

HP 9000 Cross Development Environment for HP Integrity



HP Integrity – The Most Trusted. Always.



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Introducing the speaker

Soumitra Chatterjee has been part of the HP-UX compiler team for more than 6 years now. Currently works in the HP-UX compilers, linker and tools development team in AETL, STSD based in Bangalore, India. He has played a critical role in re-engineering the HP 9000 aC++ compiler. He has also helped many customers in Integrity migration and performance tuning.

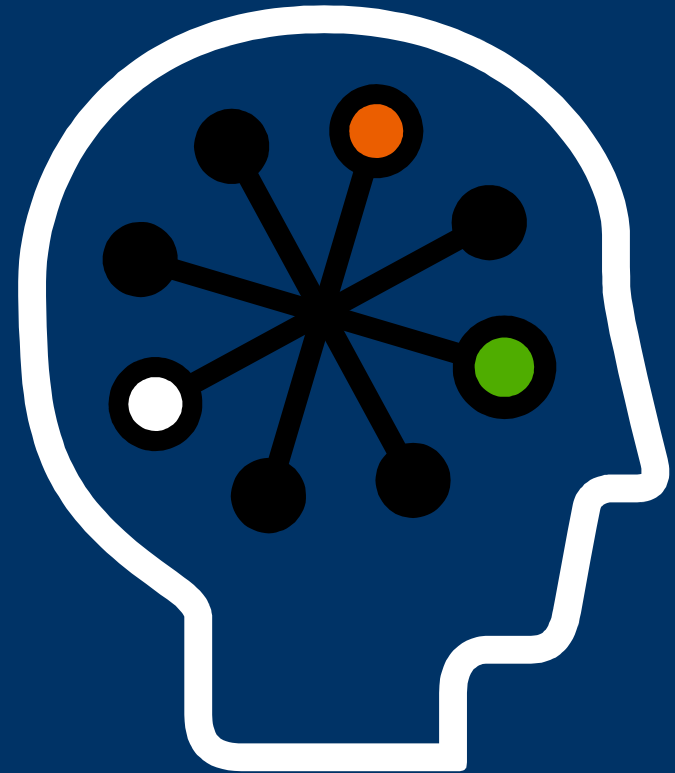


Agenda

- HP 9000 to Integrity Transition
- HP 9000 Cross Development Environment (XPADE)
- Benefits of XPADE
- Using XPADE
- Summary



HP 9000 to HP Integrity Transition



HP 9000

- Last order date for HP 9000 systems was 31st December 2008
- HP 9000 systems supported only up to 2013
 - Need to transition the current HP 9000 server(s) to the HP Integrity server(s)
- Native migration (porting) to HP Integrity is the preferred transition path
- Full program emulation possible in case source code or 3rd-party dependency unavailable for rebuilding natively on Integrity HP-UX



HP 9000 to HP Integrity Application migration options

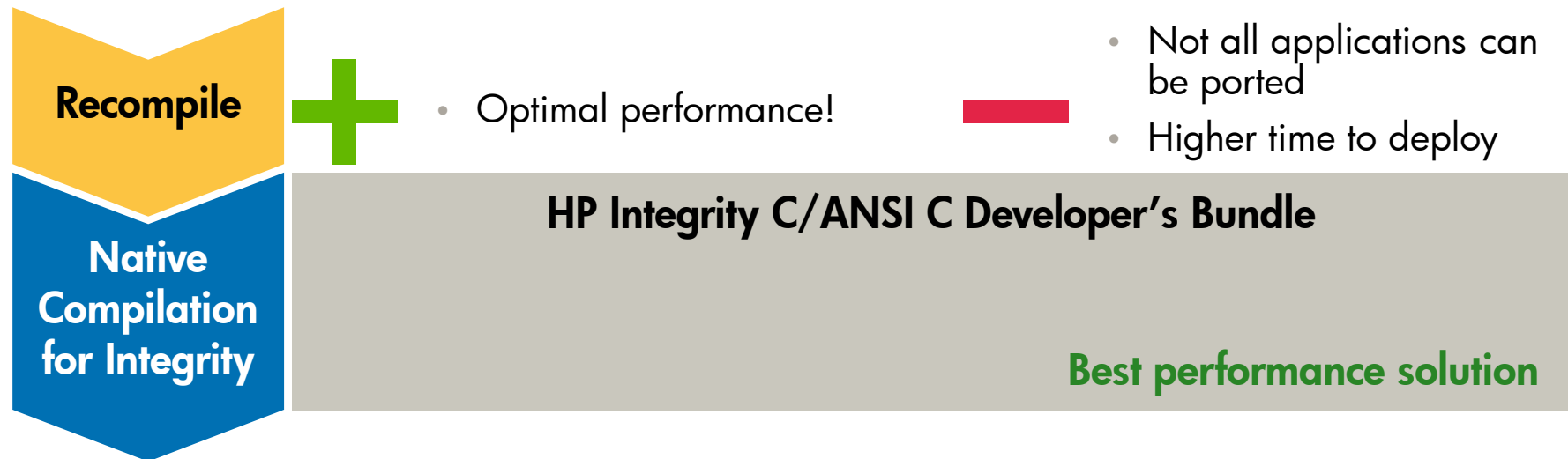
Recompile

**Native
Compilation
for Integrity**

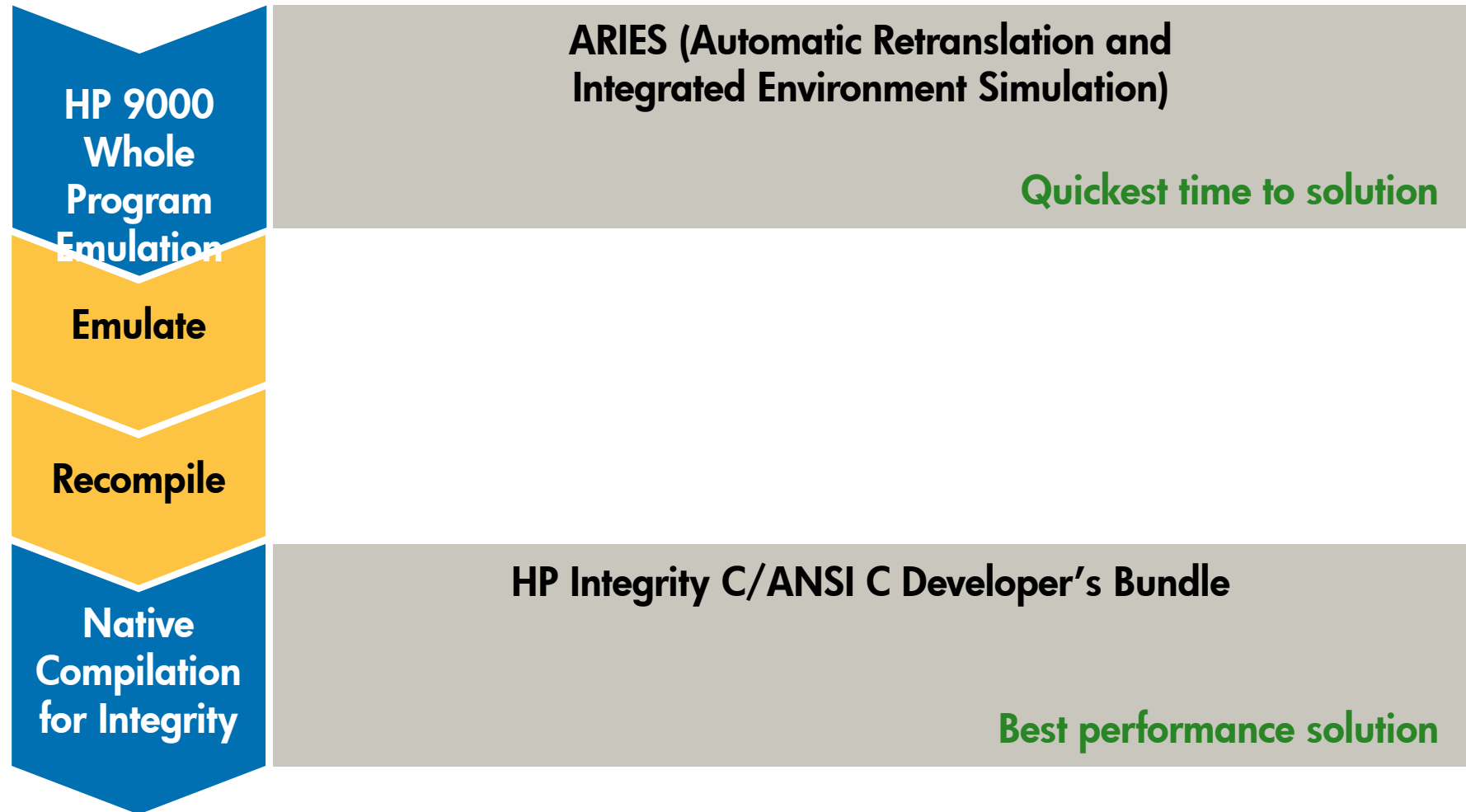
HP Integrity C/ANSI C Developer's Bundle

