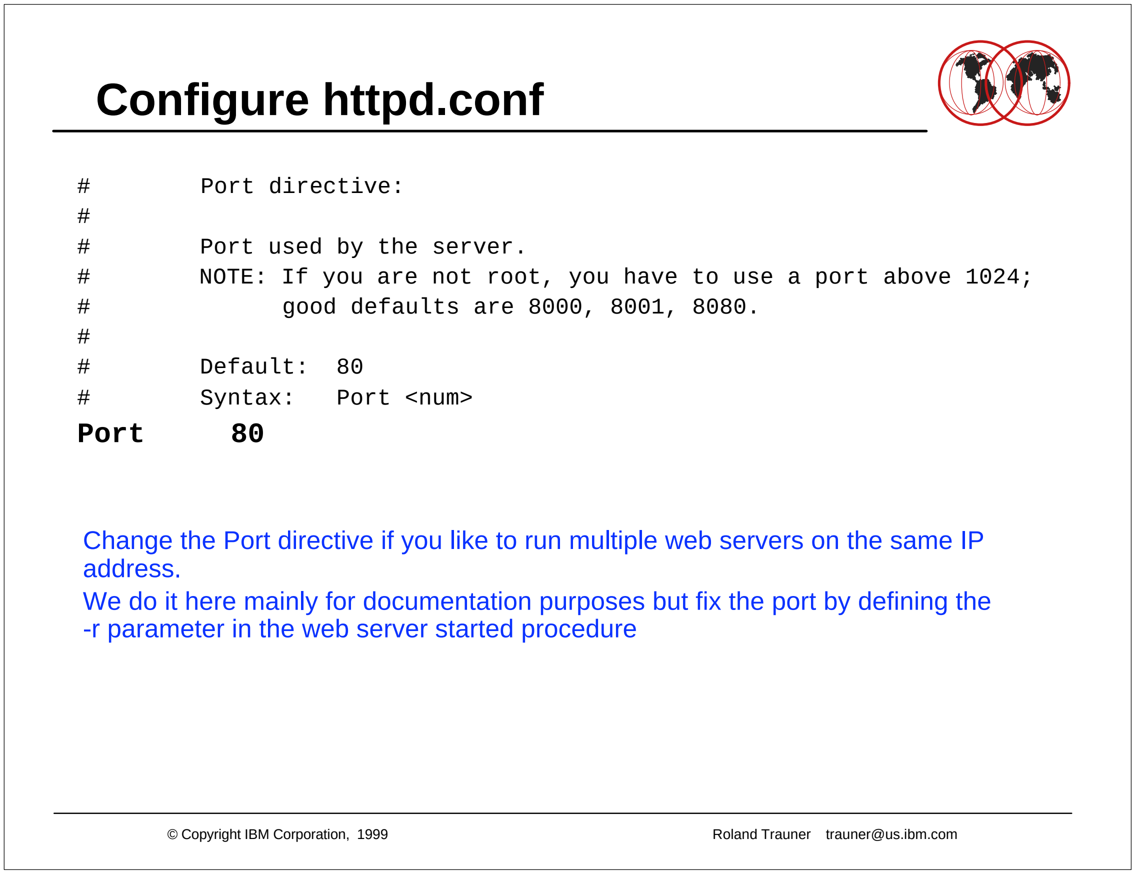

Configure httpd.conf

```
#        Port directive:
#
#        Port used by the server.
#        NOTE: If you are not root, you have to use a port above 1024;
#              good defaults are 8000, 8001, 8080.
#
#        Default:  80
#        Syntax:   Port <num>
Port      80
```

Change the Port directive if you like to run multiple web servers on the same IP address.

We do it here mainly for documentation purposes but fix the port by defining the -r parameter in the web server started procedure

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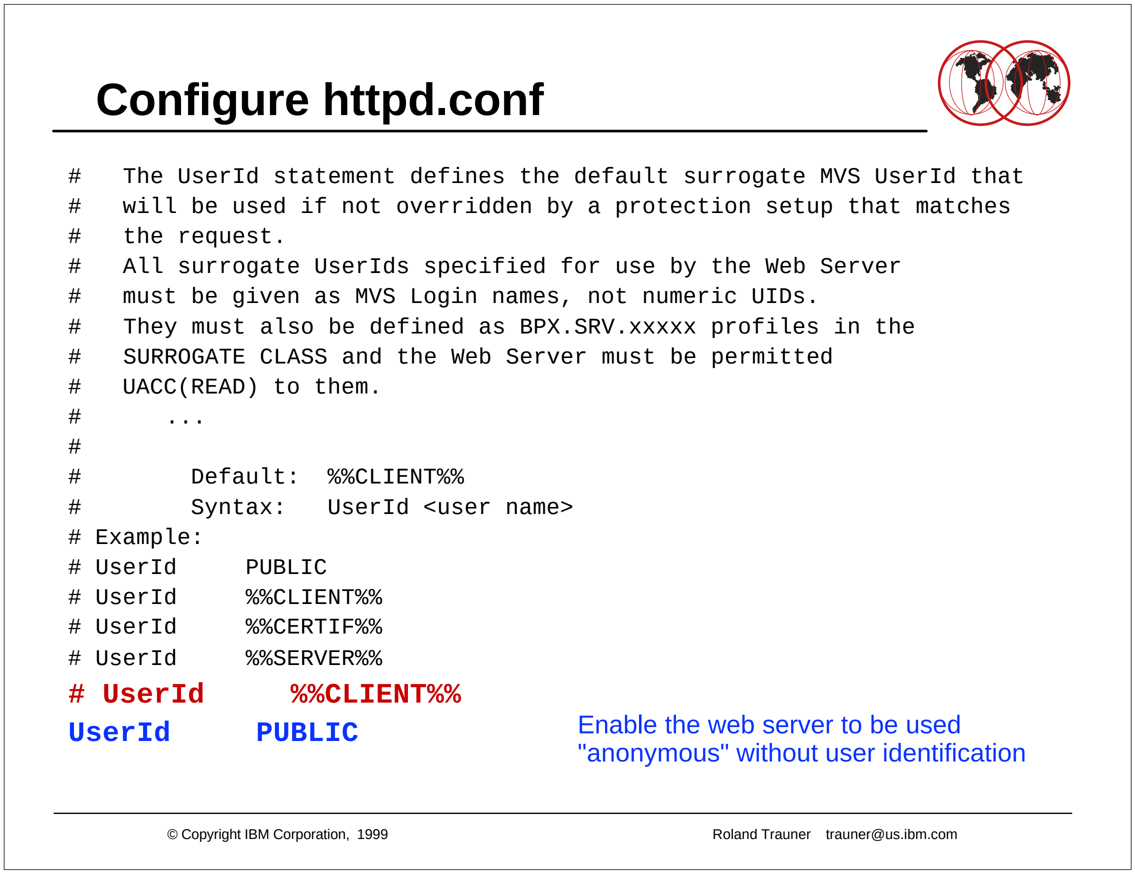

Configure httpd.conf

```
#   The UserId statement defines the default surrogate MVS UserId that
#   will be used if not overridden by a protection setup that matches
#   the request.
#   All surrogate UserIds specified for use by the Web Server
#   must be given as MVS Login names, not numeric UIDs.
#   They must also be defined as BPX.SRV.xxxxx profiles in the
#   SURROGATE CLASS and the Web Server must be permitted
#   UACC(READ) to them.
#      ...
#
#        Default:  %%CLIENT%%
#        Syntax:   UserId <user name>
# Example:
# UserId     PUBLIC
# UserId     %%CLIENT%%
# UserId     %%CERTIF%%
# UserId     %%SERVER%%
# UserId     %%CLIENT%%
UserId     PUBLIC
```

Enable the web server to be used "anonymous" without user identification

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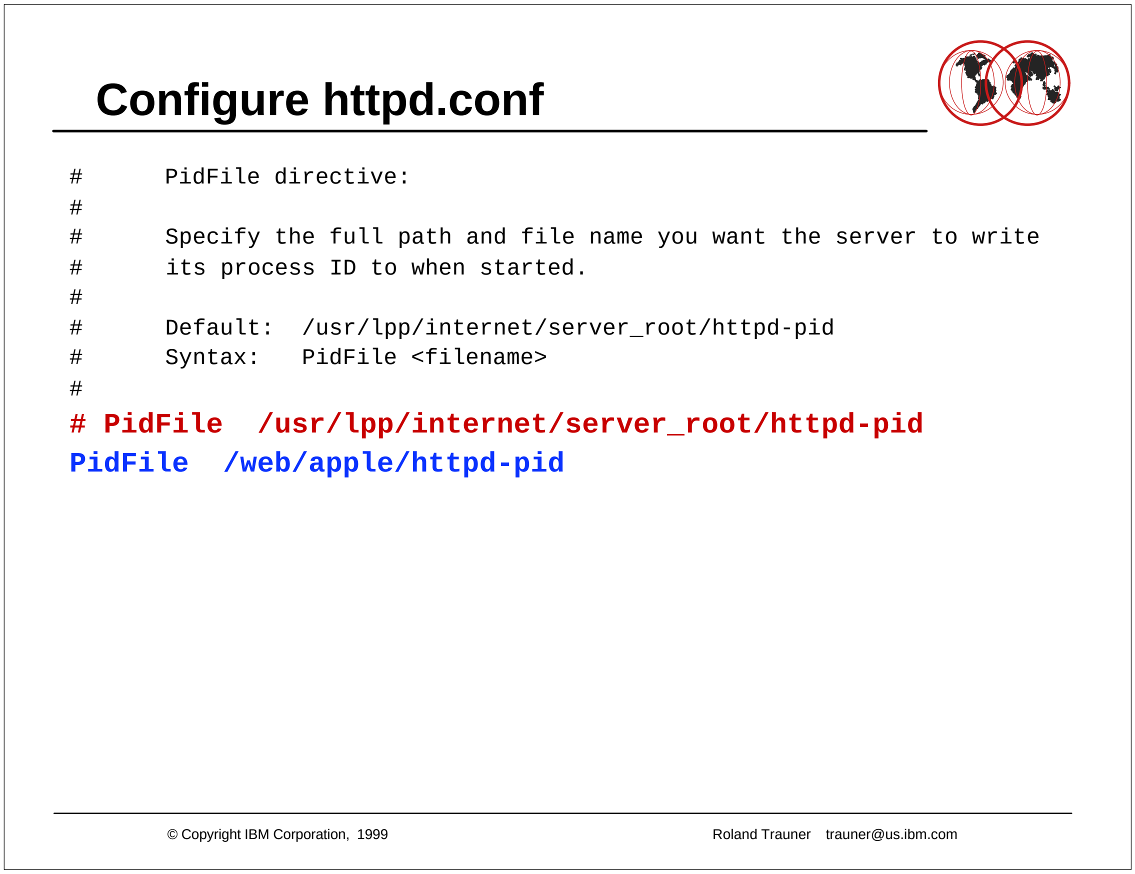

Configure httpd.conf

```
#      PidFile directive:
#
#      Specify the full path and file name you want the server to write
#      its process ID to when started.
#
#      Default:  /usr/lpp/internet/server_root/httpd-pid
#      Syntax:   PidFile <filename>
#
# PidFile  /usr/lpp/internet/server_root/httpd-pid
PidFile  /web/apple/httpd-pid
```

