Session
VS040

Case Studies in OpenVMS Shareable Libraries

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Thursday, June 6, 1996
11:00 – 11:50
Room 124

Spring 1996 US DECUS Symposium
America's Center
St. Louis, Missouri

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Why Use Shareable Libraries?

Maintenance
Speed/Efficiency
Leave no stone unturned
(or program un-relinked)
Dynamic code generation

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When and Why?

It is well known that shareable libraries make sense in heavily used applications. For example, the VMS Run-Time library is implemented as a series of Shareable Libraries.

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NOTES

When and Why? (cont'd)

Not as well known are the benefits realized in program development and applications implementation. These benefits are completely user realizeable. and are separate from the traditional system–wide benefits of using shareable libraries.

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Maintenance

No need to re-link entire program for change in one routine.

Ability to quickly switch between new and old versions of routines.

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Speed/Efficiency

- ***INSTALLed shareable image***
- ***Read-only pages shared by many processes***
- ***Significant reduction in memory requirements***
- ***Significant reduction in disk storage requirements***

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Leave No Stone Unturned

- ***Changes in object libraries require relinking to take effect***
- ***Relinking is a major task in a medium/large facility (tens or hundreds of programs)***

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Dynamic Code Generation

- ***Permits execution time customization***
- ***Highly efficient***
- ***Simplifies code***
- ***Old tactic; but not well known***

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Cases from our Files:

- ***We will present two case studies:***
- ***Development advantages***
- ***Applications tool for dynamic code generation***

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Case 1 – Development

Symptom:

Large Program – Slow Links

Linking this program takes up to 20 minutes on a VAX–11/780

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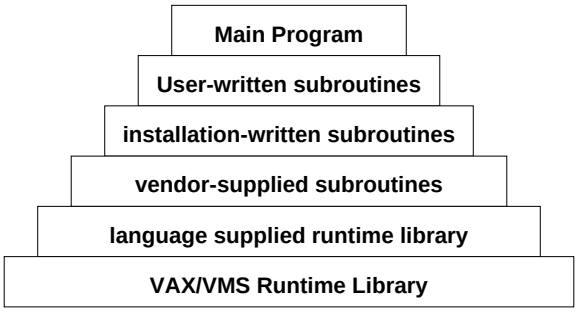
Problem:

Program is like a pyramid – very large foundation



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Solution:

Create one or more user shareable images containing most of the foundation elements.

Result:

Link time reduced to 15 seconds!

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Mechanics of Shareable Libraries

Define Transfer Vector:

```
.TRANSFER     TEKPLT
.MASK         TEKPLT
JMP           L^TEKPLT+2
.END
```

Assemble transfer vector.

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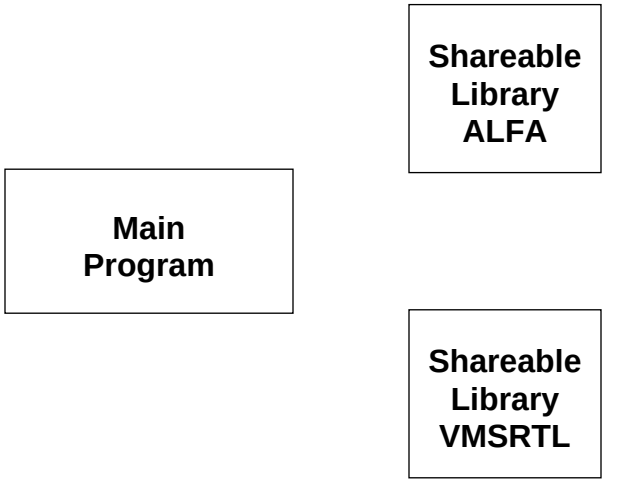
NOTES

The support code, which is the bulk of the image, is in the shareable libraries!



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Specify the shareable library at execution time

Use logical names.

No privileges required!

```
$ ASSIGN –
$_ $1$DUA2:[GEZELTER]TEKPLT.EXE –
$_ TEKPLT
$ RUN program
```


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Case 2 – Dynamic Linking a.k.a. Power Tools with Interchangeable Heads/Bits

Most programs are written to do a particular job.

