Prosperity Heights Software

The MetaSyn™ Family of Tools

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Demonstration Motivation

- **Create an exploratory prototype for building and using adaptable software (a product family)**

- **Exhibit capabilities that tools should have to represent a product family**

- **Explore, specifically, graphical representations for software adaptability**

Tool Purpose

- **Support building multiple or alternative customized solutions to similar problems**

- **Reduce instance product building to decision resolution**

- **Express adaptability in textual and graphical work product content**

Example MetaSyn Tools

- **Software components library**

- **Document generator**
  - **Requirements**
  - **Design**
  - **Test**
  - **User**

- **Design alternatives generator**

- **Whole-product generator**

Demonstration Tool Attributes

- **Instance product attributes:**
  - a simple graphical specification (labeled nodes-arcs)
  - instance nodes having associated textual content (direct or in a file)

- **Product family allows specifying:**
  - A set of decisions that control instance customization
  - Decision-based inclusion or repetition of nodes/arcs
  - Substitution of decision values into node-arc labels and content
  - Decision-based customization of content
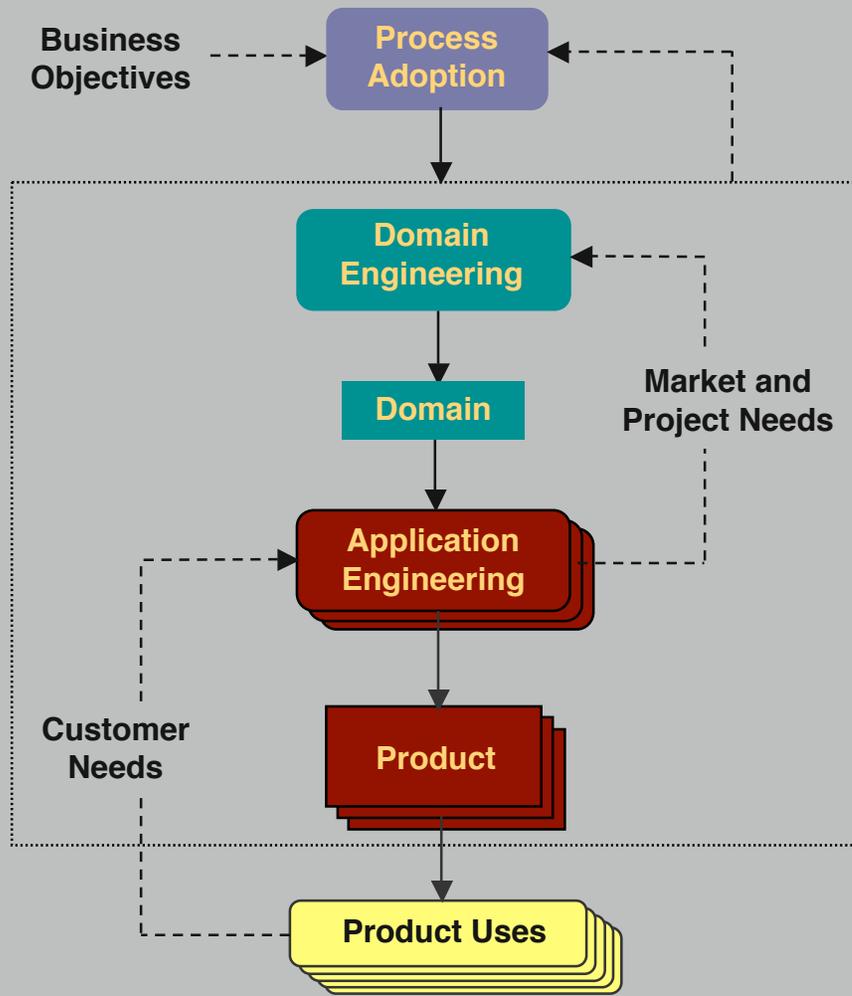 - Application of decisions to file-based adaptable assets

A Basic Reuse Tenet

The only sound basis for reuse is an envisioned set of *similar* products: a <u>family</u>

- Similarity
  - Commonality: the basis for *standardization* of work products and process
  - Variability: the *flexibility* needed to accommodate different needs

- Adaptability
  - An explicit representation of similarity
  - A characteristic set of deferred <u>decisions</u> that distinguish among the members of a family

The Role of Decisions

- **Engineering is a decision-making process.**

- **A product family shows how different ways to resolve a set of decisions lead to different products.**

- **Decisions represent:**
  - **Customer requirements (needs and constraints)**
  - **Engineering tradeoffs (such as cost, quality, esthetics)**

- **A focus on similar problems (a family) enables standardization, reducing number, variety, and complexity of decisions.**