Best performance solution

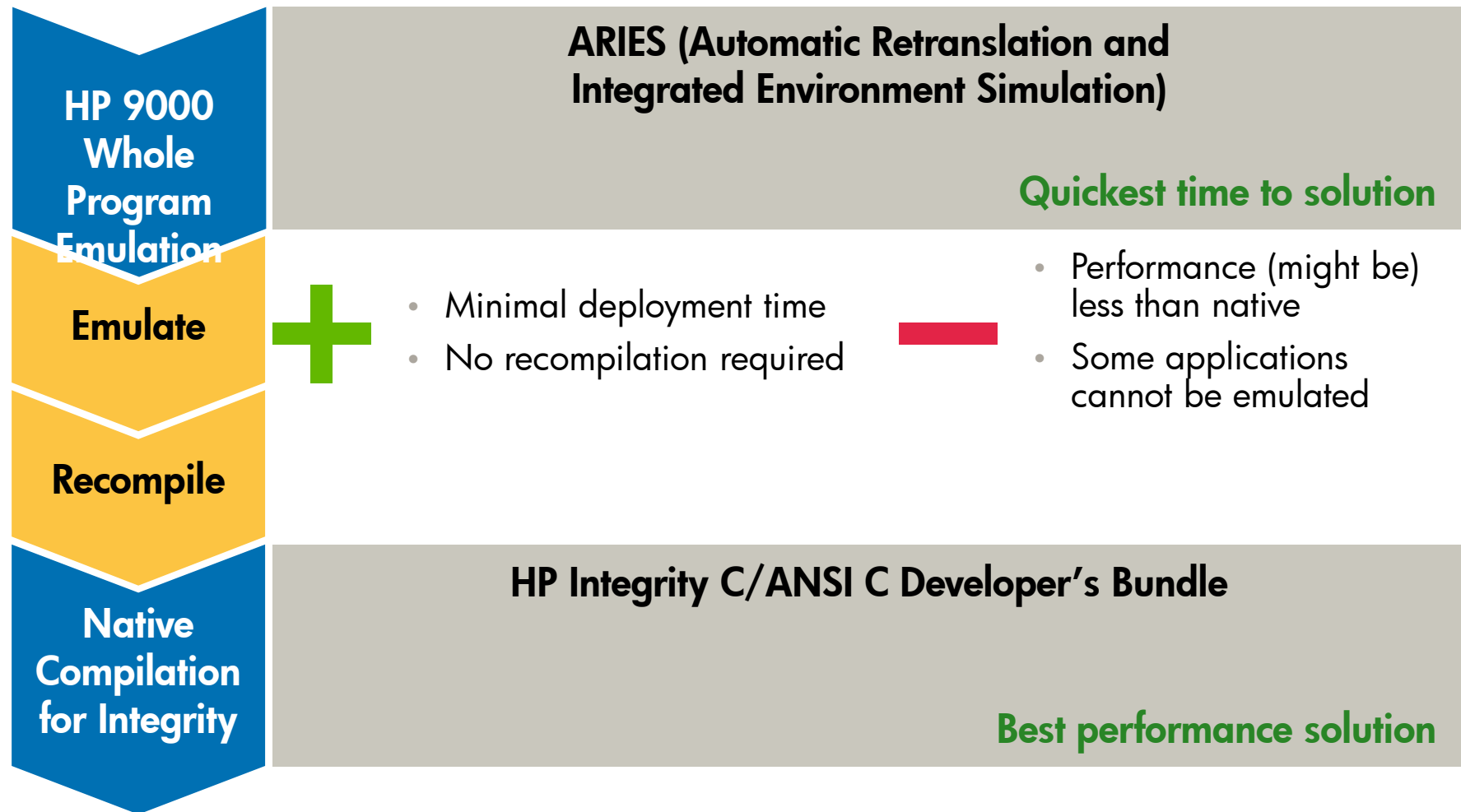
HP 9000 to HP Integrity Application migration options



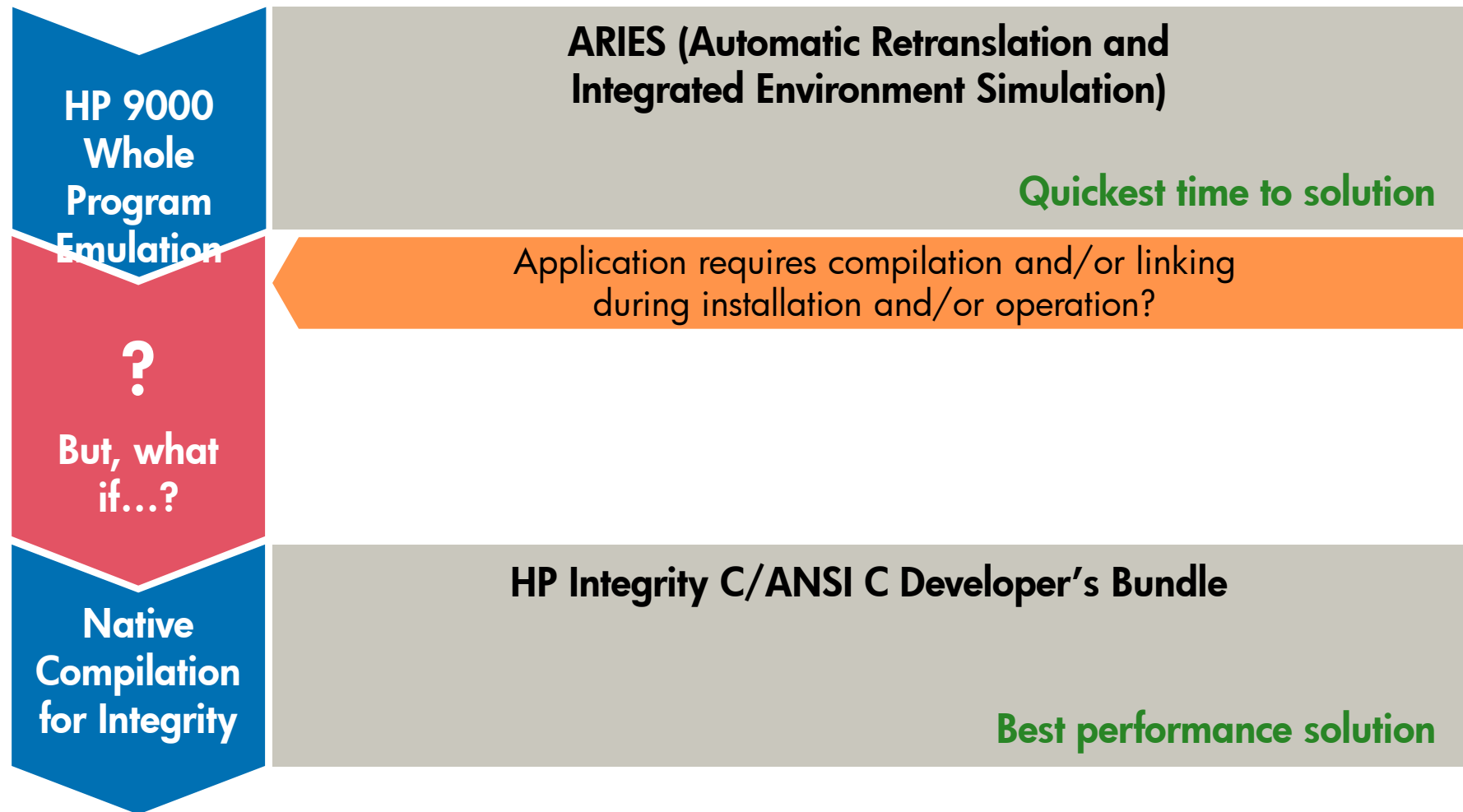
HP 9000 to HP Integrity Application migration options