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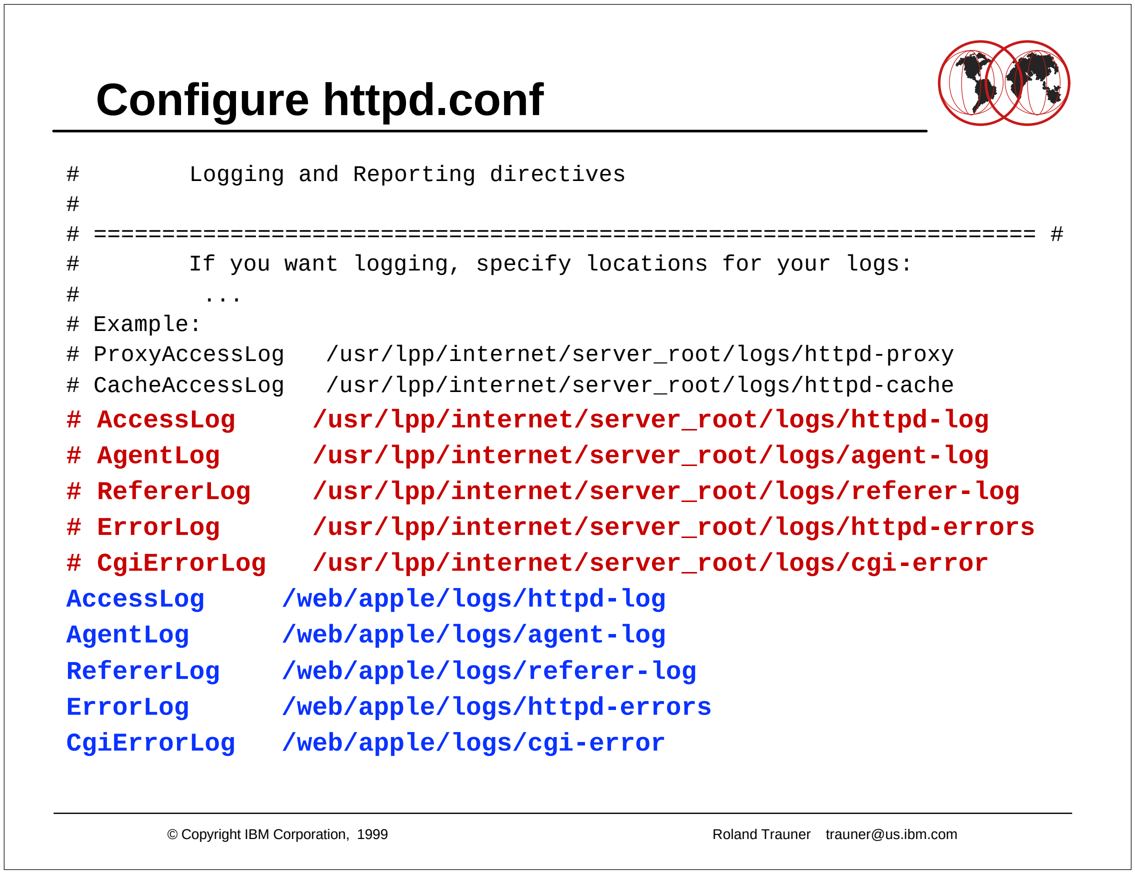

Configure httpd.conf

```
#        Logging and Reporting directives
#
# ====================================================================== #
#        If you want logging, specify locations for your logs:
#         ...
# Example:
# ProxyAccessLog   /usr/lpp/internet/server_root/logs/httpd-proxy
# CacheAccessLog   /usr/lpp/internet/server_root/logs/httpd-cache
# AccessLog     /usr/lpp/internet/server_root/logs/httpd-log
# AgentLog      /usr/lpp/internet/server_root/logs/agent-log
# RefererLog    /usr/lpp/internet/server_root/logs/referer-log
# ErrorLog      /usr/lpp/internet/server_root/logs/httpd-errors
# CgiErrorLog   /usr/lpp/internet/server_root/logs/cgi-error
AccessLog     /web/apple/logs/httpd-log
AgentLog      /web/apple/logs/agent-log
RefererLog    /web/apple/logs/referer-log
ErrorLog      /web/apple/logs/httpd-errors
CgiErrorLog   /web/apple/logs/cgi-error
```

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Configure httpd.conf

```
#       AccessLogArchive and ErrorLogArchive directive:
#
# Enables the purge options (purge) or the user exit option (userexit)
# or does not do either (none). When selected, the purge action or
# userexit action will take place at midnight, immediately after the
# previous day's logs have been closed and the new day's logs have been
# opened. If the userexit option is specified, the name and location
# of the user exit that is called must be specified following the
# userexit option parameter.
#
#       Default:  AccessLogArchive none
#                 ErrorLogArchive  none
# ...
# AccessLogArchive none
# ErrorLogArchive  none
AccessLogArchive purge
ErrorLogArchive  purge
```

Purge the logs on condition.
Condition defined later.

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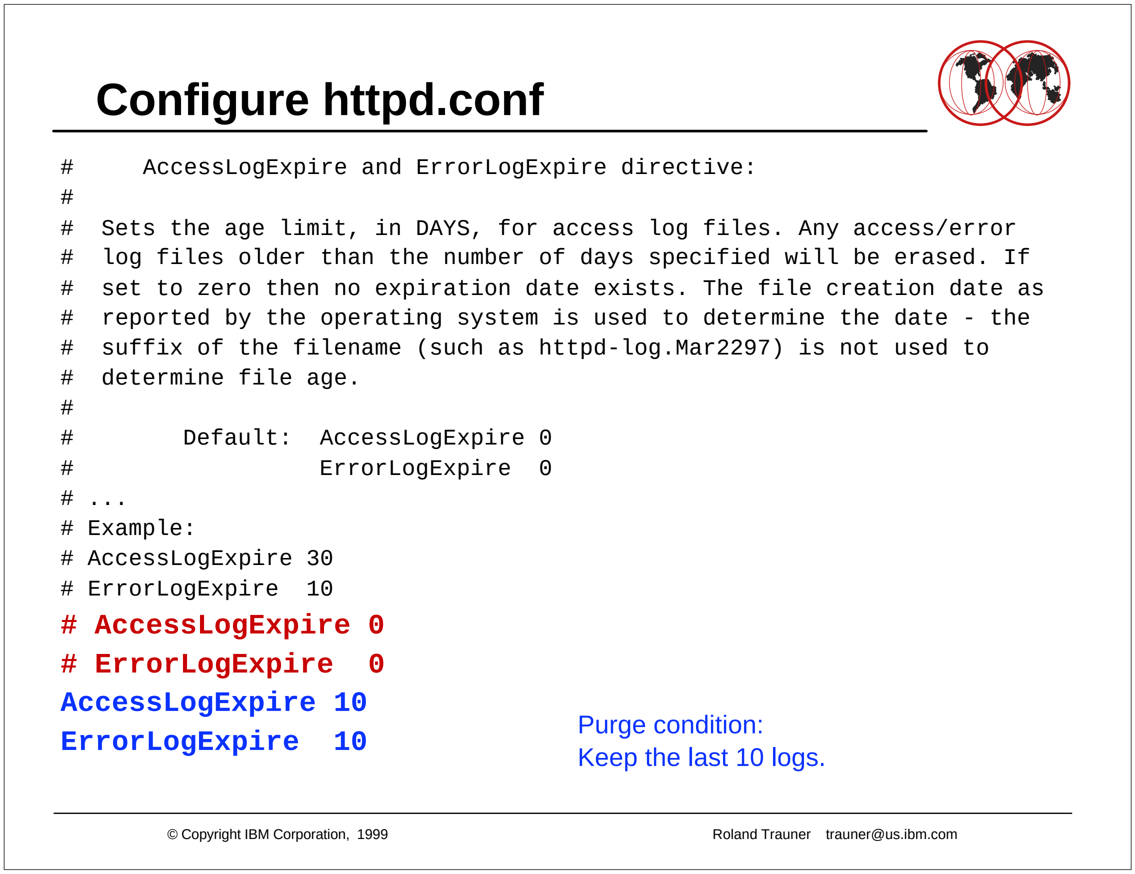

Configure httpd.conf

```
#     AccessLogExpire and ErrorLogExpire directive:
#
#  Sets the age limit, in DAYS, for access log files. Any access/error
#  log files older than the number of days specified will be erased. If
#  set to zero then no expiration date exists. The file creation date as
#  reported by the operating system is used to determine the date - the
#  suffix of the filename (such as httpd-log.Mar2297) is not used to
#  determine file age.
#
#       Default:  AccessLogExpire 0
#                 ErrorLogExpire  0
# ...
# Example:
# AccessLogExpire 30
# ErrorLogExpire  10
# AccessLogExpire 0
# ErrorLogExpire  0
AccessLogExpire 10
ErrorLogExpire  10
```

Purge condition:
Keep the last 10 logs.

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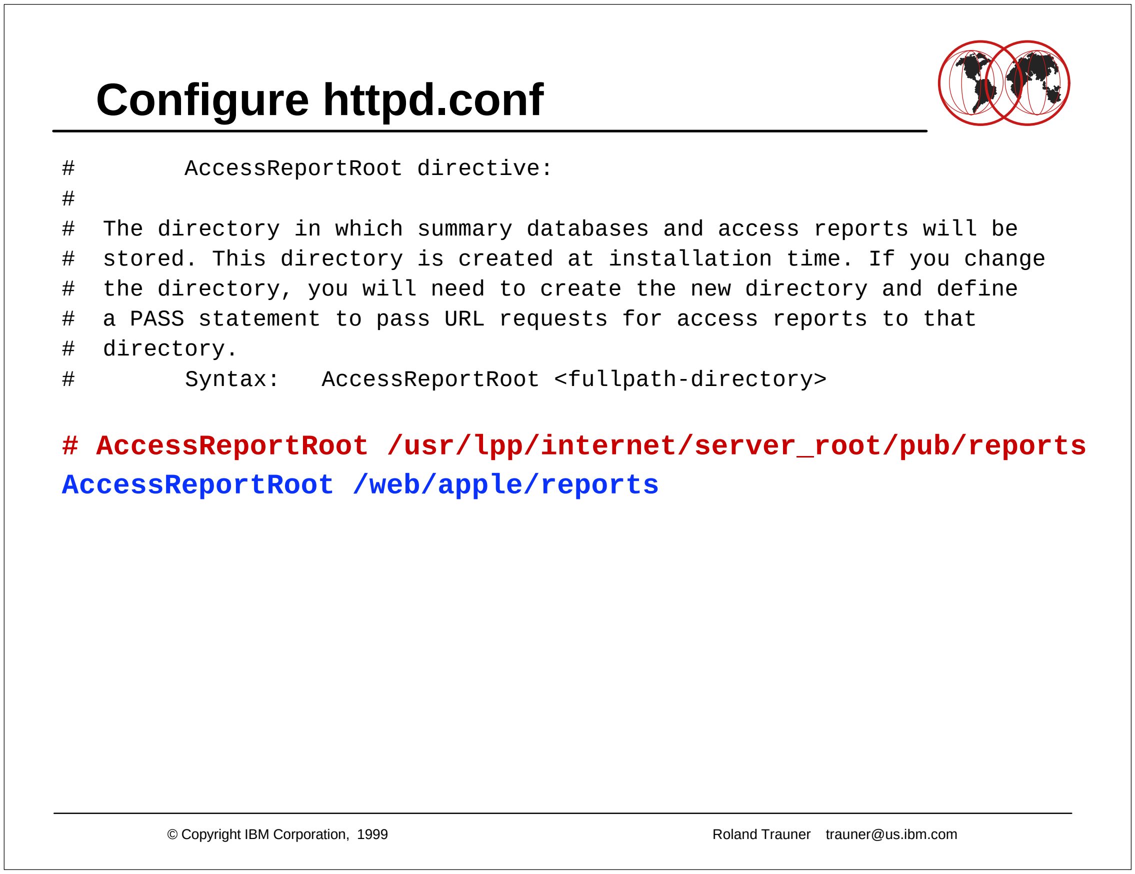

Configure httpd.conf

```
#       AccessReportRoot directive:
#
#  The directory in which summary databases and access reports will be
#  stored. This directory is created at installation time. If you change
#  the directory, you will need to create the new directory and define
#  a PASS statement to pass URL requests for access reports to that
#  directory.
#       Syntax:   AccessReportRoot <fullpath-directory>

# AccessReportRoot /usr/lpp/internet/server_root/pub/reports
AccessReportRoot /web/apple/reports
```

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Configure httpd.conf

```
#       ReportDataArchive directive:
#
# Enables the purge options (purge) or the user exit option (userexit)
# or does not do either (none) for Report data files.
# When selected, the purge action or userexit action will take place at
# midnight immediately after the previous day's reports have been closed
# and the new day's reports have been opened.
# If the userexit option is specified, the name and location of the
# user exit that is called must be specified following the userexit
# option parameter
#
#   Default:  none
#   Syntax:   ReportDataArchive <none | purge | userexit user_exit_spec>
#
# Example:
# ReportDataArchive purge
# ReportDataArchive none
ReportDataArchive purge
```

Purge the reports on condition.
Condition defined later.

