

\$Root Status



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- Issue was support for separate compilation/analysis
 - Unknown types/ownership for data and functions in \$root
 - Unknown ports for use with .*
- Solution is to provide extern declarations of the appropriate object
- For functions/data declared in \$root

```
extern int foo;  
extern function int func1(int I);
```
- Elaboration error for declared items to not exist when all of the design is seen

Extern Modules

- For tools that operate a single module at a time, .* is problematic (synthesis, formal verification)
- Allow (not require) external declaration of modules

```
extern module a #(parameter size = 8) (input [size:0]b);  
module top();  
    a a (.*);  
endmodule
```

- Becomes

```
module top();  
    a a (b);  
endmodule
```

- To allow minimal typing of port list, also support `.*` in module declarations when extern declarations exist

```
extern module a #(parameter size = 8) (input [size:0]b);  
  
module a(.*);  
  
endmodule
```

Becomes

```
module a #(parameter size = 8) (input [size:0] b);  
  
endmodule
```

- If an extern declaration and a full module definition exist, they must match exactly.

- Proposals have been forwarded to the SV-BC
 - Extern module proposal accepted
 - Extern data and functions approved in principle
 - > Formal language being developed