LESSONS LEARNED

FROM AN

Ada CONVERSION PROJECT

Tim Porter

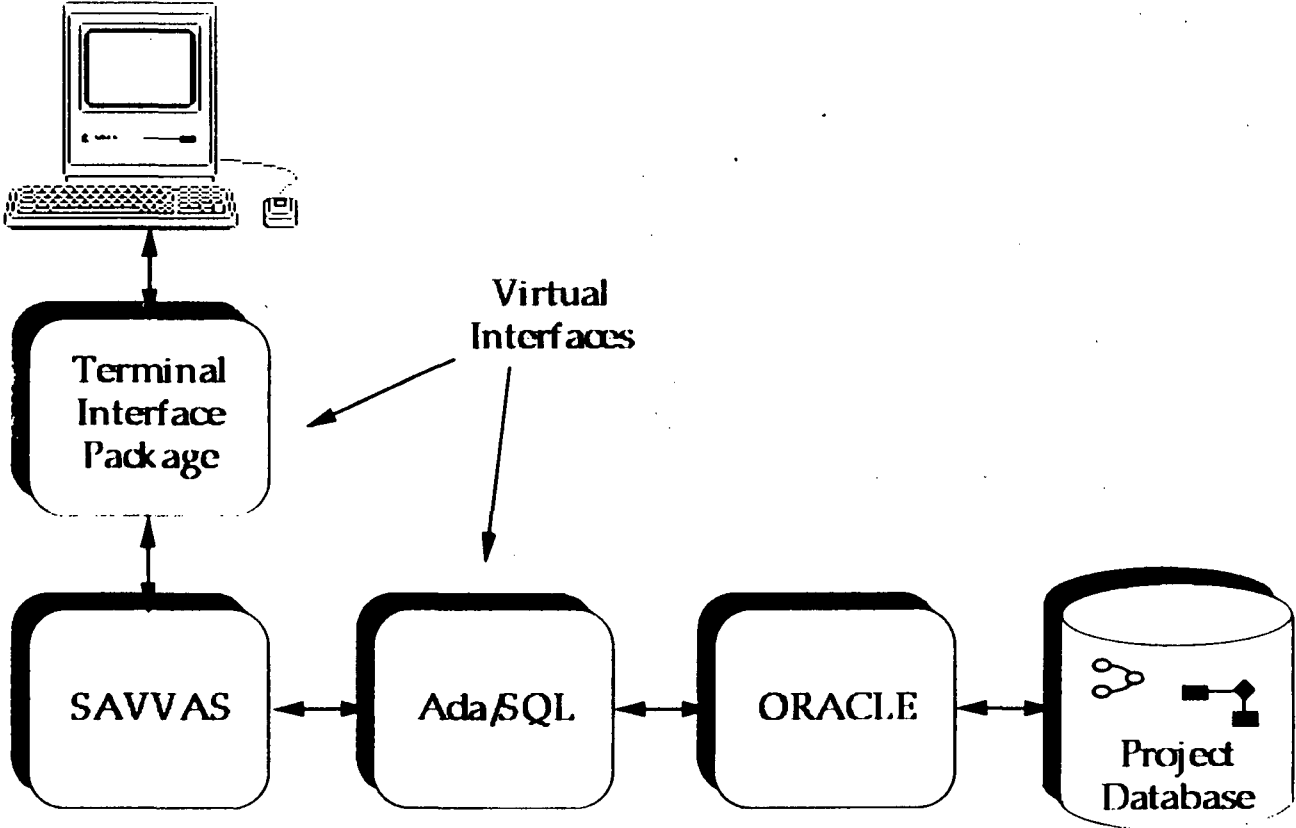10 November 1988

SAIC COMSYSTEMS

An Employee Owned Company

BACKGROUND

- SOFTWARE AUTOMATED VERIFICATION AND VALIDATION SYSTEM (SAVVAS)

- ORIGINALLY DEVELOPED
  - FOR VAX/VMS
  - USING DEC Ada

- PORTED FOR NASA SPACE STATION SSE
  - TO IBM 3090/VM
  - USING ALSYS Ada

SAVVAS ARCHITECTURE

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SOFTWARE PORTABILITY

Software portability is measured by the relative ease with which software is moved between alternative hardware, compilers, operating system, and other external interfaces.

HOW DO WE IMPROVE PORTABILITY?

