BNF – syntax description

• Formal specification of SV syntax
• Annex A is now 30+ pages
• Descended from the IEEE 1364 BNFs of 1995 and 2001 (“V2K”)
• Developed for SV 3.0 by Stefen Boyd
• Developed for SV 3.1 by Stefen Boyd and Dan Jacobi
SV 3.1A BNF development

• Verilog
  – Track and incorporate all V2K errata fixes by IEEE 1364 Verilog standard working group

• SV 3.1
  – Find/fix remaining bugs in SV 3.1 BNF

• SV 3.1A
  – Specify new BNF for SV 3.1A language extensions
  – Integrate with SV 3.1 BNF
Verilog $\subseteq$ SystemVerilog

- SV must be a superset of V2K
- BNF is the only text shared among the V2K LRM and the SV LRM
- BNF needs to be backward compatible with V2K in two ways:
  - SV syntax must be superset of V2K syntax
  - SV BNF (the textual description itself) should be approximate superset of V2K BNF
Semantic checks vs. syntax

- V2K BNF is nice in some ways, but it also has some structural problems
- Too many semantic constraints are imposed via syntactic descriptions.
An Example – Function Statement

```plaintext
loop_statement ::=  
  forever statement  
  | repeat ( expression ) statement_or_null  
  | while ( expression ) statement_or_null  
  | for ( variable_decl_or_assignment ; expression ; variable_assignment )  
    statement_or_null  
  | do statement while ( expression )
```

```plaintext
function_loop_statement ::=  
  forever function_statement  
  | repeat ( expression ) function_statement_or_null  
  | while ( expression ) function_statement_or_null  
  | for ( variable_decl_or_assignment ; expression ; variable_assignment )  
    function_statement_or_null  
  | do function_statement while ( expression )
```
Shared IEEE/Accellera solution

In A.6.2, REMOVE function_statement_item.
In A.6.2, REMOVE function_blocking_assignment.
In A.6.3, REMOVE function_seq_block.
In A.6.6, REMOVE function_conditional_statement.
In A.6.6, REMOVE function_if_else_if_statement.
In A.6.7, REMOVE function_case_statement.
In A.6.7, REMOVE function_case_item.
In A.6.8, REMOVE function_loop_statement.

Plus fine-tuning of the V2K LRM text and a footnote for extra clarity.
Remaining 3.1A BNF issues

- Some BNF proposals still waiting for committee approval
- Any language extensions still in committee are subject to change – so is their BNF
- Assertions BNF still needs a proposal to fix some known bugs
- There are more bugs in there, we just haven’t found them all yet