HP 9000 to HP Integrity Application migration options



HP 9000 to HP Integrity Application migration options



HP 9000 to HP Integrity Application migration options

HP 9000
Whole
Program
Emulation

ARIES (Automatic Retranslation and Integrated Environment Simulation)

Quickest time to solution

?

But, what
if...?

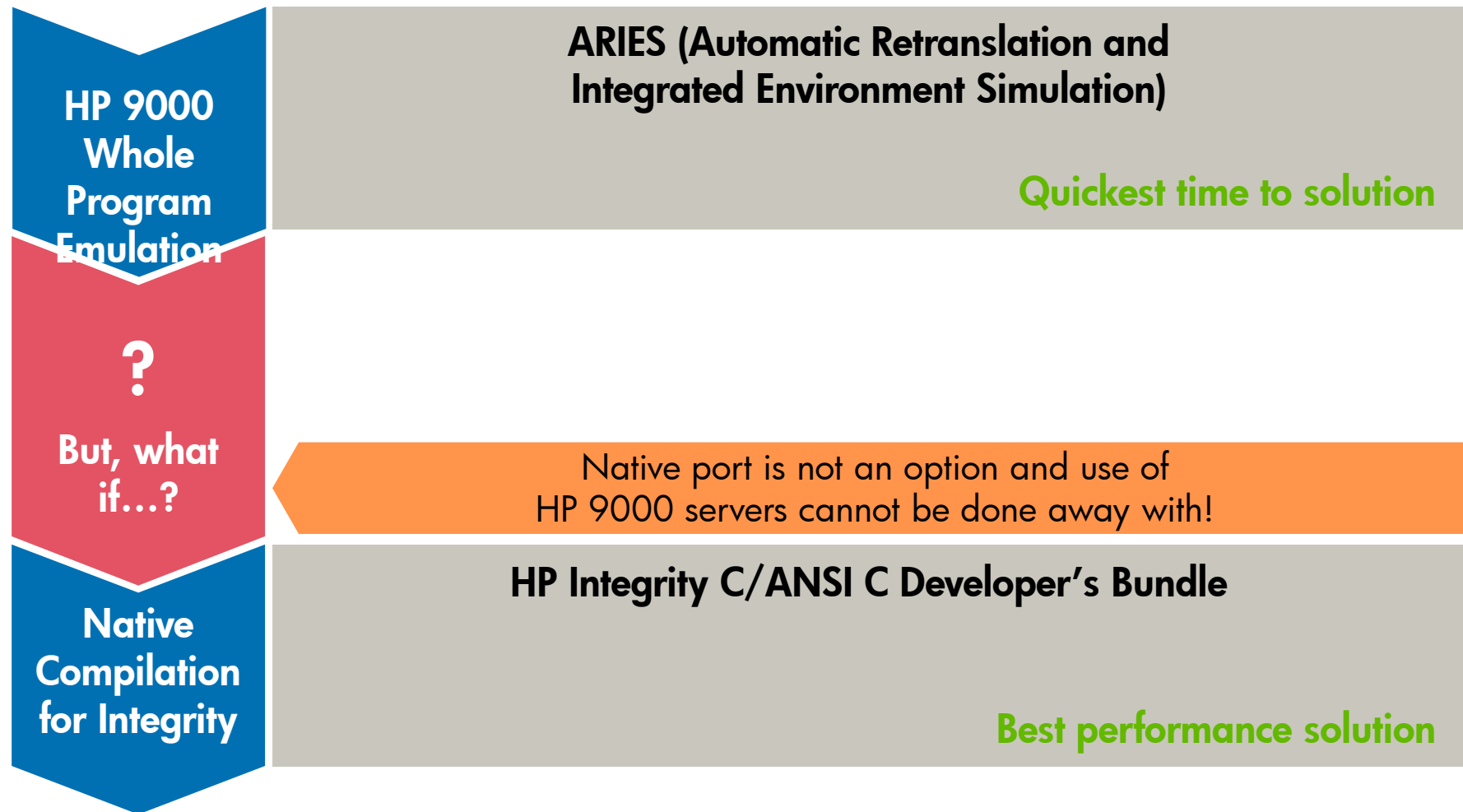
Application generates code with
HP 9000 (PA-RISC) runtime dependencies?

Native
Compilation
for Integrity

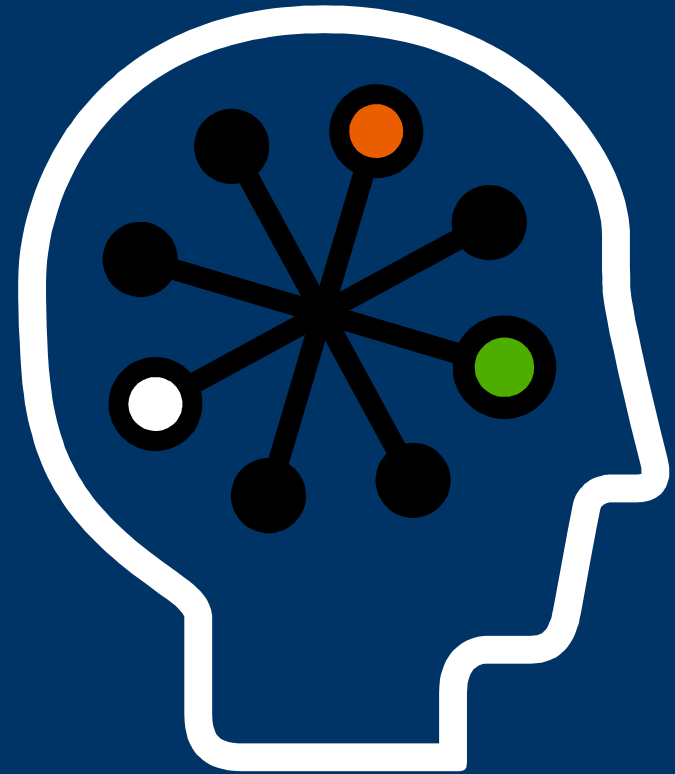
HP Integrity C/ANSI C Developer's Bundle

