



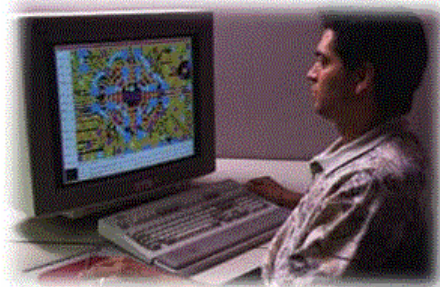
CELESTICA™

Data Convergence An EMS Perspective

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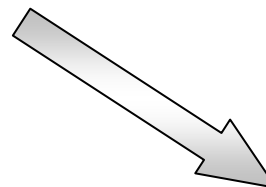
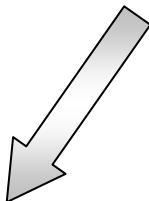
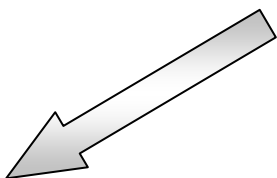
Customer

CAD
BoM
AVL



PDM CAD Team

- Educate Customer
- Neutralize CAD Data
- Verify / Fix issues



- Data Quality Essential
- Significant Delays (5days +) when error detected

Quote Process

DfX Process

NPI Prototype Build

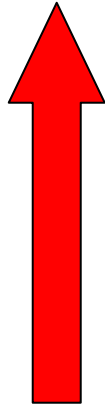
| | |
|--------------------------|-----------------|
| Stencil & Tooling Design | SMT Programming |
| Flying Probe | MPI Authoring |

Different Tools Require
Different Inputs

- Time Sensitive
- Understanding of Content Critical

- Automation

Highly organized, Integrated,
related, clear



Flat, dumb, vague,
assumptions

Converged Standard

EDIF, AP210, GenCam, ODB++

EDA DBs, Alg, Men, RR, ...

