

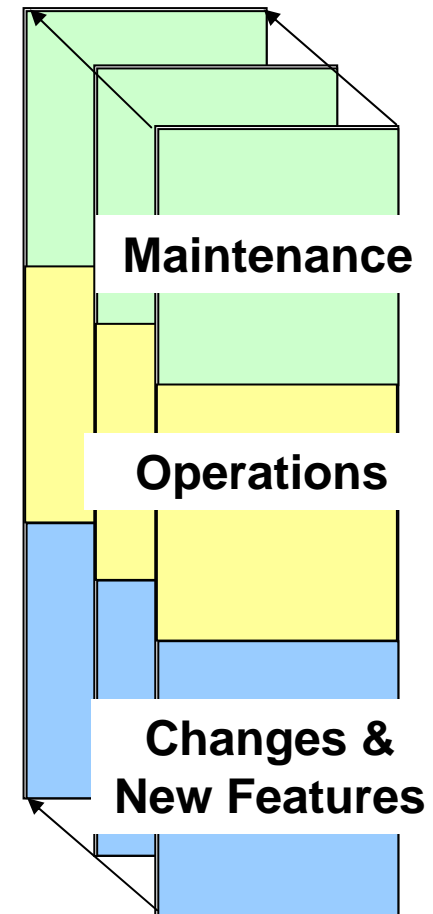
# Engineering in a Non-Development Environment

Kathy King and Thomas Zience

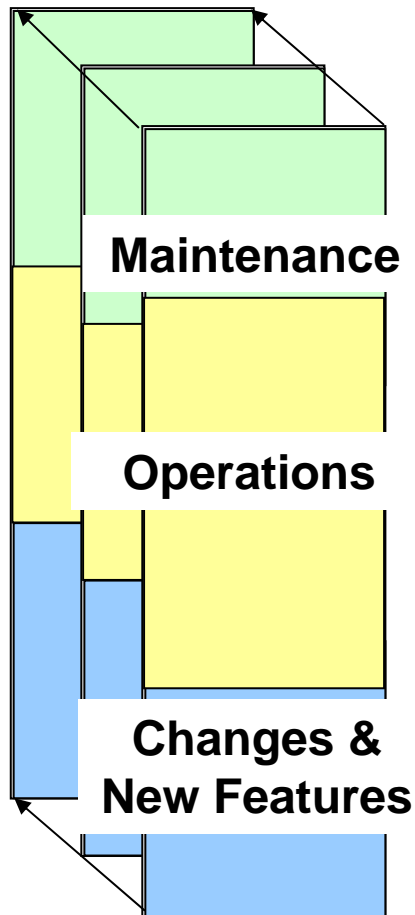


# Challenges in a Level of Effort Services Organization - 1

- ◆ CMMI Challenges
  - **Inability to develop an Organizational Set of Standard Processes** – Little commonality among contracts
  - **Inability to establish a project's defined process** - Customer mandated processes, procedures and tools
  - **Little or no engineering** – Fixes to existing functional architecture