Best performance solution

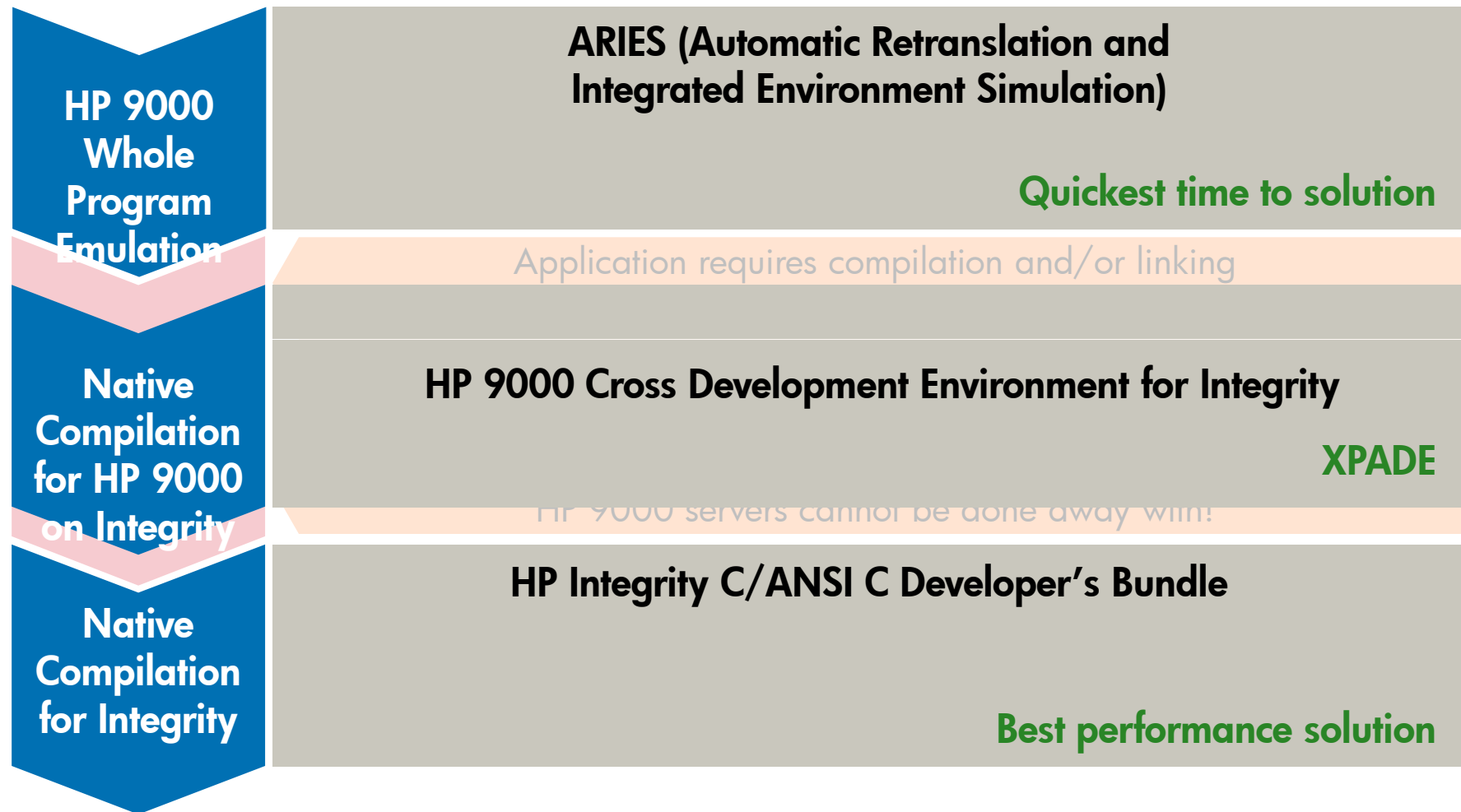
HP 9000 to HP Integrity Application migration options



HP 9000 Cross Development Environment for Integrity (XPADE)



HP 9000 to HP Integrity Application migration options



XPADE – An overview

Native
Compilation
for HP 9000
on Integrity

HP 9000 Cross Development Environment for Integrity

XPADE

- HP 9000 (PA-RISC) cross development environment on Integrity HP-UX 11iv2 and 11iv3
- Further enables application availability on Integrity
 - Deployment of HP 9000 applications on Integrity requiring compilation during installation or operation
 - Deployment of HP 9000 applications on Integrity that generate C/C++ object code with PA-RISC runtime dependency

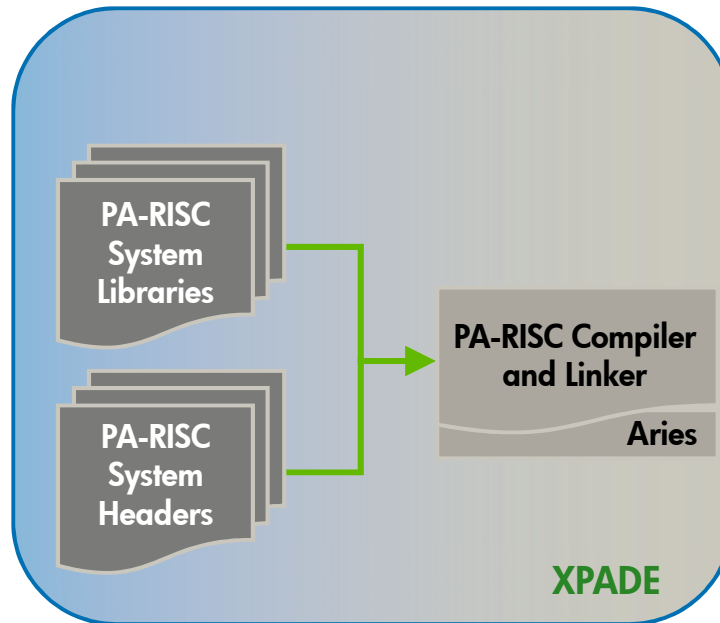


XPADE – The architecture

Native
Compilation
for HP 9000
on Integrity

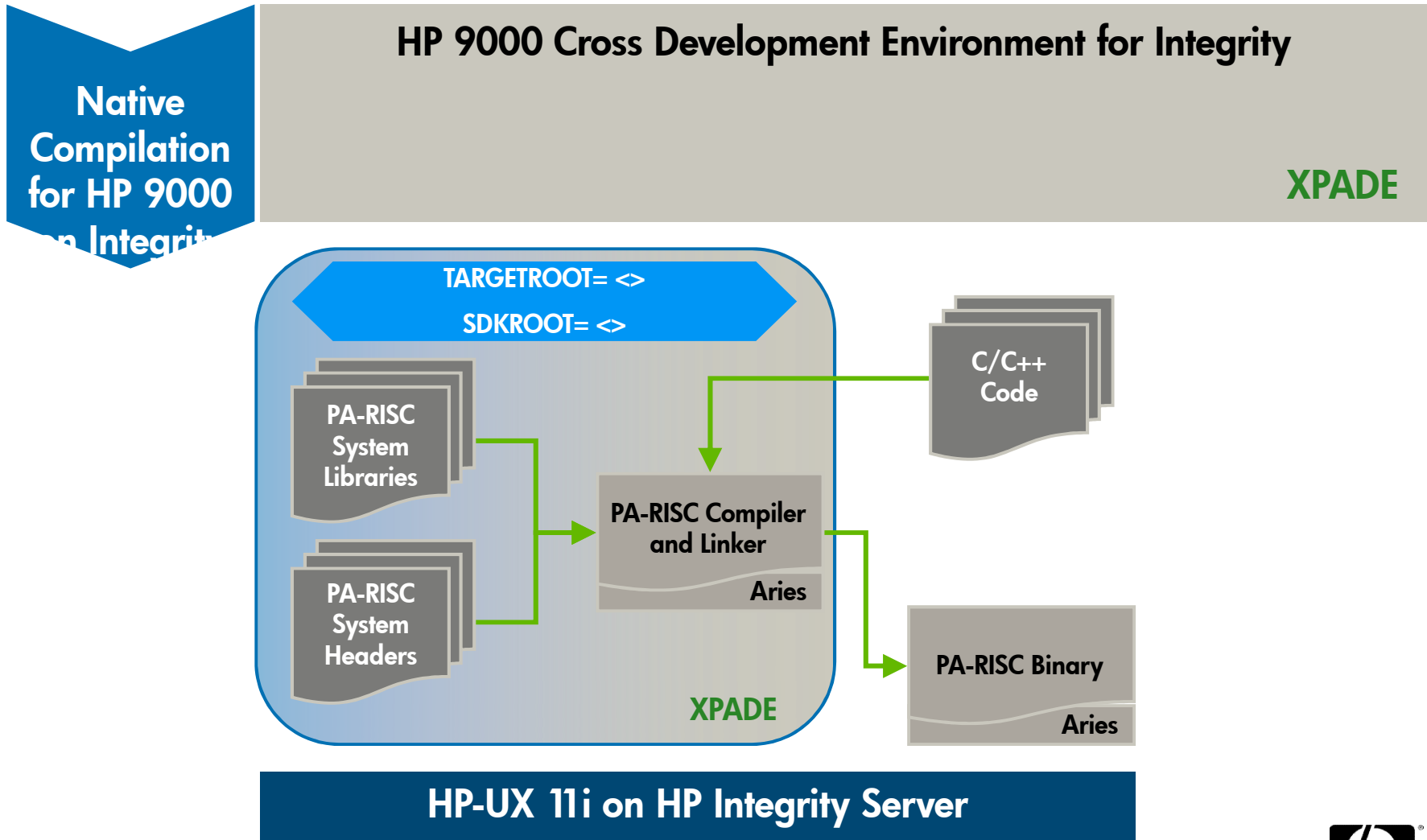
HP 9000 Cross Development Environment for Integrity