CAM DBs, GenCAD, PDW, FATF

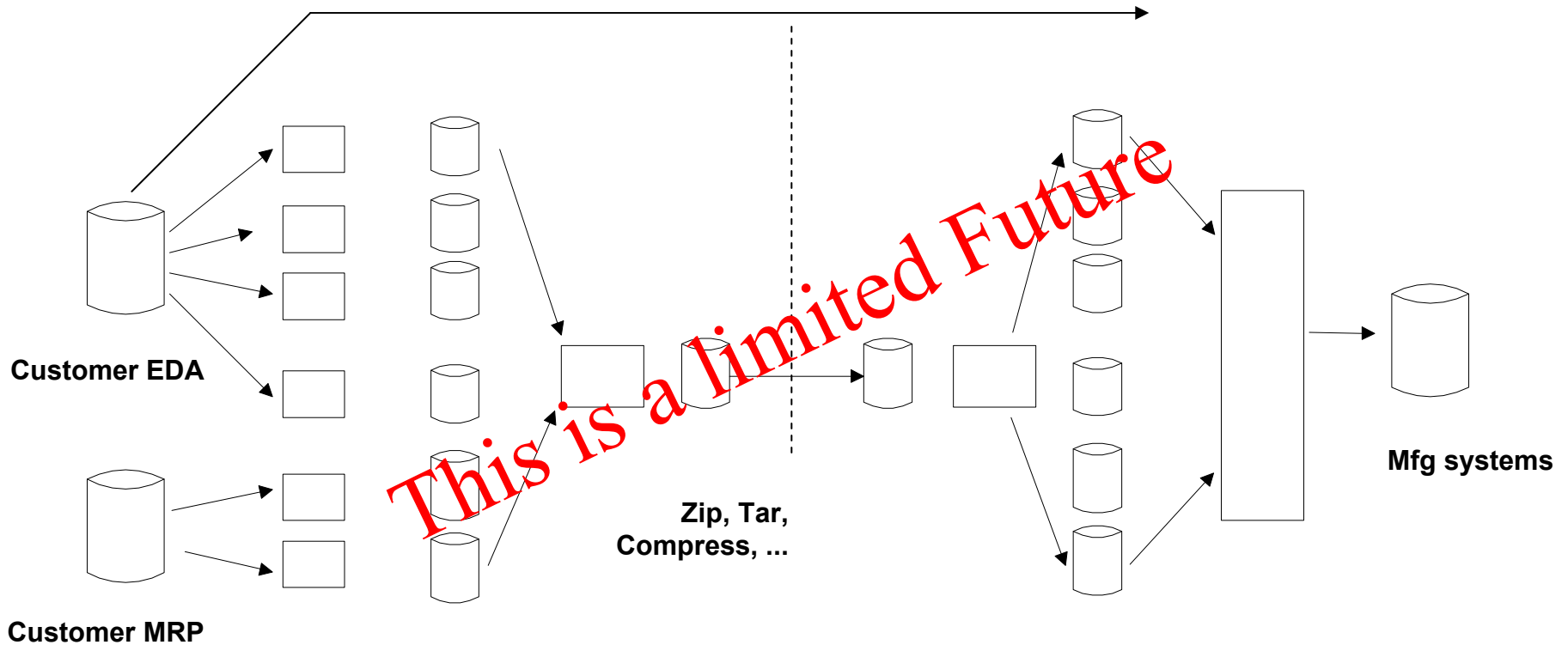
PIPs, BODs, 25xx

BOMs, CPLs, Netlists

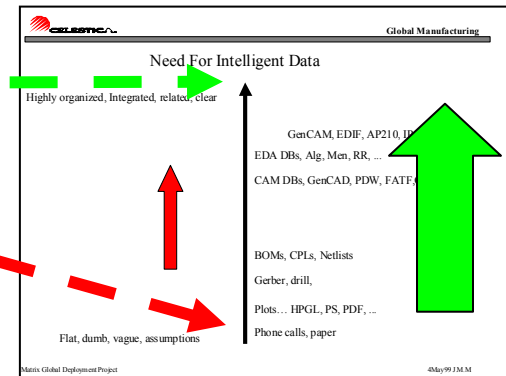
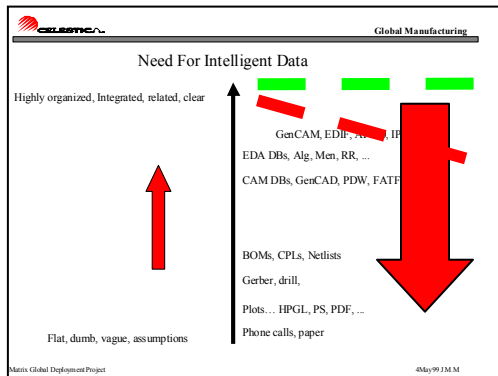
Gerber, drill,

Plots... HPGL, PS, PDF, ...

Phone calls, paper



Customer MRP



1.1.1.1 Drawings

Assembly/Layout

Indicates position of components on each side of the card assembly.

Card Fab

Shows the locations and sizes of all drilled holes on the PCB.

Panelization

Gives the coordinates and rotation of boards within the panel/plak.

Mechanical Assembly

Provides detail information on how to assembly and mechanical hardware such as screws, rivets, brackets etc..

1.1.1.2 Assembly Bill Of Materials

Reference Designator

Quantity

Description

Part Type (PTH, SMT....)

Customer Part Number

Vendor Part Number

Die Revision

1.1.1.3 Other Documentation

Assembly Specifications

Details on Received Data

Label Specification

Detail on PCB

Mechanical CAD File

Workmanship Standards - if other than IPC-A-610

Mentor Board Station

- The entire pcb database in Mentor is required. The minimum file structure in Mentor typically is as follows:
 - pcb
 - mfg.
 - cda
 - check
- There can be other subdirectories under “pcb”, what is above is the minimum requirements.
- Please ensure that the following files exist in the locations outlined below. It is **CRITICAL** that they are the most recent version. In particular, verify that the `ascii_geoms` file is the correct revision.
 - /pcb/mfg/**neutral_file**
 - /pcb/mfg/**geoms_ascii** or /pcb/mfg/**ascii_geoms**
 - /pcb/**traces.traces_XXX** (XXX is some number of the most recent revision)
 - /pcb/**layers.layers_XXX**
 - /pcb/**tech.tech_XXX**
 - /pcb/**aperture_table.apertt.XX**
 - /pcb/**testpoints.testpoints_XXX**
- At a minimum tar the pcb directory. For large boards, further compression is often advisable.

Today (no Converged Standard):

- Significant investment required working with / educating customer on ideal data transfer package
- Time and resource wasted on neutralizing / fixing incoming CAD data stream

Tomorrow (with Converged Standard):

- Simple method for OEM to output single format for EMS and PWB Fabricator
 - Format can be loaded in directly to all key tools supporting Assembly & Test processes
 - Elimination of non-Value Add efforts required Today
-

Industry Participation in Standards Effort!!!!

- **OEM**
 - “owner of data”
 - needs to fit into their business process
 - **EMS Providers & PWB Fabricators**
 - “users of data”
 - **Solution providers**
 - enablers
 - ECAD vendors key for OEM output capability
 - CAM / CIM vendors key for “users”
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