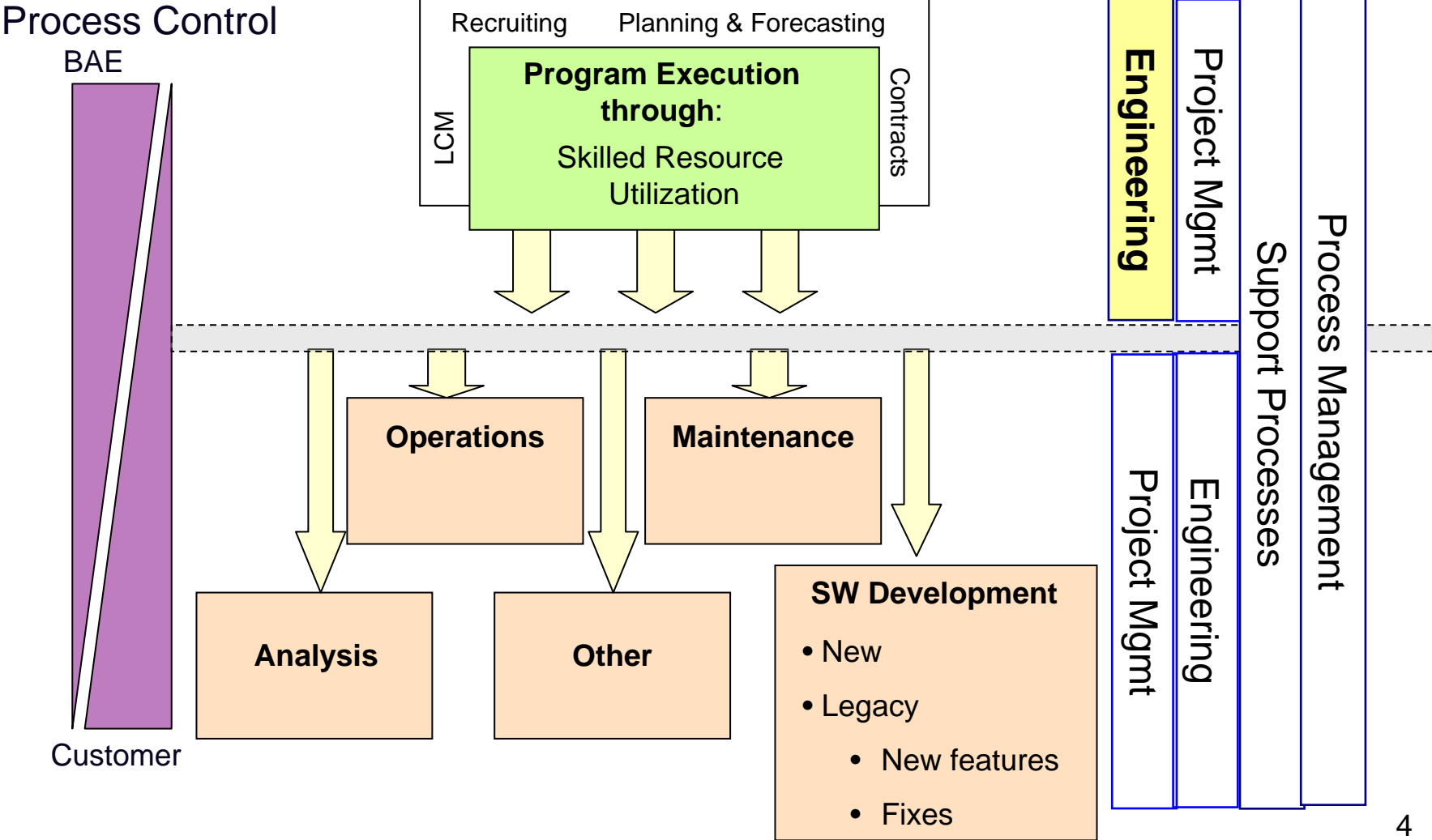


## Challenges in a Level of Effort Services Organization - 2



- ◆ **Business Challenges**
  - **Fixed staffing levels with changing workload demands**
    - Help desk call volume
    - Inherited legacy system problems
    - Service Level Agreement requirements
  - **Inability to share best practices –**
    - Customer controlled processes
    - Lack of commonality among contracts
  - **Environment challenges**
    - 24-7 operation
    - Remote, local, pager support

# Integrating Engineering Practices at the Top Level


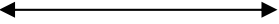
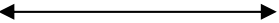





# Skilled Resource Utilization Processes

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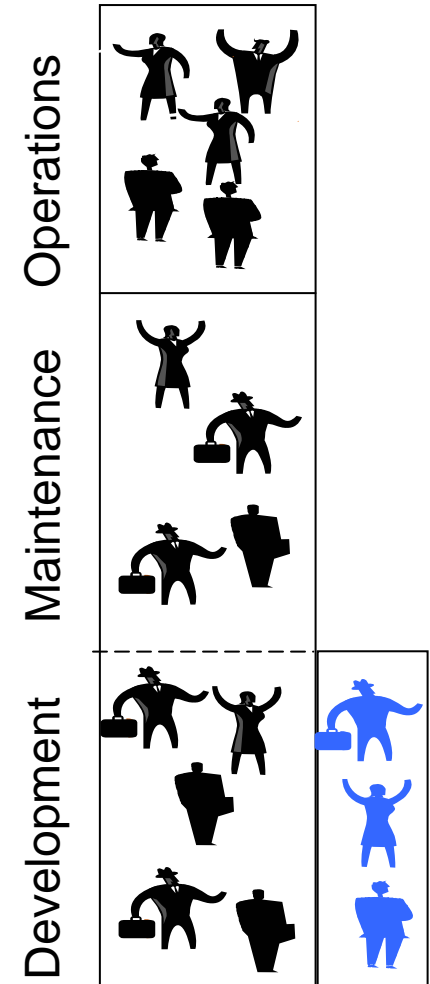
- ◆ Describe business activities
- ◆ Five basic processes
  - Define the Work
  - Design the Staffing Solution
  - Fill the Positions
  - Define the Project Approach
  - Monitor and Control
- ◆ SRU processes integrate the Project Management, Engineering, and Support Process Areas (PAs)