XPADE

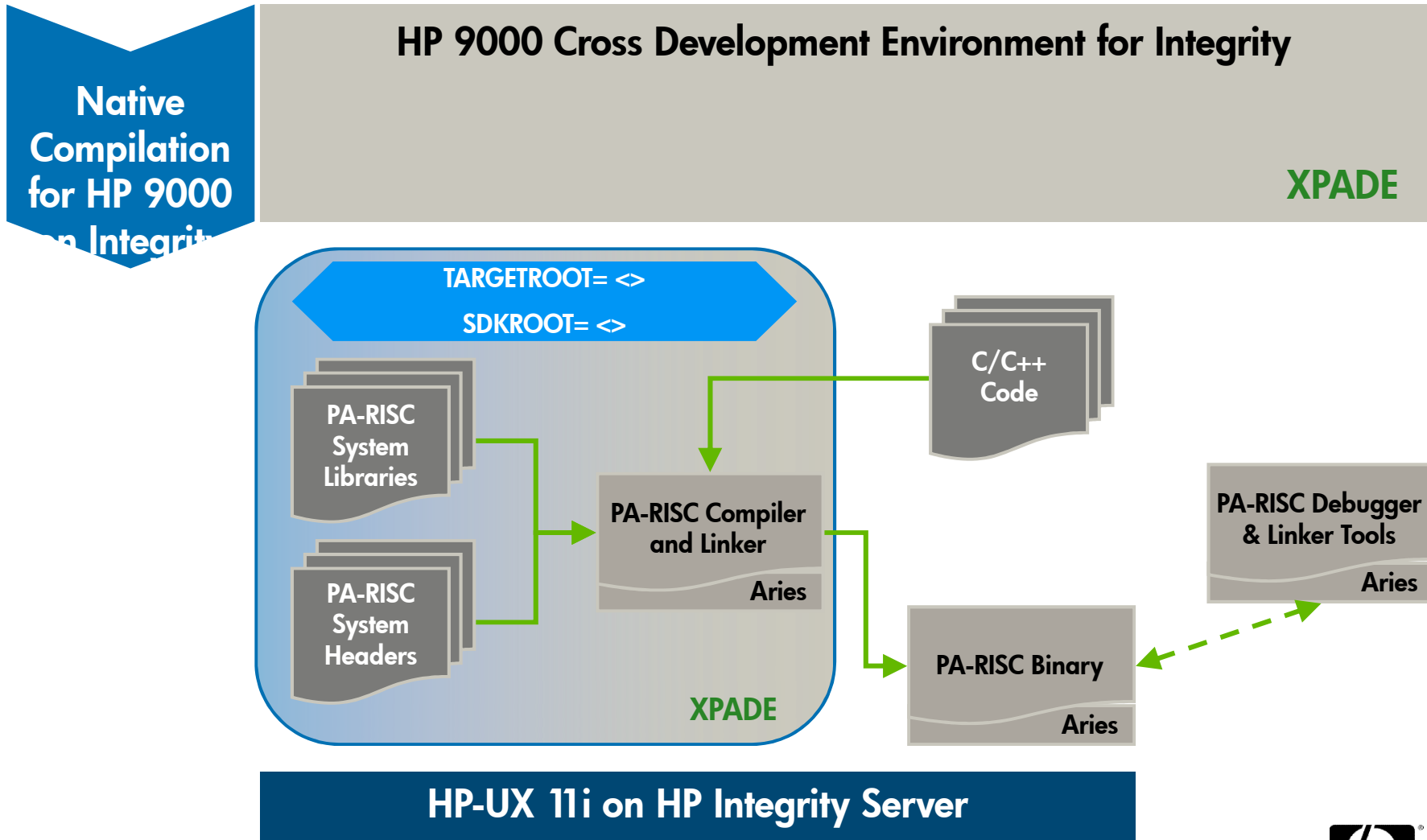


HP-UX 11i on HP Integrity Server

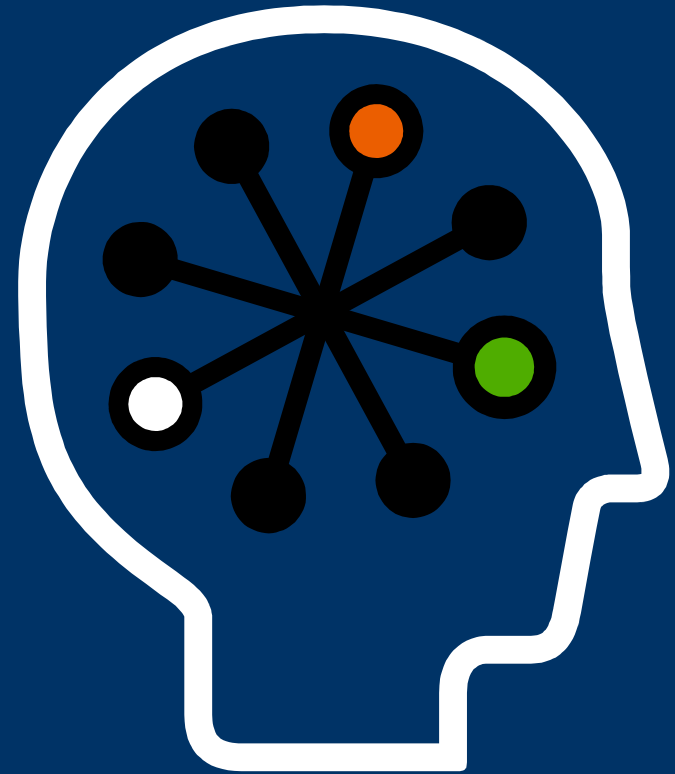
XPADE – The architecture



XPADE – The architecture



Benefits of XPADE



XPADE – Benefits

- HP 9000 applications that require compilation and/or linking as part of installation, bring up or runtime can be migrated to HP Integrity servers using ARIES
- No need to copy header files, libraries, utilities from HP 9000 servers to HP Integrity servers for cross-development
- Can co-exist with native Integrity C/aC++ Developer's Bundle on the same Integrity server



XPADE – Benefits

- A self contained single installable depot with the complete HP 9000 compiler and tool chain
 - Separate depots for HP-UX 11i v2 and 11i v3
 - Package contains HP 9000 compilers, tools, headers and libraries
- Helps in consolidating HP 9000 based build/test activities on Integrity
 - Provides a co-existent development environment for HP 9000 as well as Integrity
 - Reduced dependency on HP 9000 system(s)