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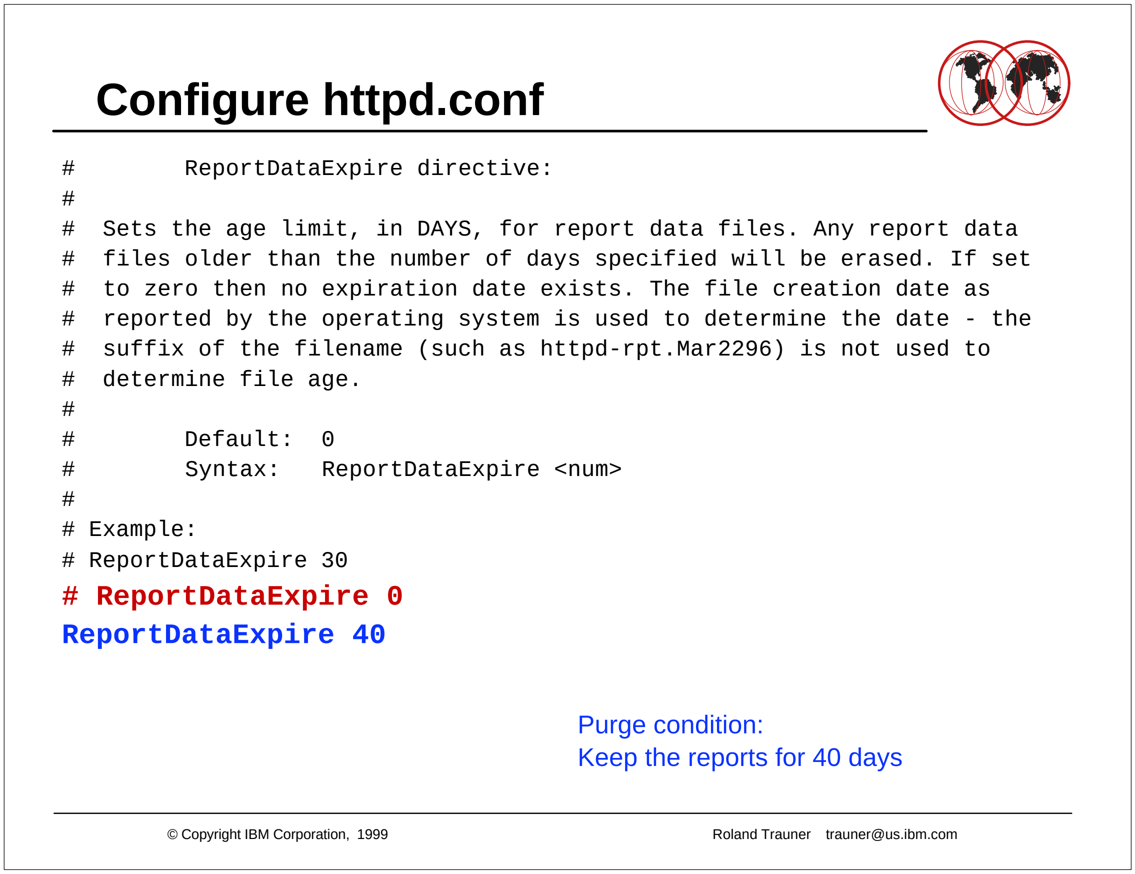

Configure httpd.conf

```
#       ReportDataExpire directive:
#
#  Sets the age limit, in DAYS, for report data files. Any report data
#  files older than the number of days specified will be erased. If set
#  to zero then no expiration date exists. The file creation date as
#  reported by the operating system is used to determine the date - the
#  suffix of the filename (such as httpd-rpt.Mar2296) is not used to
#  determine file age.
#
#       Default:  0
#       Syntax:   ReportDataExpire <num>
#
# Example:
# ReportDataExpire 30
# ReportDataExpire 0
ReportDataExpire 40
```

Purge condition:
Keep the reports for 40 days

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Configure httpd.conf

```
#        LoggingReportingProgram directive:
#
#        This is the program that will be kicked off at midnight as the
#        logs get closed.  This can be any program including perl
#        scripts.  You must give an absolute path to the program
#        and set up any options in the
#        LoggingReportingProgramOptions directive.
#
#   Default:  <none>
#   Syntax:   LoggingReportingProgram <fully-qualified program name>
#
# Example:
# LoggingReportingProgram   /usr/lpp/internet/sbin/htlogrep
#
LoggingReportingProgram   /usr/lpp/internet/sbin/htlogrep
```

Enable Reporting

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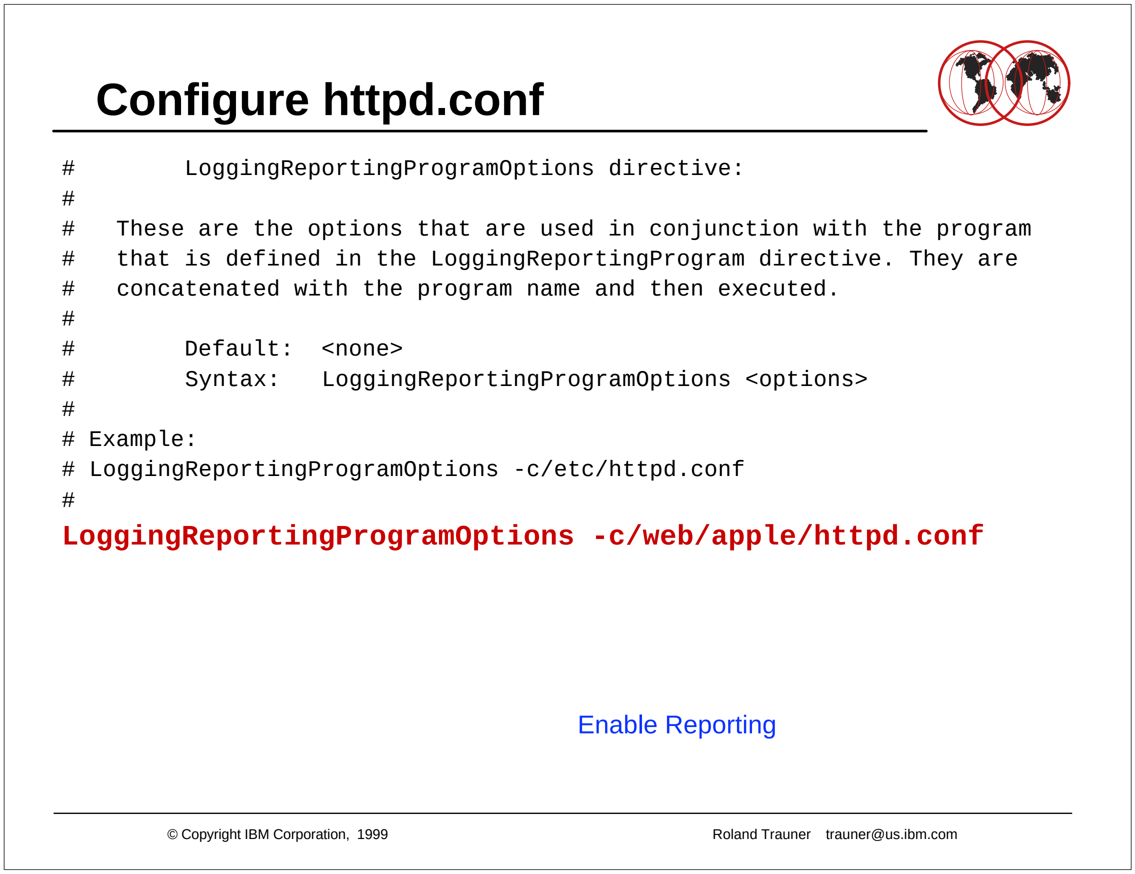

Configure httpd.conf

```
#        LoggingReportingProgramOptions directive:
#
#   These are the options that are used in conjunction with the program
#   that is defined in the LoggingReportingProgram directive. They are
#   concatenated with the program name and then executed.
#
#        Default:  <none>
#        Syntax:   LoggingReportingProgramOptions <options>
#
# Example:
# LoggingReportingProgramOptions -c/etc/httpd.conf
#
LoggingReportingProgramOptions -c/web/apple/httpd.conf
```

Enable Reporting

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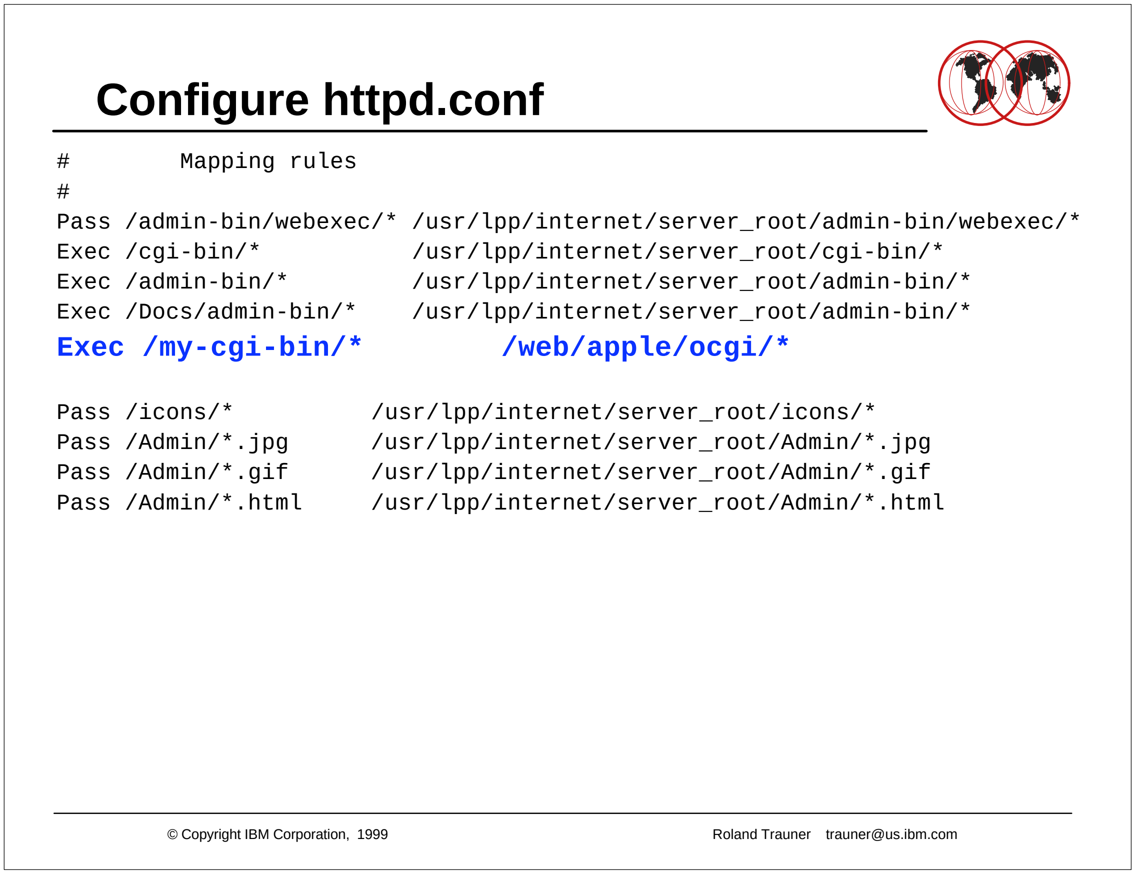
Configure httpd.conf

```
#   =====================================================
#   *** OS/390 Web Traffic Express Support directives ***
#   =====================================================

# ServerInit      /usr/lpp/internet/bin/Jav_dll.so:Javelin_init
# Service  /cgi-bin/dogc.icapi   /usr/lpp/internet/bin/Jav_dll.so:doGC
# PreExit         /usr/lpp/internet/bin/Jav_dll.so:Javelin_preFilter
# Enable  ICSERRORLOG /usr/lpp/internet/bin/Jav_dll.so:Javelin_errorLog
```