## Interpreting Key Terms in the Model

- ◆ Project  ◆ Funding period
- ◆ System/Product  ◆ Staffing Solution
- ◆ Product Components  ◆ Staff Member with specific skills
- ◆ Functional Architecture  ◆ Service Architecture
- ◆ Interface Requirements  ◆ Requirements for Interfaces with Customer, other Teams, and Other Staff Members
- ◆ Technical Data Package  ◆ Skills, Certifications, and Clearances

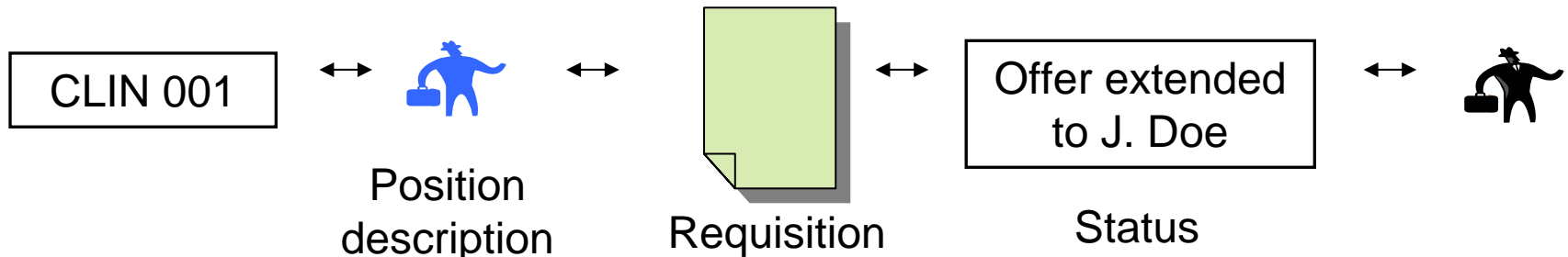
# Requirements Development

- ◆ Customer Requirements and Expectations
  - Staffing number with specified skill sets
  - Service Level Agreements (SLAs)
  - Services to be performed
  - Staffing Constraints
- ◆ Con ops and functional architecture
  - Description of services, relationships and interfaces
  - Environment - multiple contractors, shifts, travel
- ◆ Analysis of requirements
  - Necessary and sufficient?
  - Balance (cost and workload variability)
- ◆ High interaction with other PAs
  - Technical Solution
  - Validation



# Requirements Management

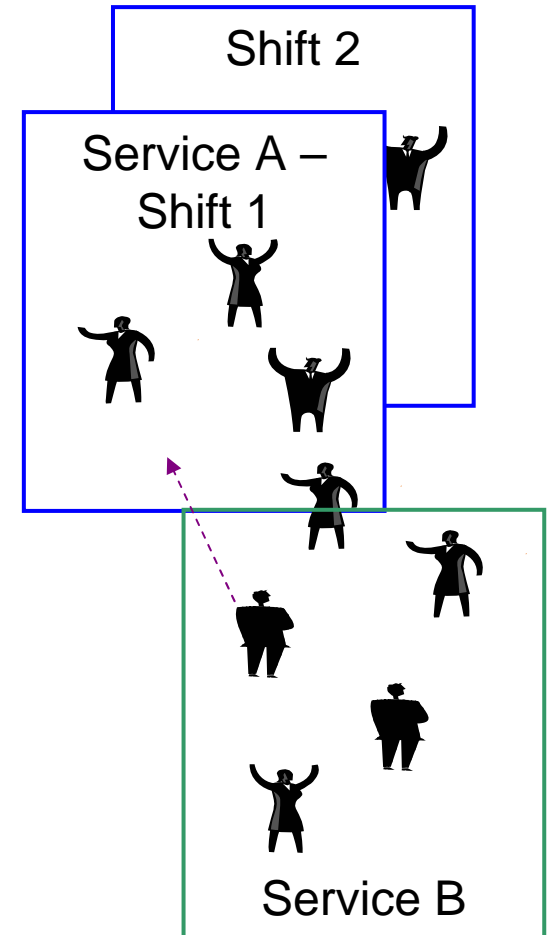
- ◆ Requirements include
  - Customer requirements – staff numbers and skills, SLAs
  - Derived requirements – based on design of staffing solution, validation activities – may include non-staff resources
- ◆ Requirements traceability matrix maps requirements to individuals
- ◆ New or changed requirements for staff are analyzed using the Requirements Traceability matrix
  - Reassignment of existing staff
  - New hire requisitions (may change based upon experience)





