



**SANMINA-SCI**

# **Data Convergence: Why is it critical?**

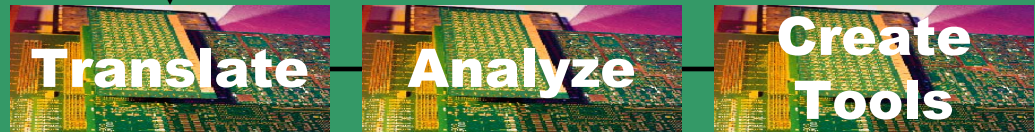
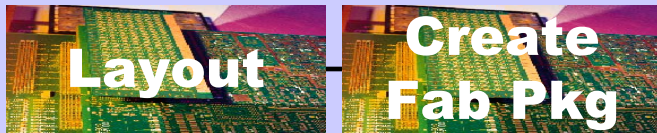
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Director, Product Engineering  
PCB Operations**

# Prior Environment



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## OEM



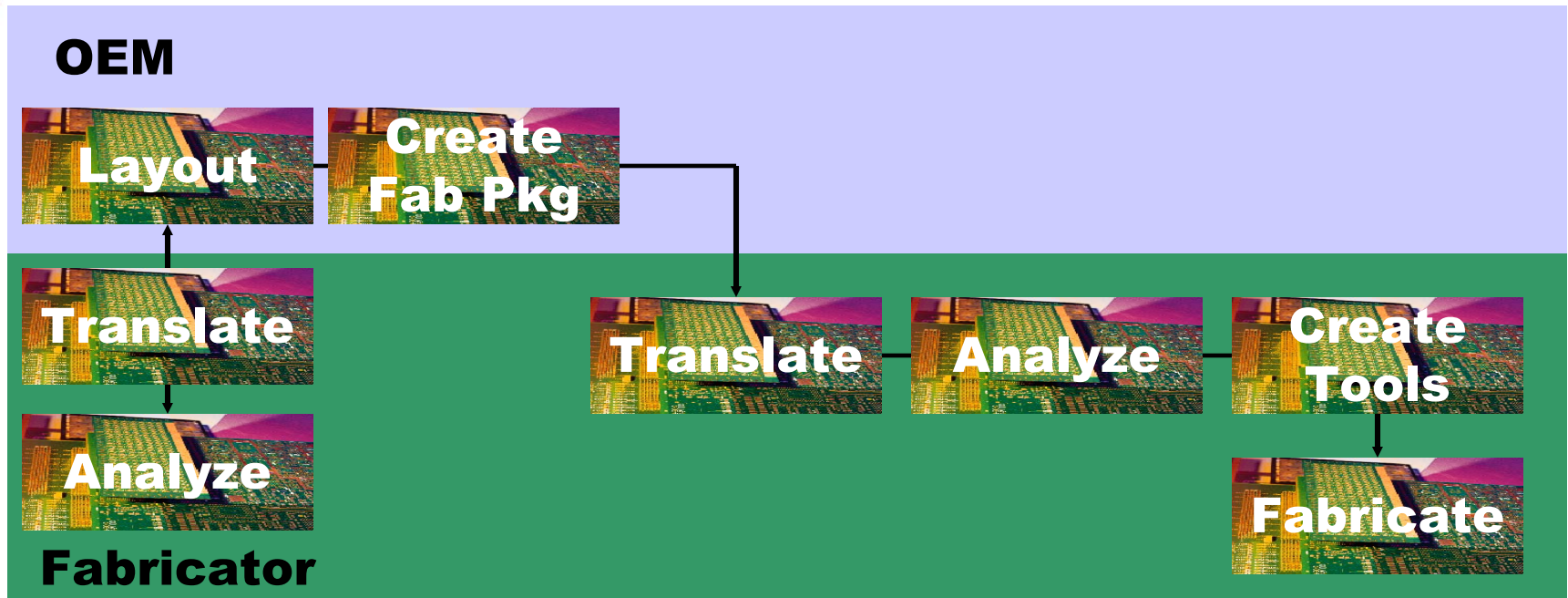
## Fabricator

- Serial, “throw it over the wall” process
- Requires two data conversions (Intelligent > Non-intelligent > Intelligent)
- Native database > Gerber > ODB++ (Manual intervention)
- CAD > HPGL print > Manual entry ODB++ (Manual entry)