Disable Web Traffic Express (special Proxy functions) if not needed.
Performance/Resource option



Configure httpd.conf

```
#        Mapping rules
#
Pass /admin-bin/webexec/* /usr/lpp/internet/server_root/admin-bin/webexec/*
Exec /cgi-bin/*           /usr/lpp/internet/server_root/cgi-bin/*
Exec /admin-bin/*         /usr/lpp/internet/server_root/admin-bin/*
Exec /Docs/admin-bin/*    /usr/lpp/internet/server_root/admin-bin/*
Exec /my-cgi-bin/*        /web/apple/ocgi/*

Pass /icons/*          /usr/lpp/internet/server_root/icons/*
Pass /Admin/*.jpg      /usr/lpp/internet/server_root/Admin/*.jpg
Pass /Admin/*.gif      /usr/lpp/internet/server_root/Admin/*.gif
Pass /Admin/*.html     /usr/lpp/internet/server_root/Admin/*.html
```

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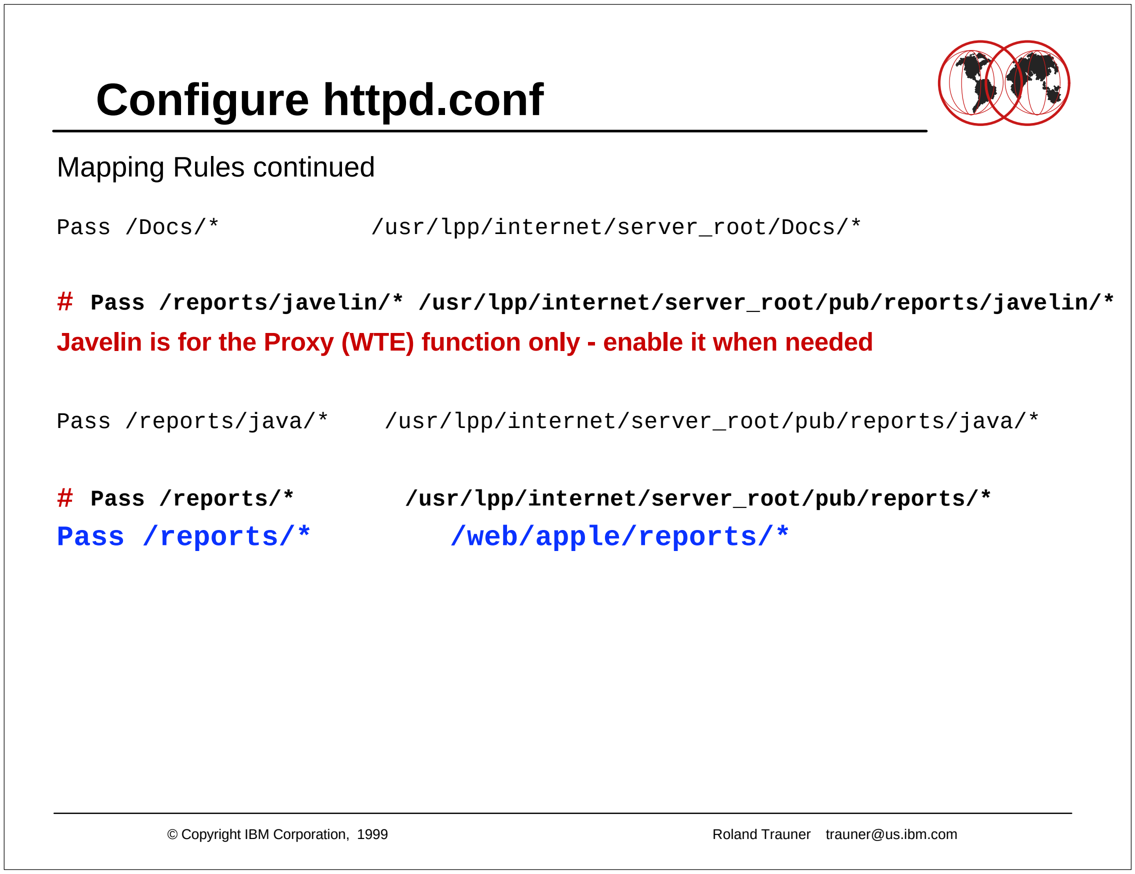

Configure httpd.conf

Mapping Rules continued

```
Pass /Docs/*           /usr/lpp/internet/server_root/Docs/*

# Pass /reports/javelin/* /usr/lpp/internet/server_root/pub/reports/javelin/*
```

Javelin is for the Proxy (WTE) function only - enable it when needed

```
Pass /reports/java/*    /usr/lpp/internet/server_root/pub/reports/java/*

# Pass /reports/*        /usr/lpp/internet/server_root/pub/reports/*
Pass /reports/*        /web/apple/reports/*
```

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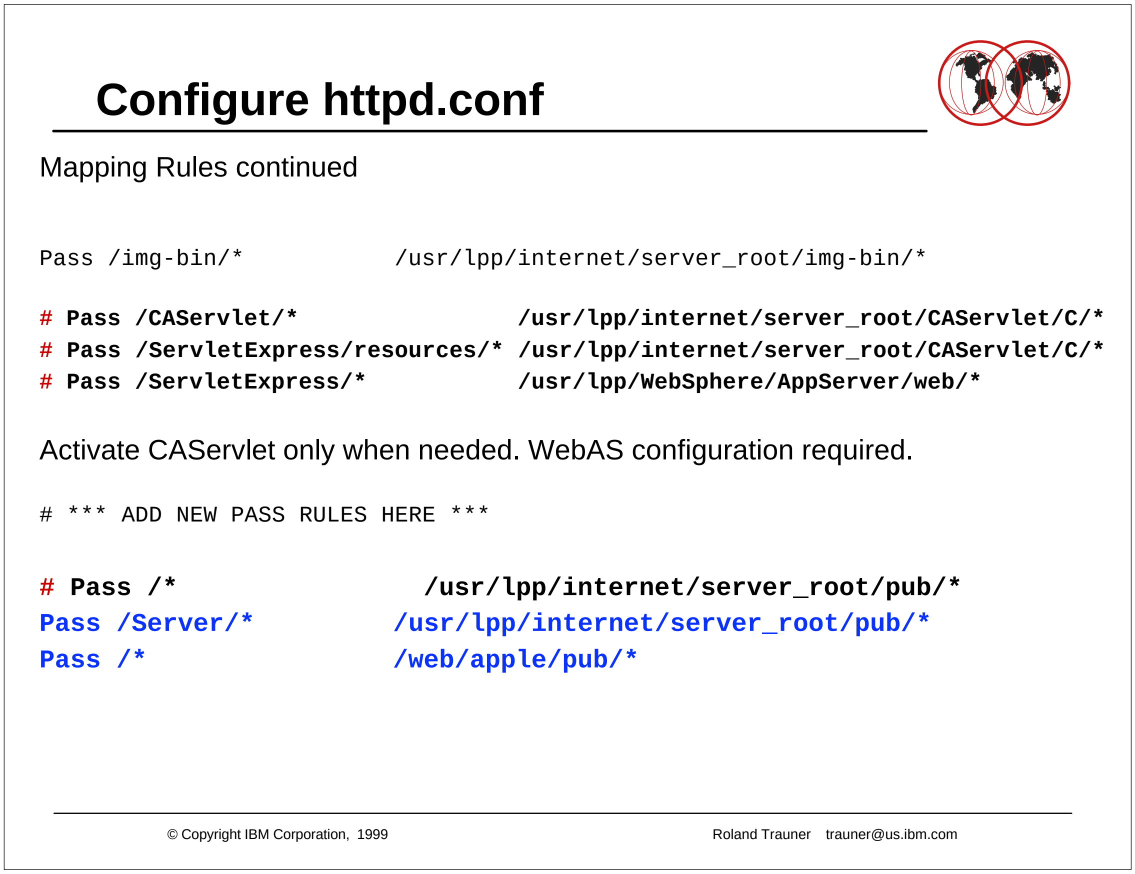

Configure httpd.conf

Mapping Rules continued

```
Pass /img-bin/*           /usr/lpp/internet/server_root/img-bin/*
```

```
# Pass /CAServlet/*                /usr/lpp/internet/server_root/CAServlet/C/*
# Pass /ServletExpress/resources/* /usr/lpp/internet/server_root/CAServlet/C/*
# Pass /ServletExpress/*           /usr/lpp/WebSphere/AppServer/web/*
```

Activate CAServlet only when needed. WebAS configuration required.

```
# *** ADD NEW PASS RULES HERE ***
```

```
# Pass /*                /usr/lpp/internet/server_root/pub/*
Pass /Server/*         /usr/lpp/internet/server_root/pub/*
Pass /*                /web/apple/pub/*
```