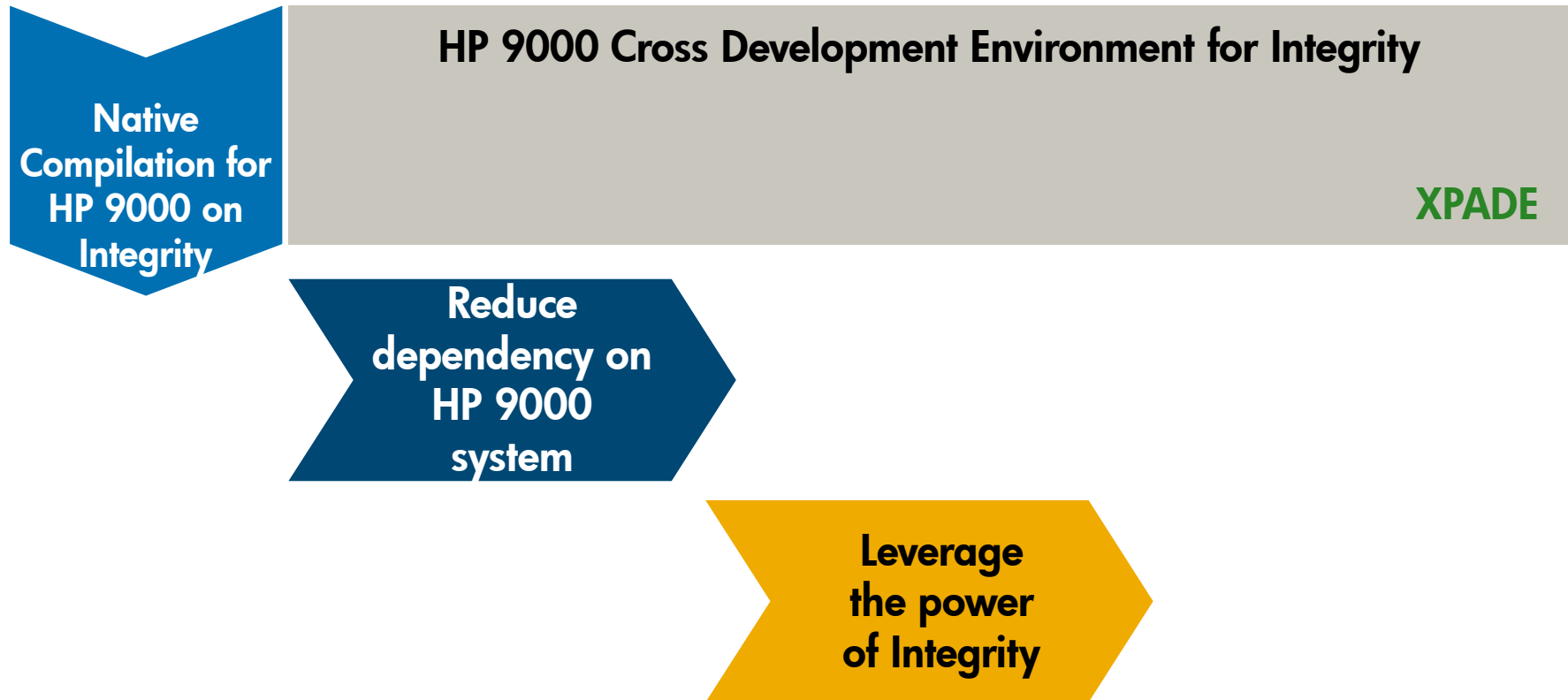
XPADE – Transition benefits

- Transition benefits through '+hpxstd98' option of HP 9000 aC++ compiler available on XPADE
 - HP 9000 aC++ version A.03.80 onwards provides a standard compatibility option '+hpxstd98'
 - Uses the same frontend technology as used by the Integrity aC++ compiler
- Ensures source compatibility between HP 9000 and Integrity aC++
- Keeps code transition-ready to Integrity

