Session
AD029

Introduction to AST Programming

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7:00 pm – 7:50 pm
Room 120

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Agenda –

- ***This session will teach you how to use OpenVMS VAX ASTs***
- ***The rules presented here ARE stricter than many of the rules presented in DIGITAL manuals.***
- ***These rules are designed to ensure correct, efficient applications.***

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Introduction

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NOTES

Basics

- ***Synchronization roughly equivalent to IPL level synchronization in the VMS Executive.***
- ***High Efficiency***
- ***Fewer limits than Event Flags***

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When Should You Use ASTs?

- ***Realtime Applications***
- ***Control***
- ***Transaction Processing***
- ***Monitoring***
- ***Terminal Applications***
- ***Network Applications***
- ***Time related applications***

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General AST Concepts

- ***Non-interruptable by other ASTs at same or lesser Access Modes.***
- ***FIFO Execution.***
- ***AST Entry is via an asynchronous(!), simulated, CALLS instruction.***

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Typical Event Driven Computer Applications

- ***Printing***
- ***Terminal Management***
- ***Process Control***

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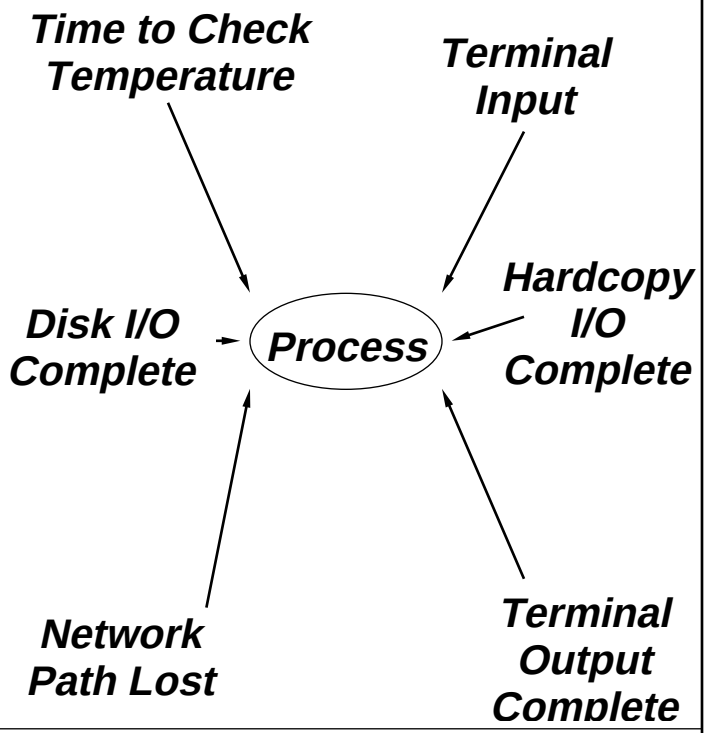
Typical Event Driven Computer Applicatio



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Common Root —

- ***External events control program***
- ***Programs need to be efficient***
- ***External event sequence is not under program control***
- ***No Dispatch Routine***

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Generating and Processing ASTs

- ***Asynchronous System Services***
  - ***$QIO***
  - ***$ENQ***
- ***Record Management Services***
- ***Timer Services ($TIMER)***
- ***Declare AST Service ($DCLAST)***
- ***Mailboxes***
- ***Unsolicited I/O Events***

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Programming Benefits

- ***Event Flags are limited***
  - ***64 Local Event Flags***
  - ***64 Common Event Flags (Remappable)***
- ***No limit on ASTs. AST limits enforced by***
  - ***ASTLIM (from SYSUAF)***
  - ***System Resources***
- ***Capable of supporting multiple, alternative sequences without polling or increases in complexity***

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Keep Programs Simple

Best main program for AST based application is extremely simple.

```
PARAMETER NO = 0
CALL INIT
EXIT_FLAG = NO
DO WHILE EXIT_FLAG .EQ. NO
    CALL SYS$HIBER()
    END DO

CALL SYS$EXIT()
```


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Keep Programs Simple

- ***Get in — GET OUT!***
- ***Never use System Service WAIT forms***
- ***Keep Logic simple***

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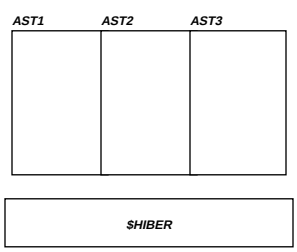
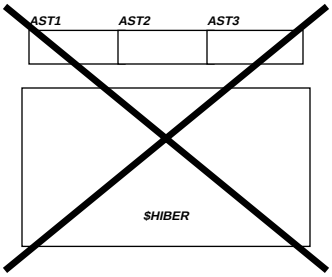
Tricks to Getting It Right

Do ALL Processing in ASTs
Avoid Performing Processing at AST level and normal Process level.





Good ***Bad***

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Tricks to Getting It Right

Some packages (e.g. RDB) expect to be used only from normal level, NOT AST level.

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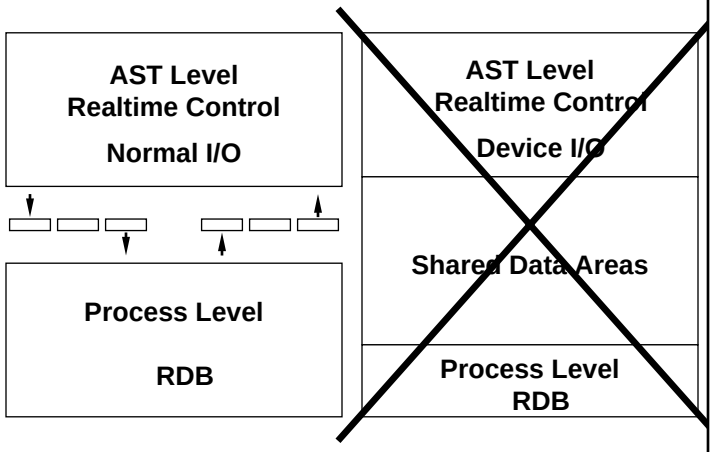
Tricks to Getting It Right

Use Work, Answer, and Free Queu to communicate.



Good ***Bad***

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Communications Between AST Level and Process Level

- ***Use Queues, Insert/Remove Queue or LIB$ routines (for HLLs)***
- ***Be careful of queue overflows, handle overflows gracefully***
- ***Remember to ALWAYS issue $WAKE call!***

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Communications Between Process Level and AST Level

- ***Use queues, Insert/Remove Queue or LIB$ routines (HLLs)***
- ***Use $DCLAST service to switch to AST level***
- ***Allow ASTs to be processed in the order they are generated, DO NOT process multiple items at a time!***

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Initialization

Do as much initialization as possible from AST level to reduce risk of race conditions.

```
SUBROUTINE INIT
X = SYS$DCLAST(INITAST, PARM)
END

SUBROUTINE INITAST(PARM)
     .
     .
END
```

Good

```
SUBROUTINE INIT
     .
     .
END
```

Bad

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NOTES

Avoid Problems

- ***Kill bugs before they occur***
- ***DO NOT inhibit ASTs. Use $DCLAST to avoid interruptions.***

Questions?

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