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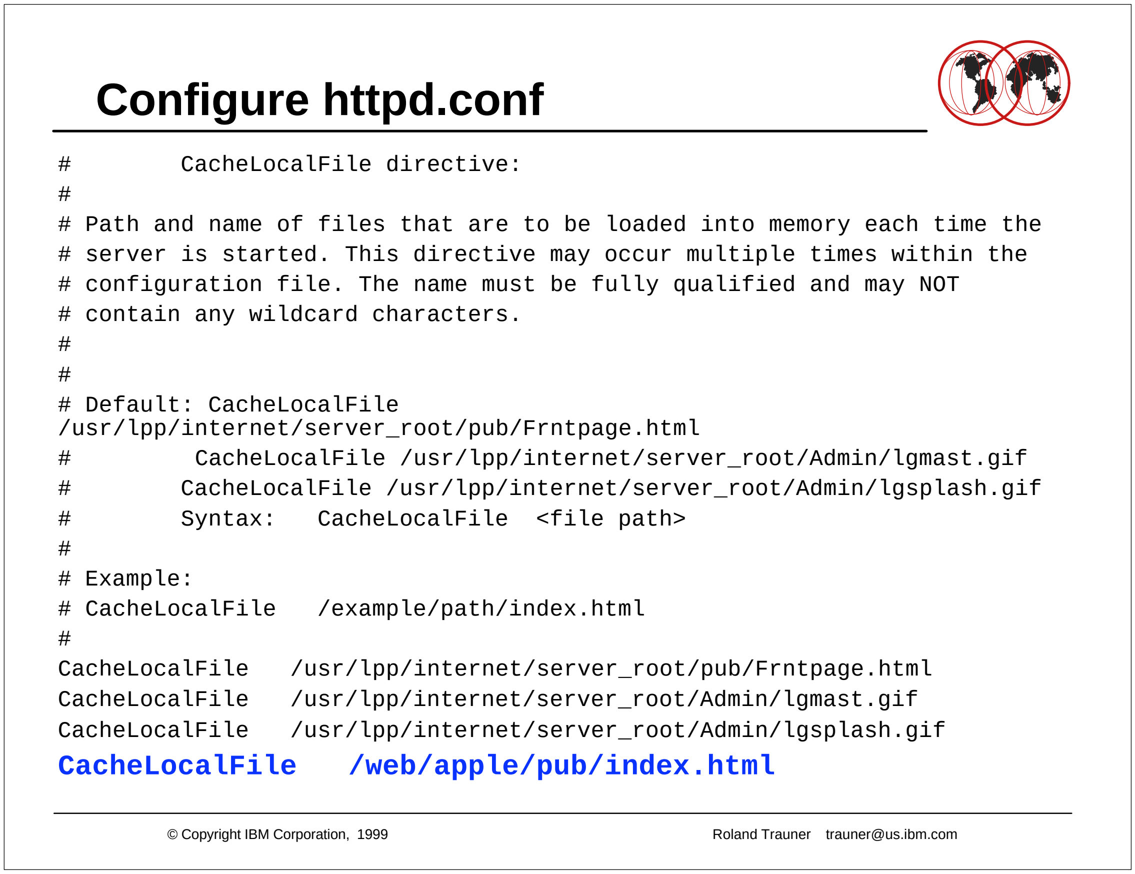
- The default httpd.conf setup and mapping rules define /usr/lpp/internet/server_root/pub/Frntpage.html to be the primary homepage.
- The changed setup and mapping rules define /web/apple/pub/index.html to be the primary homepage.
- Frontpage.html (and with it the Remote Server Configuration Dialog) still can be reached using URL http://servername/Server
- If you decide not to use the Remote Server Configuration Dialog, you may comment most of the mapping statements.



Configure httpd.conf

```
#        CacheLocalFile directive:
#
# Path and name of files that are to be loaded into memory each time the
# server is started. This directive may occur multiple times within the
# configuration file. The name must be fully qualified and may NOT
# contain any wildcard characters.
#
#
# Default: CacheLocalFile
/usr/lpp/internet/server_root/pub/Frntpage.html
#         CacheLocalFile /usr/lpp/internet/server_root/Admin/lgmast.gif
#        CacheLocalFile /usr/lpp/internet/server_root/Admin/lgsplash.gif
#        Syntax:   CacheLocalFile  <file path>
#
# Example:
# CacheLocalFile   /example/path/index.html
#
CacheLocalFile   /usr/lpp/internet/server_root/pub/Frntpage.html
CacheLocalFile   /usr/lpp/internet/server_root/Admin/lgmast.gif
CacheLocalFile   /usr/lpp/internet/server_root/Admin/lgsplash.gif
CacheLocalFile   /web/apple/pub/index.html
```

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- You may keep the "original" Frntpage.html but you should certainly cache your homepage including all the images.
- Also consider caching other frequently accessed static pages.

Configure httpd.envvars

- httpd.envvars is the web servers global variable file.
- The following httpd.envvars example enables the web server to run JAVA servlets together with the WebSphere Application Server .
  - It assumes that you've installed JAVA in /usr/lpp/java16p

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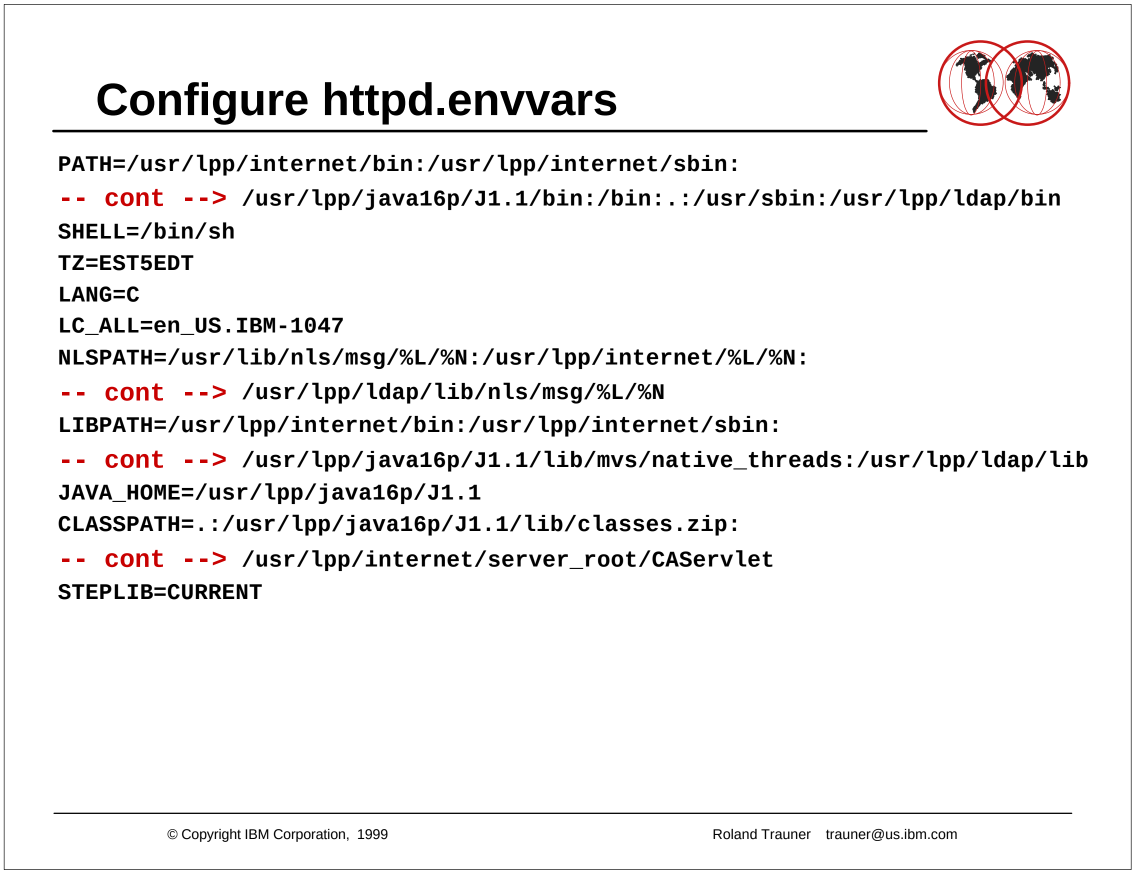

Configure httpd.envvars

```
PATH=/usr/lpp/internet/bin:/usr/lpp/internet/sbin:
-- cont --> /usr/lpp/java16p/J1.1/bin:/bin:.:/usr/sbin:/usr/lpp/ldap/bin
SHELL=/bin/sh
TZ=EST5EDT
LANG=C
LC_ALL=en_US.IBM-1047
NLSPATH=/usr/lib/nls/msg/%L/%N:/usr/lpp/internet/%L/%N:
-- cont --> /usr/lpp/ldap/lib/nls/msg/%L/%N
LIBPATH=/usr/lpp/internet/bin:/usr/lpp/internet/sbin:
-- cont --> /usr/lpp/java16p/J1.1/lib/mvs/native_threads:/usr/lpp/ldap/lib
JAVA_HOME=/usr/lpp/java16p/J1.1
CLASSPATH=.:/usr/lpp/java16p/J1.1/lib/classes.zip:
-- cont --> /usr/lpp/internet/server_root/CAServlet
STEPLIB=CURRENT
```

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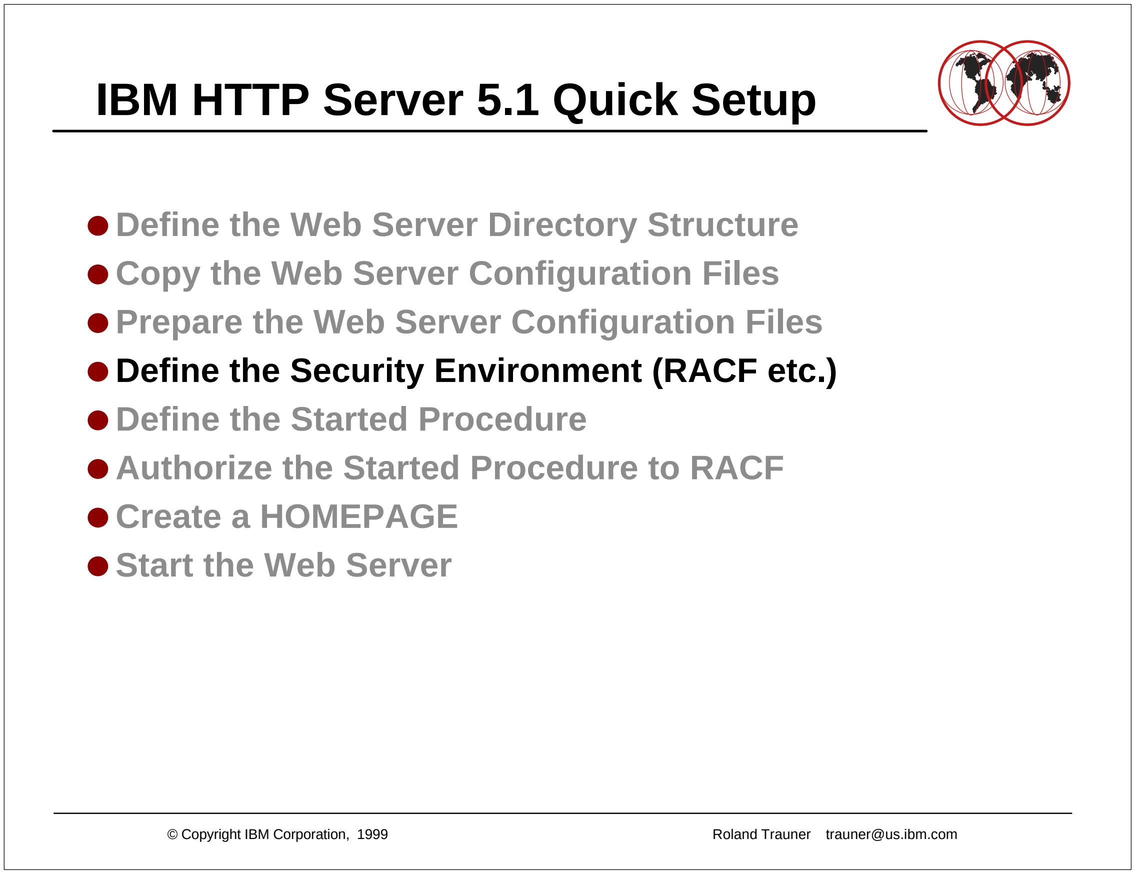
- -- cont --> means that this part should follow the statement above in the same line. Since the line would be too long to display, it is displayed using -- cont -->.
- Leave out the CAServlet directory in the classpath if you don't need it.