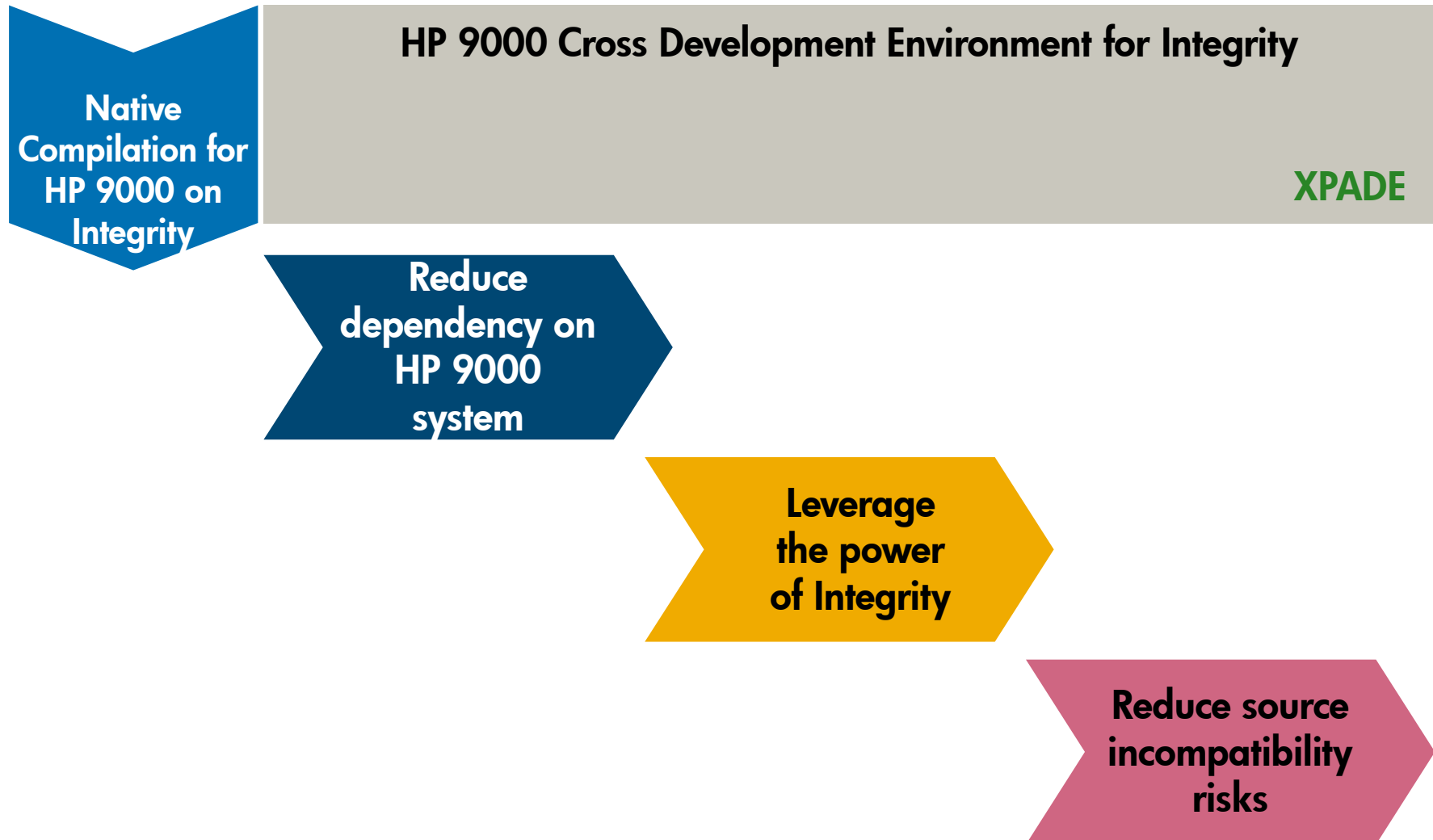
XPADE – Summary of benefits



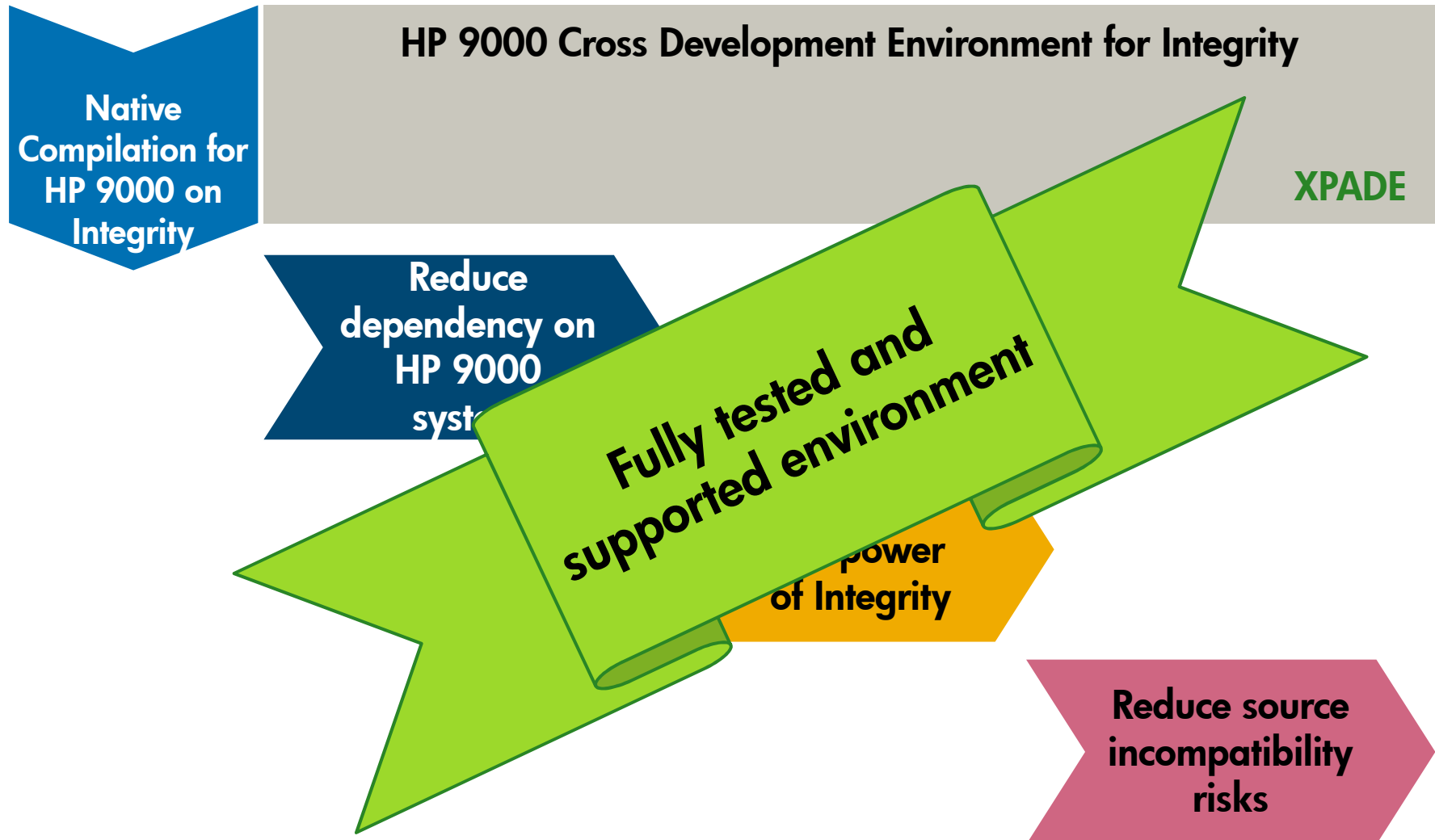
XPADE – Summary of benefits



XPADE – Summary of benefits



XPADE – Summary of benefits



Using XPADE



XPADE usage

- Install XPADE using the `swinstall` command

```
# swinstall -s <full-path-of-xpade.depot>
```

NOTE: The interactive UI was invoked, since no software was specified



XPADE usage

- Post installation, the HP 9000 tool chain will be available under
 - `/opt/XPADE/v2` for HP-UX 11i v2
 - `/opt/XPADE/v3` for HP-UX 11i v3
- HP 9000 Cross (XPADE) compilers can co-exist with Integrity native C/aC++ Developers Bundle
 - Integrity native compilers can be found in
 - `/opt/aCC/bin/aCC`
 - `/opt/ansic/bin/cc`
- HP 9000 Cross (XPADE) compilers will be available in
 - `/opt/XPADE/v2/opt/aCC/bin/aCC`
 - `/opt/XPADE/v2/opt/ansic/bin/cc`



XPADE usage

- A few important command line options for the HP 9000 Cross (XPADE) compiler are
 - +DA1.1 generates objects for PA-RISC 1.1
 - +DAportable generates objects compatible across PA-RISC 1.1 and 2.0 workstations and servers
 - +DD32 (default) generates 32-bit objects for PA-RISC 2.0
 - +DD64 generates 64-bit objects for PA-RISC 2.0
- To use the XPADE compiler, setup **SDKROOT** and **TARGETROOT** to point to the appropriate XPADE install directory
 - \$ export SDKROOT=/opt/XPADE/v3
 - \$ export TARGETROOT=/opt/XPADE/v3