The DsE Process

Business Objectives → **Process Adoption**

Domain Engineering

Domain

Market and Project Needs

Application Engineering

Customer Needs

Product

Product Uses
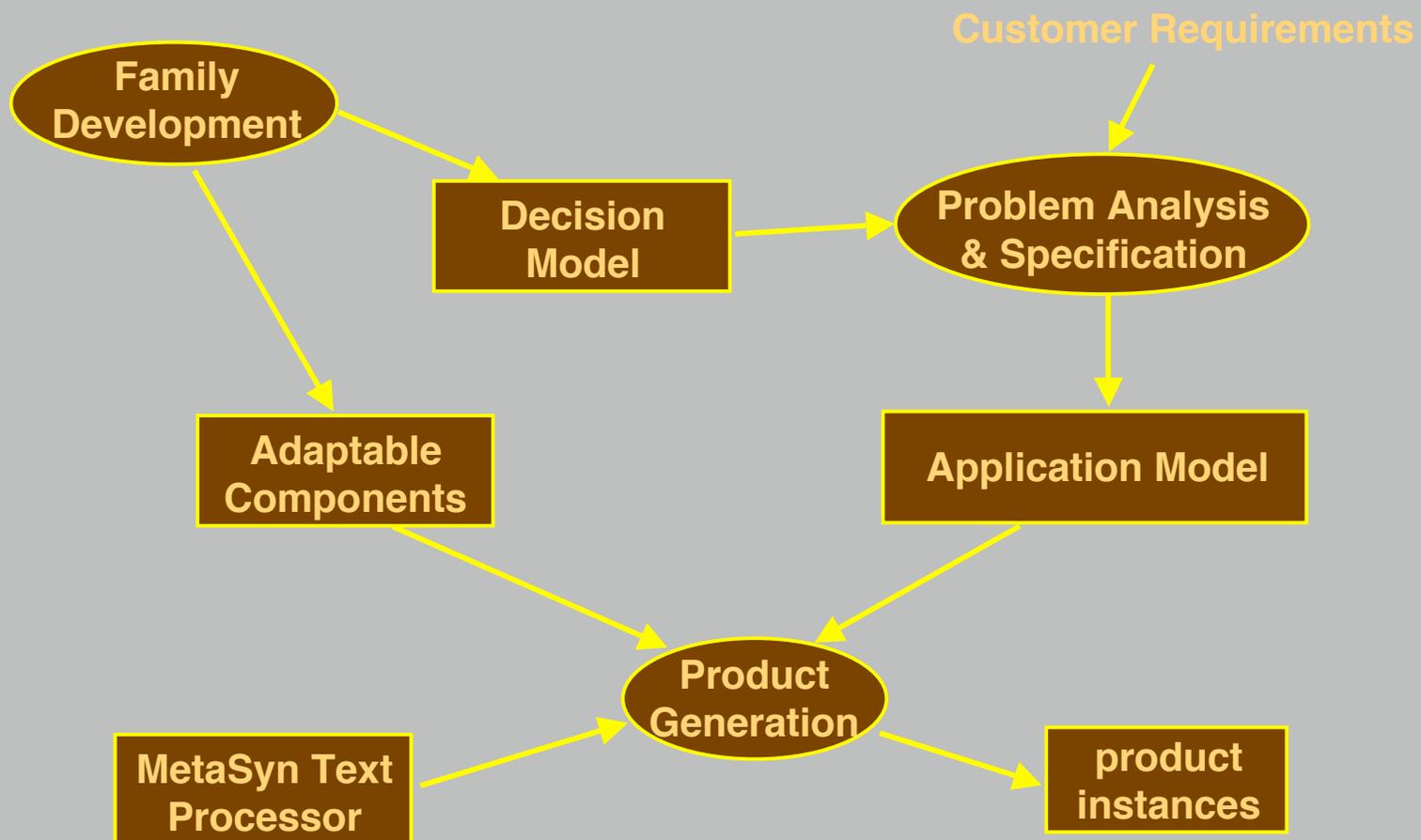
Institute & improve a product line business

Create a domain (process, tools, and assets) for building similar products

Build tailored products for customers

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A Process for MetaSyn Tool Use

Domain Engineering

Application Engineering

Customer Requirements

Family Development

Decision Model

Problem Analysis & Specification

Adaptable Components

Application Model

Product Generation

MetaSyn Text Processor

product instances

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Demonstration Outline

- **2 modes: edit family, generate instance**

- **Editing a graphical form and attached content**

- **Making a graphical form adaptable**

- **Making attached content adaptable**

- **Deriving customized instances from a family**

Future Tool Enhancements

- **composite decisions**

- **graphic node content**

- **alternate forms of text and graphic content**

- **'typed' content to activate associated tools (e.g., compiler)**

- **template-based editing of text-based adaptability constructs**

- **verification of decision completeness**

For More Information on Adaptable Software

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