- STANDARD LANGUAGE - Ada

- ISOLATION OF NON-PORTABLE CODE

- CONSTRAINTS ON LANGUAGE FEATURES

- VIRTUAL INTERFACES

HISTORY OF ADA

1972   DoD recognizes rapid growth of software costs for military
        systems

1975   HOLWG reviews language requirements

1979   Ada selected from language design efforts

1983   Ada established as an ANSI standard

1985   DoD spends $11 billion on software

1987   Ada mandated by DoD directive 5034.2
        NASA awards Space Station SSE contract

1988   STARS Competing Primes contracts awarded

1995   DoD projected software spending is over $25 billion

ISOLATION OF NON-PORTABLE CODE

- CAPITALIZE ON Ada'S FEATURES

  - PACKAGES

- CLASSES OF DEPENDENT SOFTWARE

  - INPUT/OUTPUT

  - DATABASE ACCESS

  - OPERATING SYSTEM SERVICES

SIMPLE TERMINAL INTERFACE PACKAGE

```
package SIMPLE_TERMINAL_INTERFACE is

    procedure GO_TO_POSTIION_ (X, Y: in INTEGER);

    procedure DISPLAY_TEXT (MESSAGE: in STRING);

end SIMPLE_TERMINAL_INTERFACE;

with TEXT_IO; use TEXT_IO;
package body SIMPLE_TERMINAL_INTERFACE is

    procedure GO_TO_POSITION_ (X, Y: in INTEGER) is
    begin

        Send the appropriate code sequence to the terminal.
        These are different for varying terminal types.

    end GO_TO_POSTIION;

    procedure DISPLAY_TEXT (MESSAGE: in STRING) is
    begin

        -- Send the message to the terminal.
        -- Including any required code sequences.

    end DISPLAY_TEXT;

end SIMPLE_TERMINAL_INTERFACE;
```

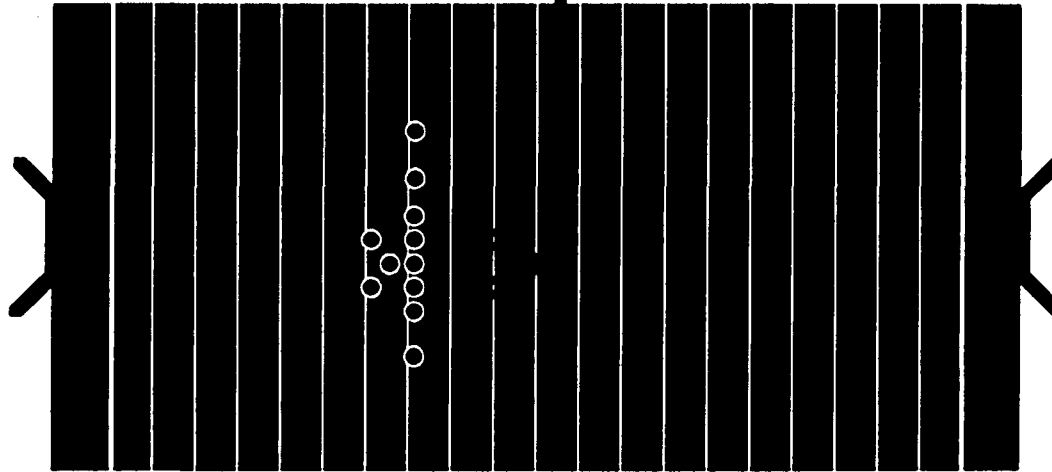# CONSTRAINTS OF LANGUAGE FEATURES

- TASKS

- PRAGMAS

- GENERICS

- EXCEPTION HANDLING

VIRTUAL INTERFACES

- DATABASE ACCESS

  - Ada/SQL
  - MODULE APPROACH

- INPUT/OUTPUT

  - X WINDOW
  - Ada-GKS

- OPERATING SYSTEM

  - CAIS
  - PCTE
  - POSIX

PLAY BY PLAY ANALYSIS

Scoreboard

SAVVAS:
Poor Programming:

	SAVVAS	Poor Practices
• INPUT/OUTPUT	7	7
• PRAGMAS	7	14
• TRAINING EDUCATION	14	21
• EXCEPTION HANDLING	14	24
• DATABASE INTERFACE	21	24
• COMPILER COMPATIBILITY	28	31
• SOFTWARE LAYERING	35	31

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MODIFICATIONS TO THE PLAY BOOK

- CONSISTENT DESIGN METHODOLOGY

- DESIGN AND CODING STANDARDS

- VIRTUAL INTERFACES

- COMPREHENSIVE Ada TRAINING