IBM HTTP Server 5.1 Quick Setup

- Define the Web Server Directory Structure
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Security Setup

- HTTP Server 5.1 requires pretty much the same security setup as DGW 5.0, 4.6.1 or ICSS 2.2
- HTTP Server 5.1 Planning, Installing and Using (SC31-8690-01) should be used to set up the environment (Chapter 3 - Installing your secure server)
- Read the PSP Bucket (MVSWEB10). It shows you the missing parts (like PGM CTL for CBC.SCLBDLL)
- The following security setup is required to enable our "standard webserver"

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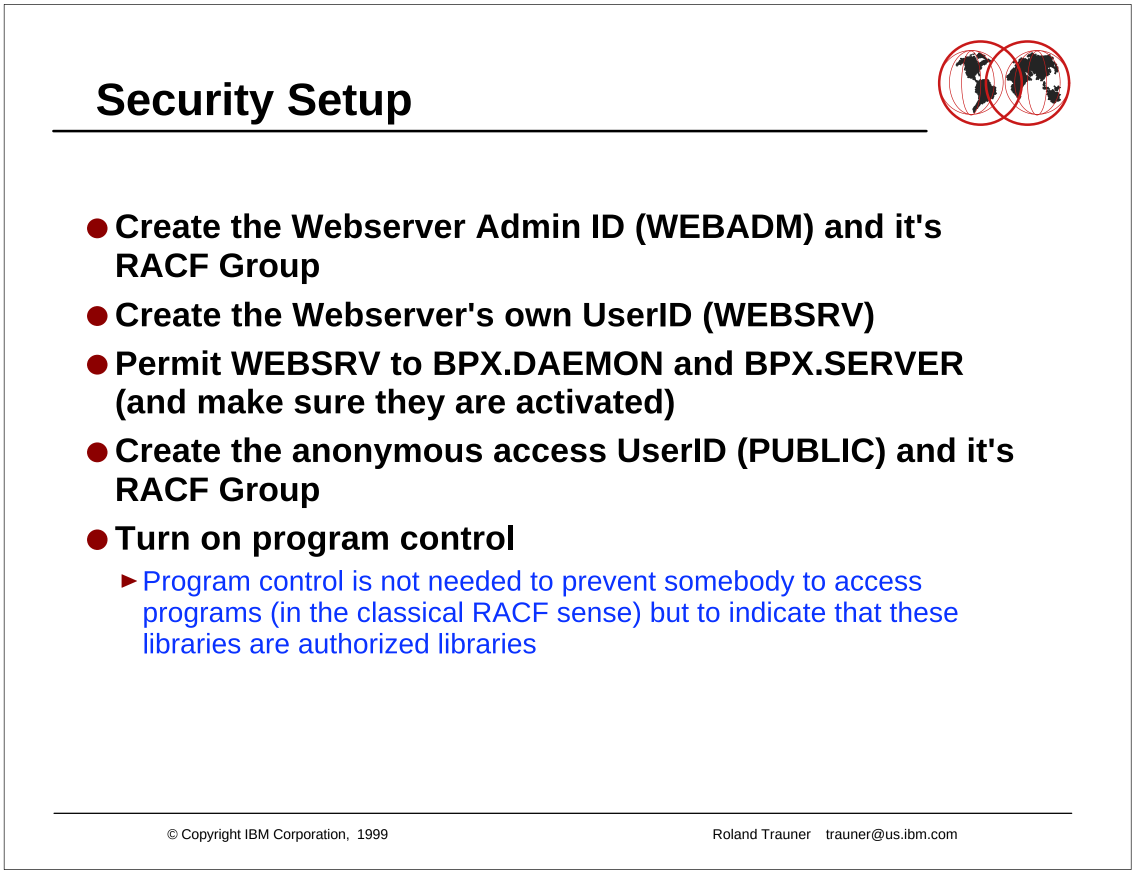

Security Setup

- Create the Webserver Admin ID (WEBADM) and it's RACF Group
- Create the Webserver's own UserID (WEBSRV)
- Permit WEBSRV to BPX.DAEMON and BPX.SERVER (and make sure they are activated)
- Create the anonymous access UserID (PUBLIC) and it's RACF Group
- Turn on program control
  - ► Program control is not needed to prevent somebody to access programs (in the classical RACF sense) but to indicate that these libraries are authorized libraries

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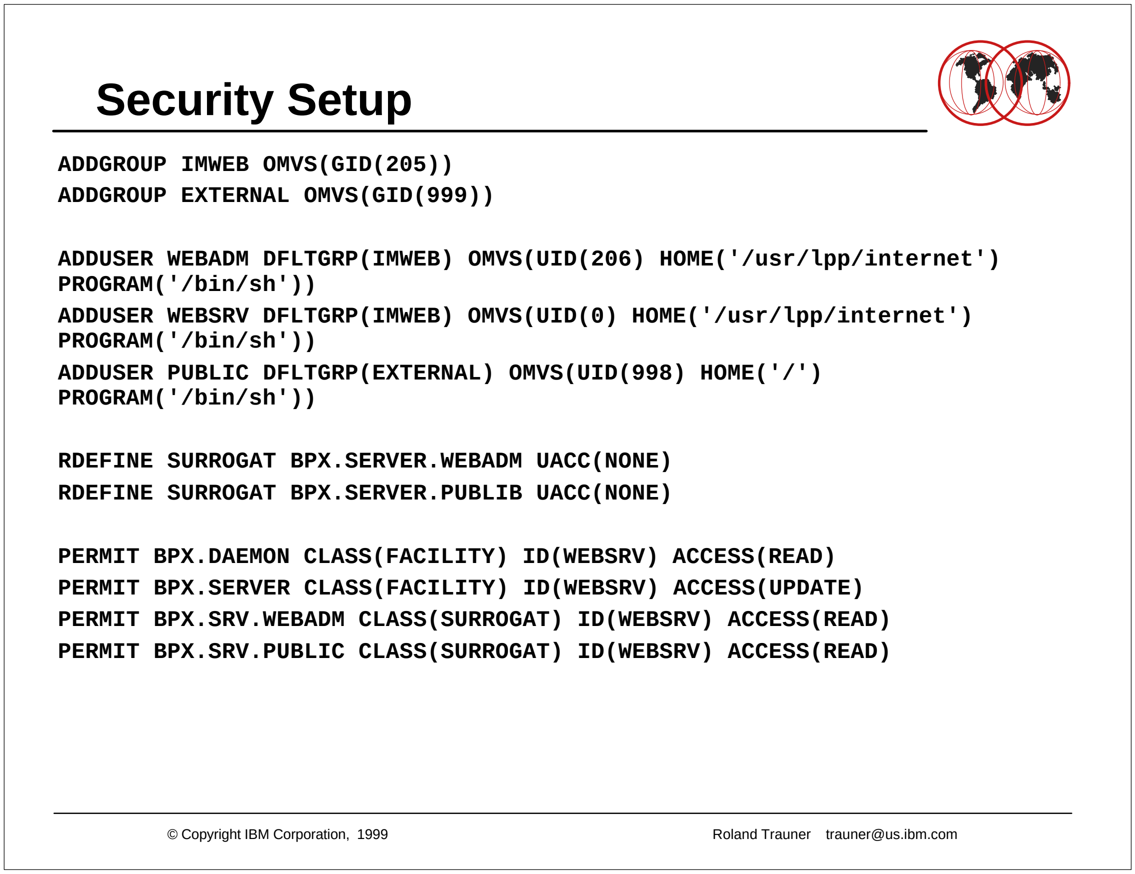

Security Setup

```
ADDGROUP IMWEB OMVS(GID(205))
ADDGROUP EXTERNAL OMVS(GID(999))

ADDUSER WEBADM DFLTGRP(IMWEB) OMVS(UID(206) HOME('/usr/lpp/internet')
PROGRAM('/bin/sh'))
ADDUSER WEBSRV DFLTGRP(IMWEB) OMVS(UID(0) HOME('/usr/lpp/internet')
PROGRAM('/bin/sh'))
ADDUSER PUBLIC DFLTGRP(EXTERNAL) OMVS(UID(998) HOME('/')
PROGRAM('/bin/sh'))

RDEFINE SURROGAT BPX.SERVER.WEBADM UACC(NONE)
RDEFINE SURROGAT BPX.SERVER.PUBLIB UACC(NONE)

PERMIT BPX.DAEMON CLASS(FACILITY) ID(WEBSRV) ACCESS(READ)
PERMIT BPX.SERVER CLASS(FACILITY) ID(WEBSRV) ACCESS(UPDATE)
PERMIT BPX.SRV.WEBADM CLASS(SURROGAT) ID(WEBSRV) ACCESS(READ)
PERMIT BPX.SRV.PUBLIC CLASS(SURROGAT) ID(WEBSRV) ACCESS(READ)
```

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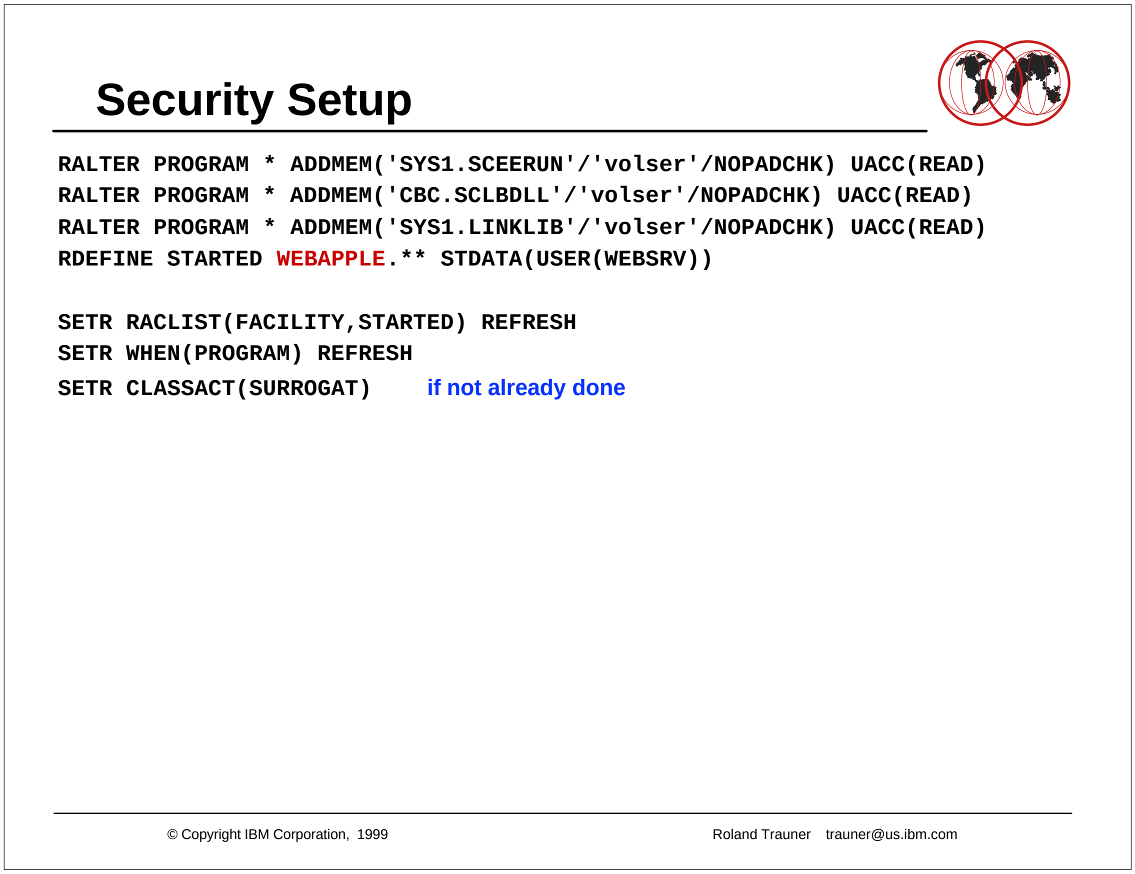
- Security experts may suggest using other UserIDs and Groups that the published ones to make it more difficult for hackers.
- We suggest that you should stay with this names if this is your first installation and switch them later until you fully understood all the dependant security mechanisms (like PROTECT statements in httpd.conf etc.).