# Current Environment



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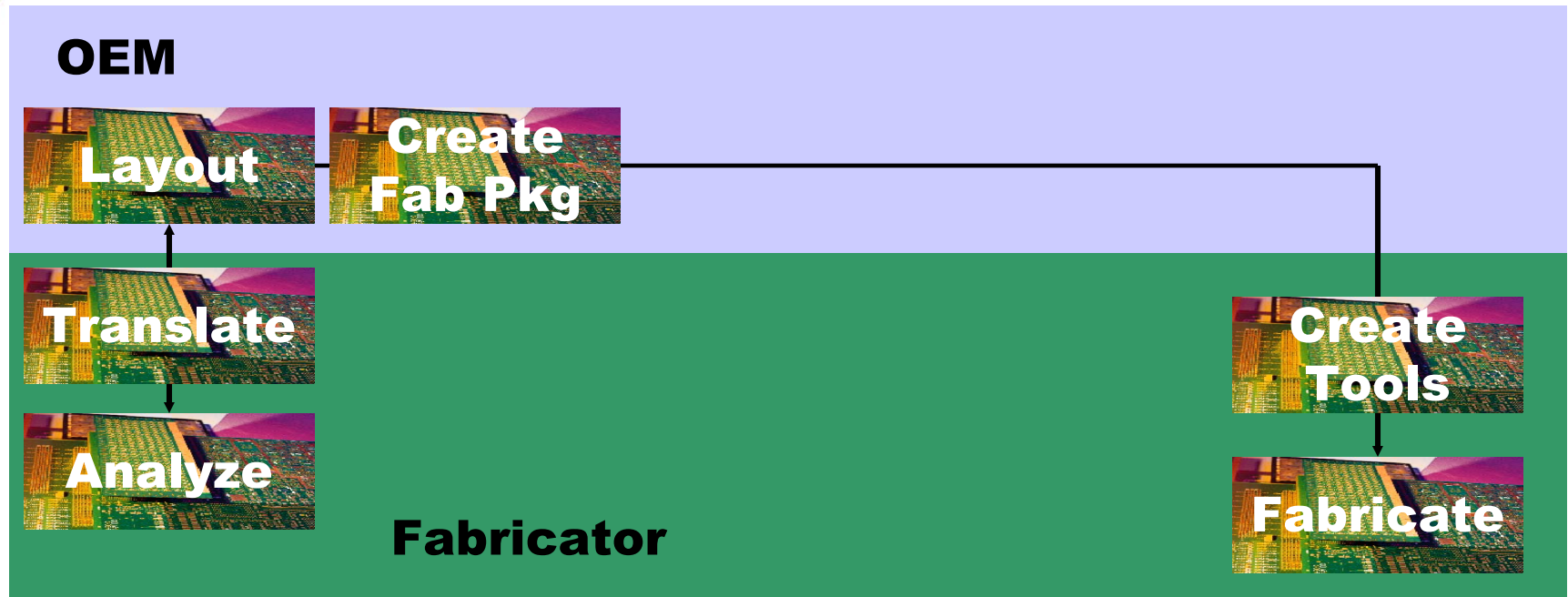


- Parallel DFM analysis
- Requires one data conversion (Intelligent > Intelligent)
- Native database > ODB++ (no manual intervention)
- CAD > HPGL print > Manual entry ODB++ (Manual entry)

# Future Environment



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- Parallel DFM analysis
- Requires one data conversion
- Native database > Converged Standard (no manual intervention)
- CAD > Converged Standard (no manual intervention)

# Data Transfer Defectivity



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- Gerber & fab print based transfer >20K DPPM
- ODB++ based transfer <100 DPPM
  - Without fab prints
  - Without netlist
- >200X lower defectivity possible for all data files that will be transferred

# Current Fabrication Data Formats



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PCB Physical	<ul style="list-style-type: none"><li>•Gerber</li><li>•ODB++</li><li>•GENCAM</li></ul>	<ul style="list-style-type: none"><li>•Yes</li><li>•Yes</li><li>•No</li></ul>
Fab Print	<ul style="list-style-type: none"><li>•HPGL</li><li>•GENCAM</li></ul>	<ul style="list-style-type: none"><li>•Yes</li><li>•No</li></ul>
Electrical Properties	<ul style="list-style-type: none"><li>•HPGL</li><li>•ODB++</li><li>•GENCAM</li></ul>	<ul style="list-style-type: none"><li>•Yes</li><li>•Rarely</li><li>•No</li></ul>
Business Information	<ul style="list-style-type: none"><li>•ASCII file</li><li>•GENCAM</li></ul>	<ul style="list-style-type: none"><li>•Yes</li><li>•No</li></ul>

- Data convergence will combine all of these

# Convergence is important. Why?



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- Seen as low defect transfer process
- Tooling cycle time reduction
- Elimination of human interaction during data transfer
- Will succeed if OEM only creates one output for fabrication and EMS