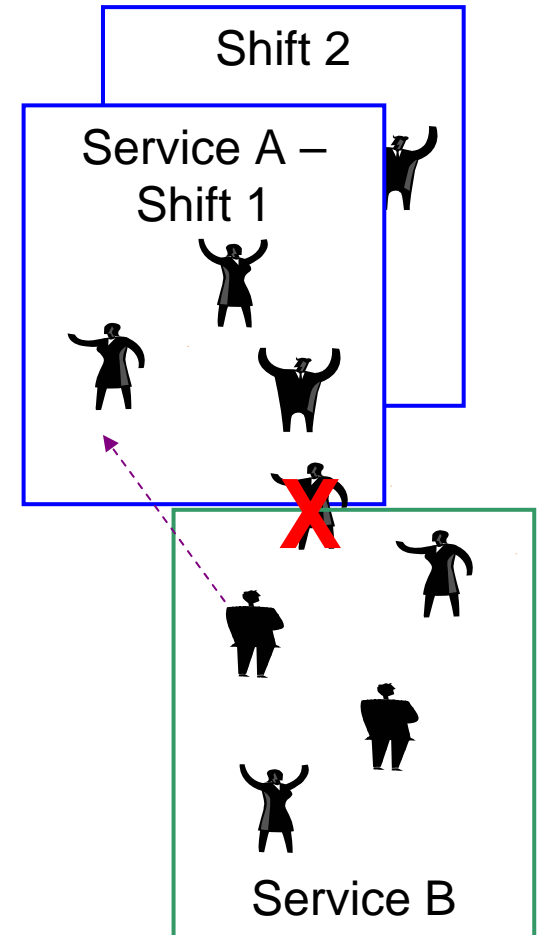
# Technical Solution

- ◆ Design of staffing has two perspectives
  - Individual staff – skill, experience level
  - Total staffing solutions
- ◆ Design factors
  - Position to skill match – primary and backup
  - Positions may be mapped to multiple requirements
  - Shift schedules – overlap and rotation alternatives
  - Presence – on-site, remote, pager
  - Emergency procedures
- ◆ Non-staff resources may be part of design, e.g. tools
- ◆ When applied
  - Initial
  - Based on validation results - workload variation, additional skills
  - Attrition
  - Perceived future trends



## Technical Solution (cont.)

- ◆ Implementation involves acquisition of resources
  - Transfers
  - Hiring
  - Supplier Agreement Management applies -
    - Staff are considered product components
    - Non-staff resources, e.g. tools, pagers
- ◆ Design constraints
  - LOE limitations
  - Contract specifications



# Product Integration

- ◆ Product Integration strategy – staged integration of staff and other resources into customer environment
  - Over time
  - Across shifts
  - Across geographical locations
- ◆ Readiness of products for integration – ability to bring staff on board
- ◆ Interface specifications – part of the communications plan
- ◆ Assemble the product components – staff members
  - Orientation and security briefings
  - Mentor assigned
- ◆ Evaluation of assembled product
  - Verification of skill level
  - Non-staff support resources (e.g. pagers, or phone call transfers)



# Verification

- ◆ Verification - Staffing satisfies contract requirements – what the customer states is required
  - Staffing levels
  - Cost
  - SLAs
- ◆ Defect analysis and resolution
  - Upgrading staff skills
  - Reassignment or scheduling
- ◆ Peer reviews
  - Mostly performed on plans
  - Internal transfers – assignments panel
  - Staffing candidates – candidate evaluation form