Security Setup

```
RALTER PROGRAM * ADDMEM('SYS1.SCEERUN'/'volser'/NOPADCHK) UACC(READ)
RALTER PROGRAM * ADDMEM('CBC.SCLBDLL'/'volser'/NOPADCHK) UACC(READ)
RALTER PROGRAM * ADDMEM('SYS1.LINKLIB'/'volser'/NOPADCHK) UACC(READ)
RDEFINE STARTED WEBAPPLE.** STDATA(USER(WEBSRV))

SETR RACLIST(FACILITY,STARTED) REFRESH
SETR WHEN(PROGRAM) REFRESH
SETR CLASSACT(SURROGAT)     if not already done
```

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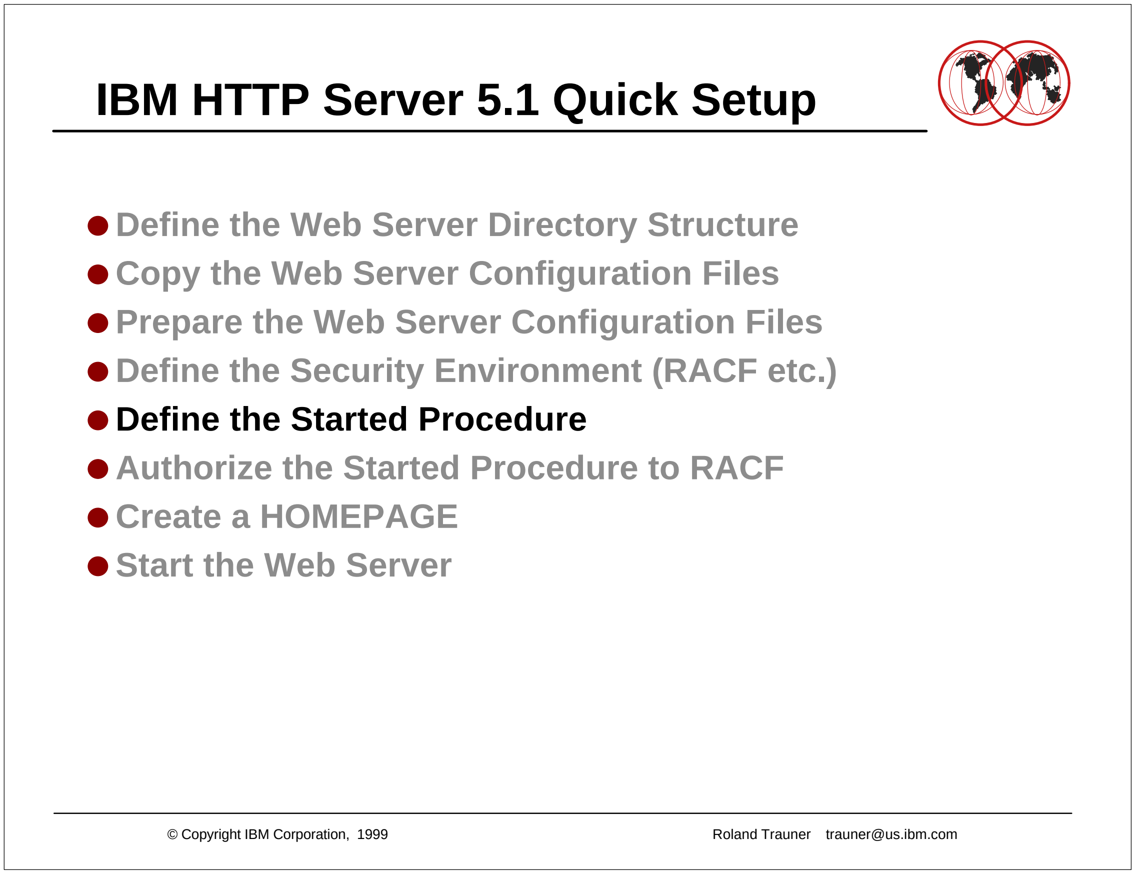
- We called our started procedure WEBAPPLE for the A(pple) web server.
- It's up to you whatever name you choose.
-
- IMW.SIMWMOD1 no longer exists in 5.1. The WebServer modules moved into SYS1.LINKLIB



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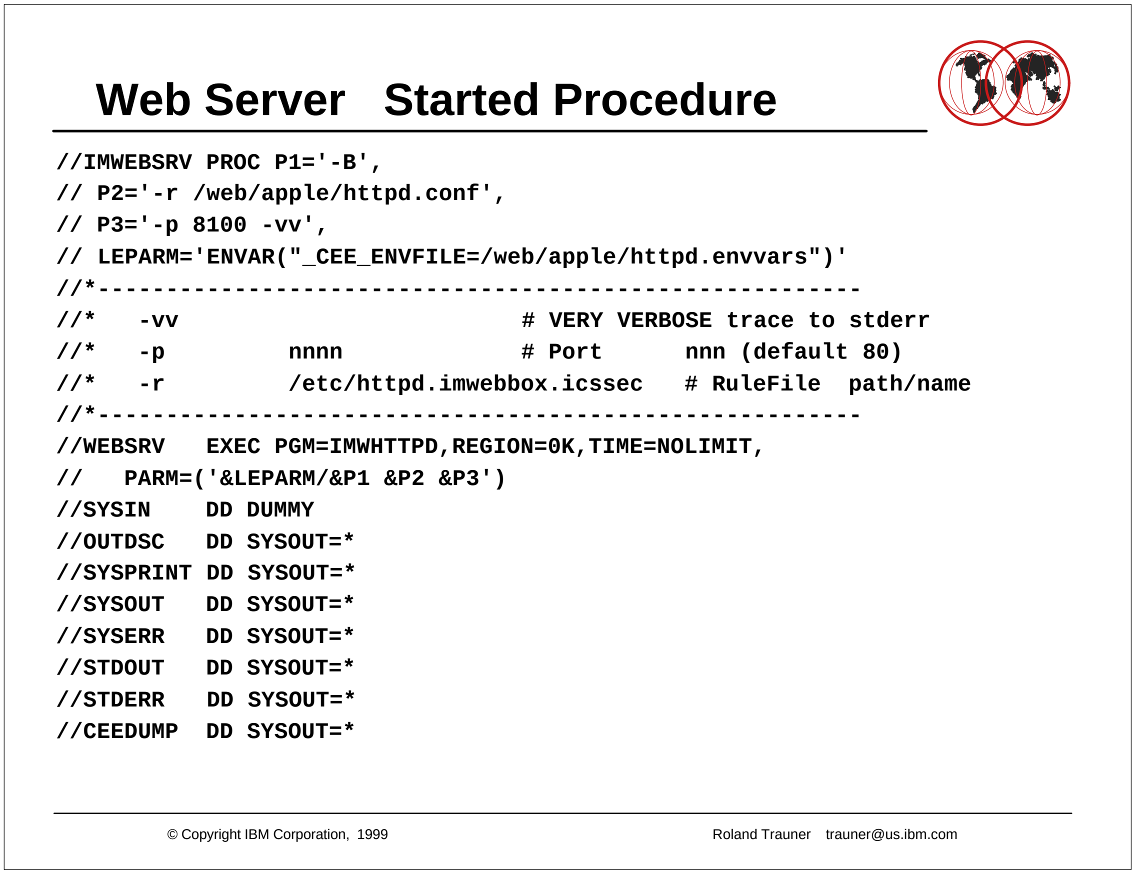

Web Server   Started Procedure

```
//IMWEBSRV PROC P1='-B',
// P2='-r /web/apple/httpd.conf',
// P3='-p 8100 -vv',
// LEPARM='ENVAR("_CEE_ENVFILE=/web/apple/httpd.envvars")'
//*--------------------------------------------------------
//*   -vv                         # VERY VERBOSE trace to stderr
//*   -p         nnnn             # Port      nnn (default 80)
//*   -r         /etc/httpd.imwebbox.icssec   # RuleFile  path/name
//*--------------------------------------------------------
//WEBSRV   EXEC PGM=IMWHTTPD,REGION=0K,TIME=NOLIMIT,
//   PARM=('&LEPARM/&P1 &P2 &P3')
//SYSIN    DD DUMMY
//OUTDSC   DD SYSOUT=*
//SYSPRINT DD SYSOUT=*
//SYSOUT   DD SYSOUT=*
//SYSERR   DD SYSOUT=*
//STDOUT   DD SYSOUT=*
//STDERR   DD SYSOUT=*
//CEEDUMP  DD SYSOUT=*
```

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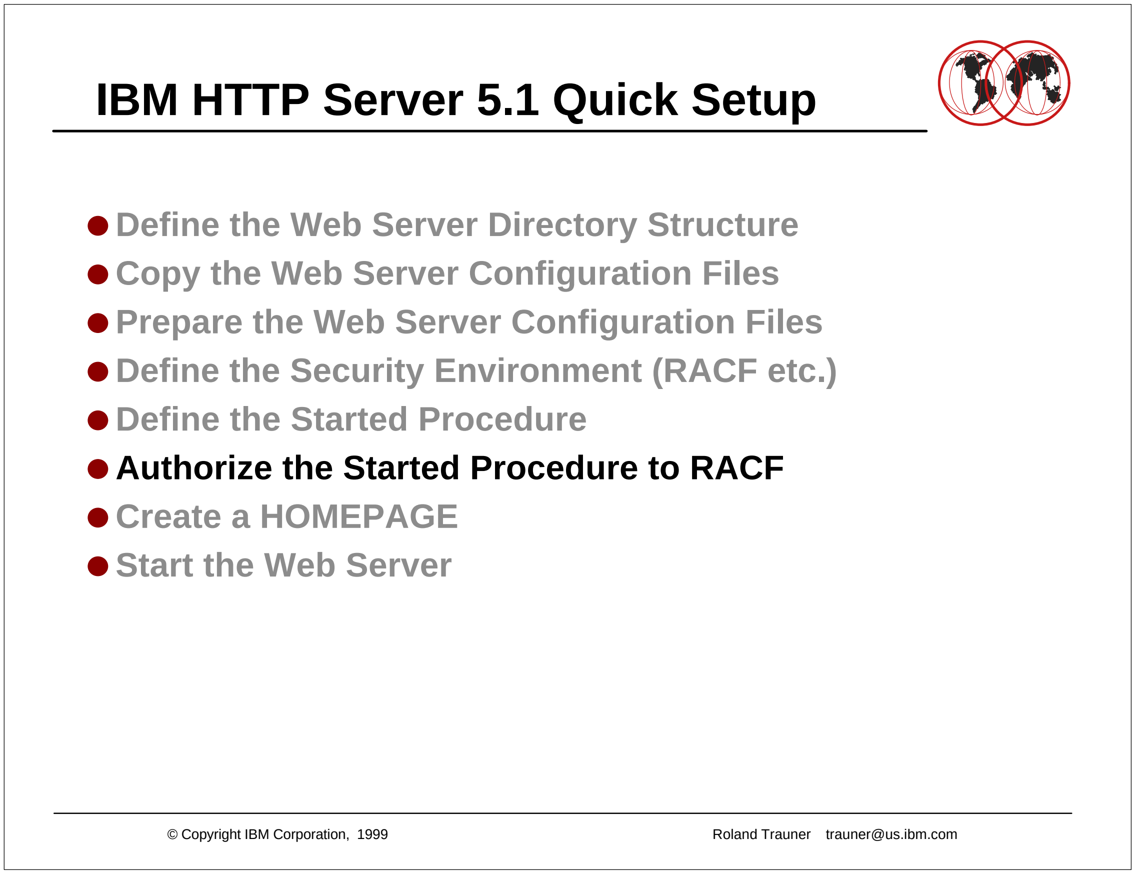
- Remember that the PARM field in JCL can be just 100 characters even if the Parameter input to the webserver is larger
- We had httpd.conf and httpd.envvars in /web/apple