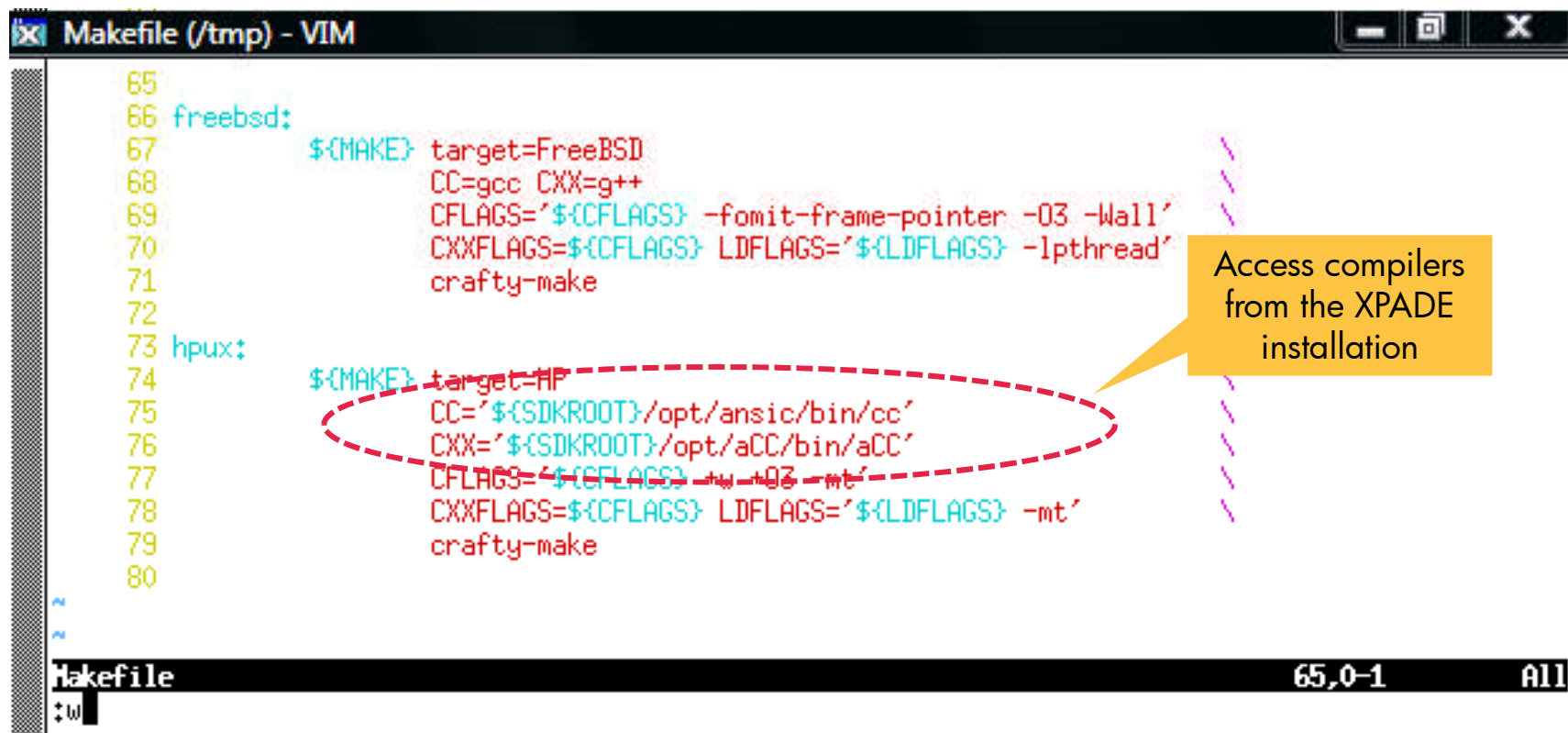
XPADE usage

- Copy HP 9000 applications source to Integrity system with XPADE installed
 - Include third-party header files and libraries
- Update the Makefile(s) and/or builds scripts
 - Must refer the compiler from the XPADE install location
`/opt/XPADE/v2/` or `/opt/XPADE/v3` as appropriate
 - Must refer the system headers and libraries from the XPADE install location
 - Use shared libraries instead of archive libraries
 - Use native binaries, such as `make`, `lex` and `yacc`



XPADE usage

- Modified **Makefile** for development using XPADE



```
65
66 freebsd:
67     ${MAKE} target=FreeBSD
68         CC=gcc CXX=g++
69         CFLAGS='${CFLAGS} -fomit-frame-pointer -O3 -Wall'
70         CXXFLAGS=${CFLAGS} LDFLAGS='${LDFLAGS} -lpthread'
71         crafty-make
72
73 hpux:
74     ${MAKE} target=HP
75         CC='${SDKROOT}/opt/ansic/bin/cc'
76         CXX='${SDKROOT}/opt/aCC/bin/aCC'
77         CFLAGS='${CFLAGS} -O3 -mt'
78         CXXFLAGS=${CFLAGS} LDFLAGS='${LDFLAGS} -mt'
79         crafty-make
80
```

Access compilers from the XPADE installation

Makefile 65,0-1 All
:w

XPADE usage

- Build and debug HP 9000 applications using the tool chain from the XPADE install location

```
$ /opt/XPADE/v3/opt/aCC/bin/aCC -O file.C
```

- Easy to identify and distinguish objects generated using the XPADE development environment

- Running `file` command identifies objects files to be PA-RISC objects

```
$ file sci2.0
```

```
sci2.0: PA-RISC2.0 shared executable dynamically linked –  
not stripped
```

- Running the `what` or `odump – comp` command identifies the compiler version as `X.03.80`

XPADE usage

- Use debugger from native integrity debugger install path
- HP 9000 tool chain executes through ARIES
 - Compile-time performance difference as compared to HP 9000 native compilation negligible
 - 25+ applications benchmarked internally
- Binaries built using XPADE run through ARIES on Integrity system
 - For performance of HP 9000 applications under ARIES
<http://h21007.www2.hp.com/portal/site/dspp/menuitem.m.863c3e4cbcdc3f3515b49c108973a801/?ciid=ee09c87d5c779110VgnVCM100000275d6e10RCRD>

XPADE usage limitations

- Applications built using XPADE can only be deployed on Integrity HP-UX through ARIES
 - Deploying of XPADE generated binaries and libraries back on HP 9000 server is not currently supported
- No support for HP-UX 9.x, 10.x, 11.00 and 11.11 object files, libraries and executables
- Profiling options and PBO builds not supported

Summary



What is XPADE?

XPADE is...

- Release on Integrity HP-UX 11i v2 and 11i v3
- 11i v2/v3 compatible build environments, running via ARIES on Integrity HP-UX 11i v2/v3
- HP 9000 (PA-RISC) compilers and tools from C/aC++ Developer's Bundle
 - Package includes HP 9000 C/aC++ compiler, linker and linker tools
 - All header files from `/opt/aCC/include`, `/opt/aCC/include_std`
 - All other files under `/opt/aCC` and `/opt/ansic`



What is XPADE?

XPADE is...

- System header files and system libraries shipped with HP 9000 HP-UX 11i v2/v3 base OE
 - Files from `/usr/include`, `/usr/lib`, `/usr/lib/pa20_64`
 - All system object files (`unix95.o`, `unix98.o`)
 - `milli.a` (32-bit and 64-bit) archive library
- Xmotif libraries and header files
- Signature to identify/distinguish XPADE built objects

What is not XPADE?

XPADE is not...

- Support for HP-UX 9.x, 10.x, 11.00 and 11.11 object files, libraries and executables
- Archive libraries and all non-library files and directories from `/usr/lib` and `/usr/lib/pa20_64`
 - Except `milli.a` (32-bit and 64-bit)
- Non HP-UX base OE elements
 - ISU components – header files, libraries
 - HP 9000 `F90` compiler, `lex`, `yacc` tools and libraries
- HP 9000 HP-UX `make` command

What is not XPADE?

XPADE is not...

- HP 9000 man pages for system header files/libraries/tools
- Profiling option `-G/-p`
 - No PBO builds
- Deprecated tools on HP 9000 11i v2/v3
- Tools/utilities from `/bin` and `/usr/bin` and symbolic links that point to files outside
 - `/usr/lib/libp`, `/usr/lib/pa1.1`,
`/usr/lib/pa2.0`, `/usr/lib/nls`

What is not XPADE?

XPADE is not...

- Transition links ([tlinks](#)) database
- 3rd-party libraries and header files
- For deployment of applications built using XPADE on a native HP 9000 system



XPADE availability

- Available for download since Jan-2009
- Downloads and upgrades permitted for DSPP registered company members
<http://www.hp.com/go/xpade>
- HP C/aC++ Developer's Bundle (Product #B9007AA) license is required to use XPADE on Integrity HP-UX 11i
 - Those having a valid license can request a download
<http://h21007.www2.hp.com/portal/site/dspp/menuitem.8b9318a87932df0d59df53103894e601/?onlineID=fc423bb464c3e110VgnVCM100000a360ea10RCRD>

References

- XPADE references
<http://www.hp.com/go/xpade>
- FAQ
<http://h21007.www2.hp.com/portal/site/dspp/menuitem.863c3e4cbcdc3f3515b49c108973a801/?ciid=c8038b7e14fae110VgnVCM200000a460ea10RCRD>
- Release Notes
http://h21007.www2.hp.com/portal/download/files/prot/files/XPADE/XPADE_release_notes.html
- Email support
xpade-help@hp.com

Additional resources

- ARIES references
<http://www.hp.com/go/aries>
- HP-UX 11i v3 knowledge-on-demand webinar
<http://h20338.www2.hp.com/hpux11i/cache/589281-0-0-0-121.html>
- FAQ
<http://h21007.www2.hp.com/portal/site/dspp/menuitem.863c3e4cbcdc3f3515b49c108973a801/?ciid=a408713ba4f02110713ba4f02110275d6e10RCRD>
- Documentation on **TARGETROOT** and **SDKROOT**
<http://docs.hp.com/en/5187-0137/5187-0137.html>

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