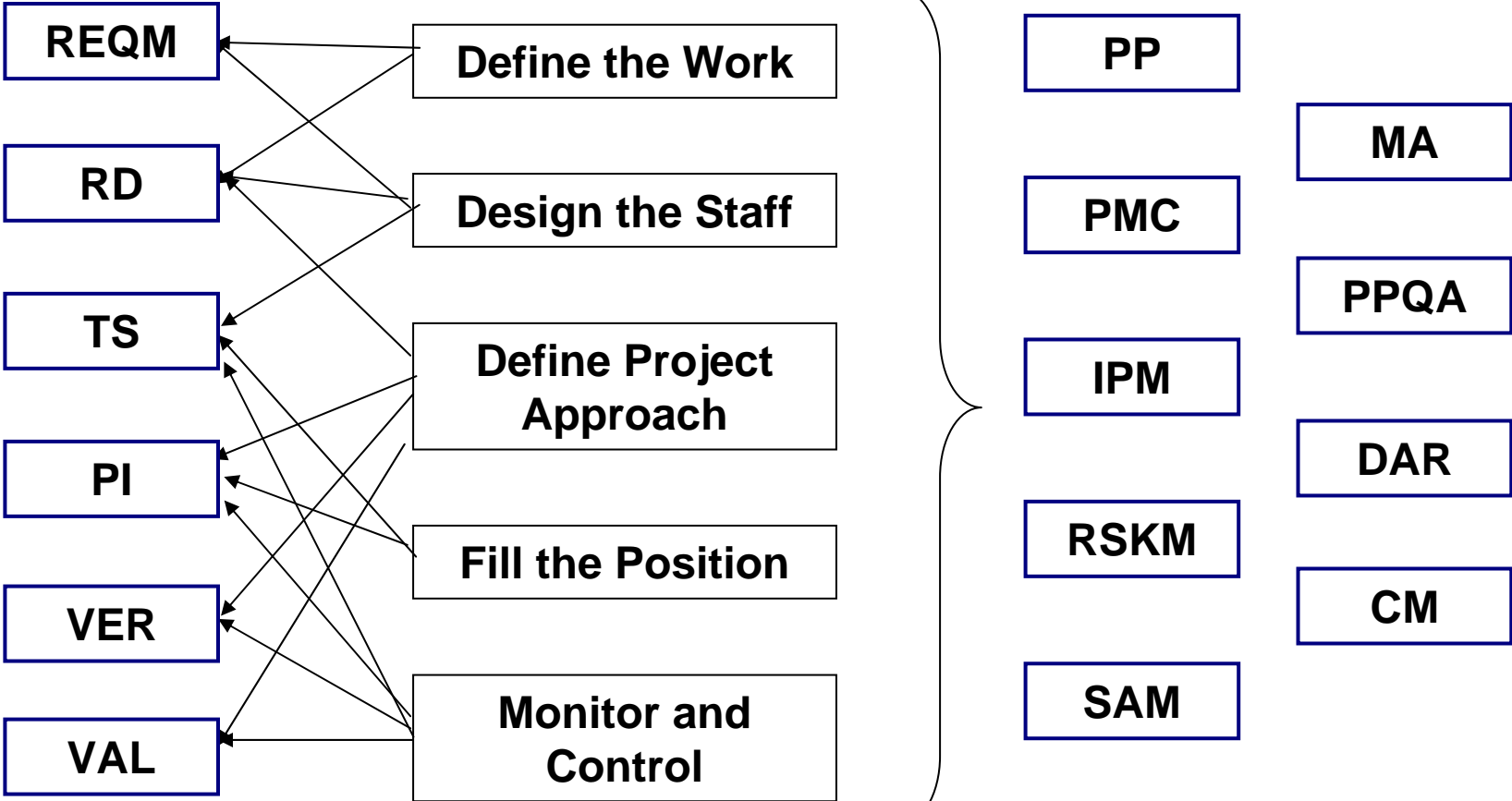


# Validation

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- ◆ Satisfaction of customer expectations – what we determine is needed beyond customer stated requirements
- ◆ Probably the most important Process Area in a services environment
  - Ultimate project success – ability to retain staff
  - Growth in business with customer
- ◆ Are the contract requirements sufficient for success?
  - Can SLAs be met with current staffing solution?
  - Is staffing design sustainable?
  - Plan for Award/Incentive fee
- ◆ Performed throughout the contract period – at least monthly
- ◆ May result in
  - Redesigning the staffing solution
  - Incorporating non-staff resources into design

# Mapping Our Process to CMMI



# Summary

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- ◆ Engineering Process Areas add rigor to designing and managing staff solutions in an LOE Services environment
- ◆ Benefits of Integrating the Engineering and Project Management Process Areas above the line
  - Relieved confusion with similarly name below the line processes
  - Led to a business driven process architecture
  - Opened new opportunities for business driven improvements beyond project teams – recruiting, finance and planning
- ◆ Engineering Process Areas with the greatest impact to business
  - Technical Solution – ability to design complex staffing solutions
  - Validation – evaluate and improve staffing solutions
- ◆ Appraisal challenges
  - Quality Assurance is performed on SRU processes
  - Appraisal requires Process Area goal satisfaction

## Contact Information

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