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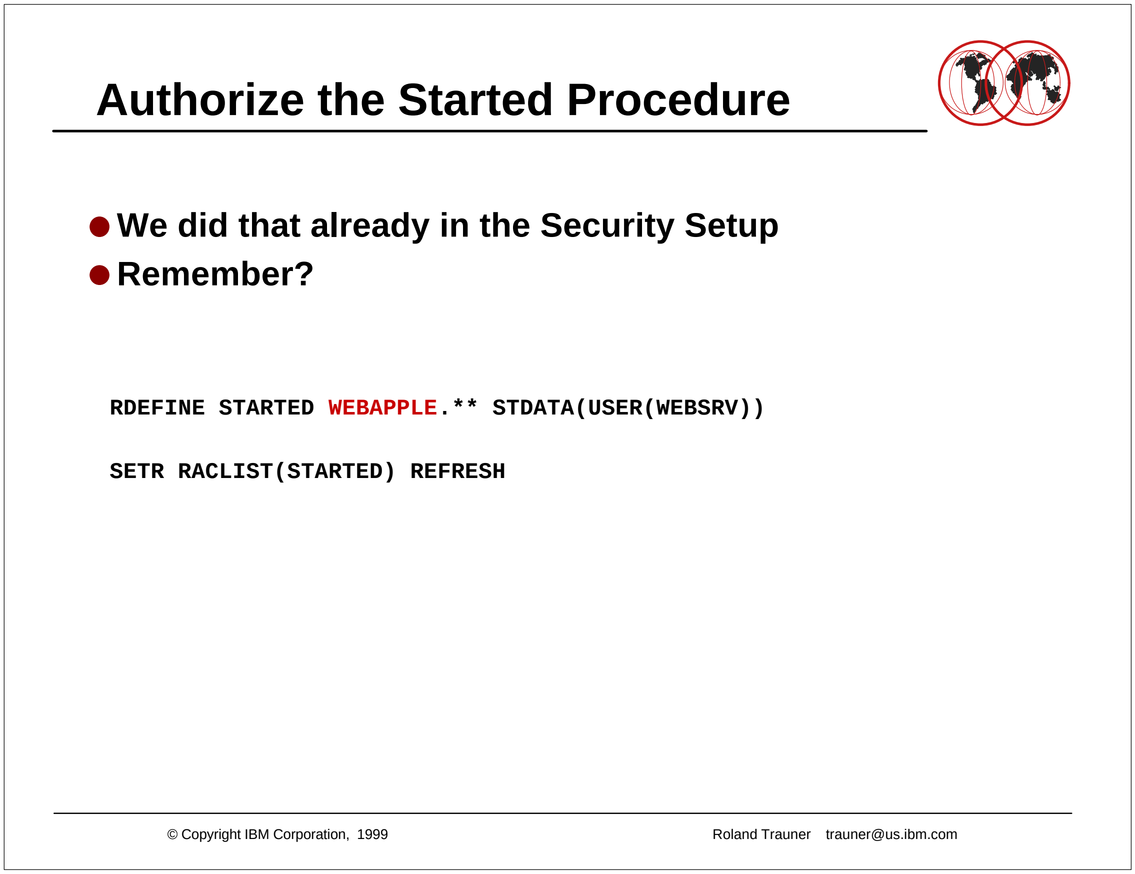

Authorize the Started Procedure

- We did that already in the Security Setup
- Remember?

```
RDEFINE STARTED WEBAPPLE.** STDATA(USER(WEBSRV))

SETR RACLIST(STARTED) REFRESH
```

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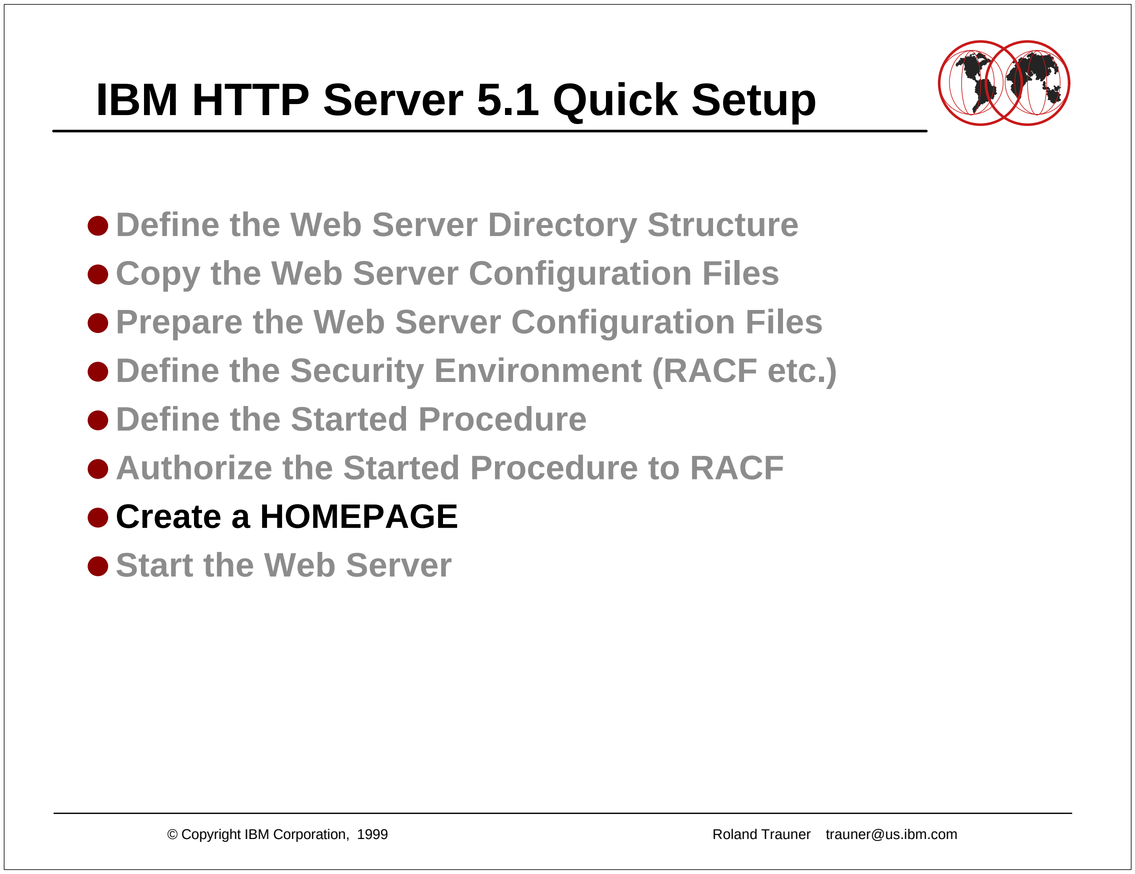
- We called our started procedure WEBAPPLE for the A(pple) web server.
- It's up to you whatever name you choose.



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Homepage

- Prepare a tiny little homepage in /web/apple/pub
- Call it   index.html

```
<html><head>
<title>HTTP Server 5.1 Project - The Apple Web Server on Port 8100</title>
<head><body bgcolor="FFFFFF">
<h1>Welcome to the apple web server on port 8100</h1>
<p>
This is the IBM HTTP Server 5.1 for OS/390.
<hr>
Follow this link to access the
<a href="/Server/">Remote Server Administration</a>.
</html>
```

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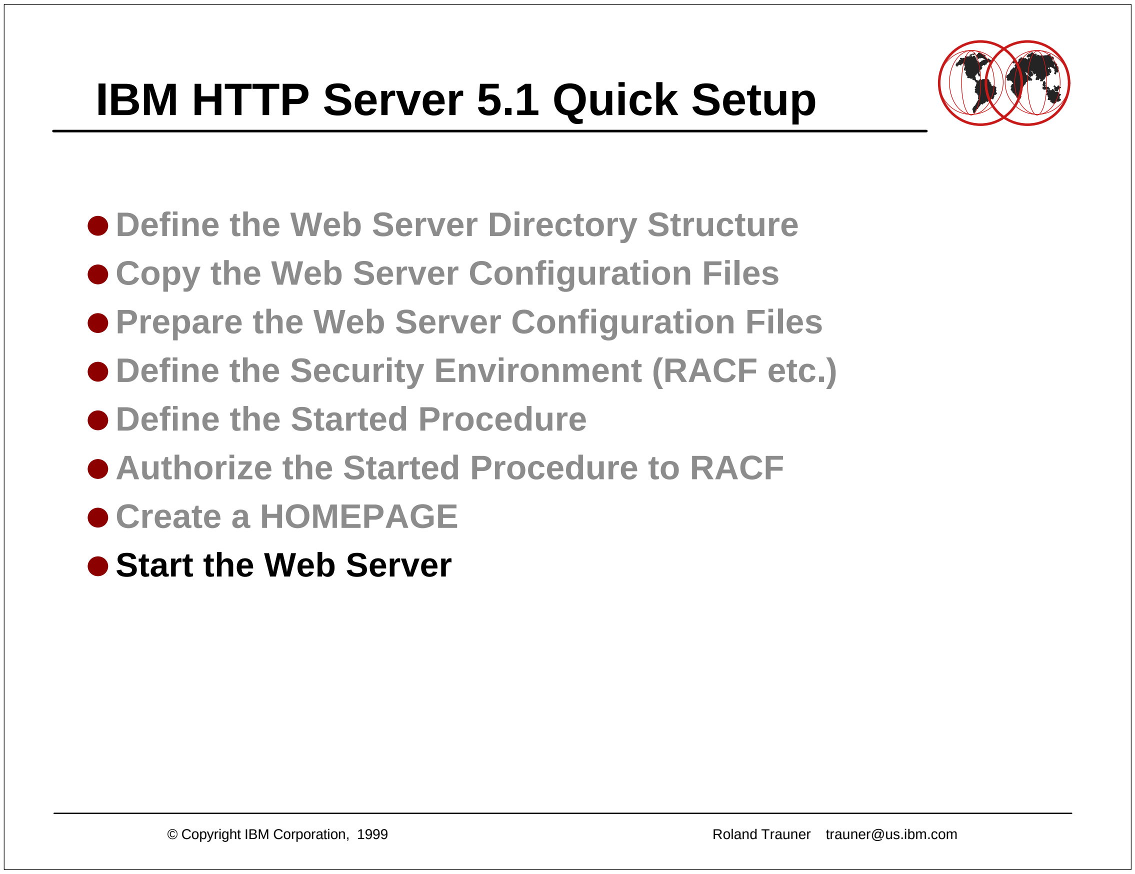

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Start the Web Server

- Start it
- Check it

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