How does one write a program to do many different jobs?

With Shareable Libraries, of course!

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Programming By Chinese Menu

Pick:

1 from Column A

1 from Column B

3 from Column C

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Conventional Programming

Column A: 5 possible choices

Column B: 7 possible choices

Column C: 30 possible choices

TOTAL: 1050 programs
(5 * 7 * 30)

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Programming By Chinese Menu

5 Group A subroutine packages

7 Group B subroutine packages

30 Group C subroutine packages

1 Main Program

TOTAL: 43 programs / packages
(5 + 7 + 30 + 1)

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Conventional Programming vs. Chinese Menu – The Difference

Conventional:
1050 programs

Chinese Menu:
43 modules/packages
3 interfaces

The Difference:
1007 programs!
(or combinations of options)

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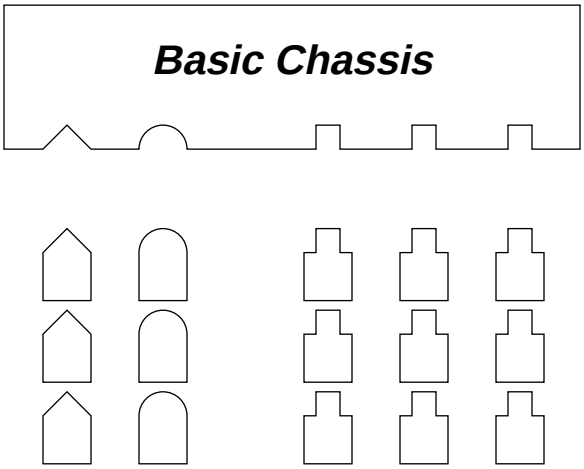
Key Concept: Programming by Chassis



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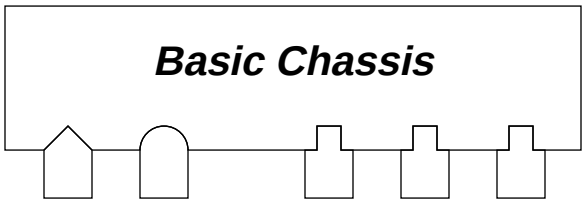
Programming by Chassis: Operation



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Goal:

Develop a large family of related programs with minimal effort

Maintain separation between different applications

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Case Study: Mailing List System

Must generate:

- ***Labels***
- ***Envelopes***
- ***Form letters***
- ***Invitations***
- ***Listings***
- ***Attendee Lists***
- ***...***

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Problem: Complexity

Program complexity grows as an exponential (n**m) of the number of different options AND the number of different values of the options

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Complexity

Research has shown that correctness of code is endangered by large numbers of nested IF statemets

By hanging different applications components on the same chassis, we are able to achieve a wide variety of options WITH NO INCREASE IN APPLICATIONS COMPLEXITY

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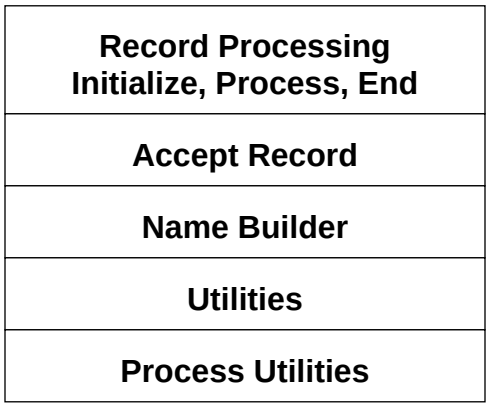
Progamming by Components



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Result:

Shareable libraries permit us to achieve the effect of multiple levels of nested IF statements without increasing program complexity.

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Production Environment

The selection of components is driven by the menu system. There is little need for multiple levels of IF statements.

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NOTES

Another view:

This way of building applications is conceptually similar to genetics. You build applications (organisms) out of simple building blocks.

Questions?

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