...make it happen
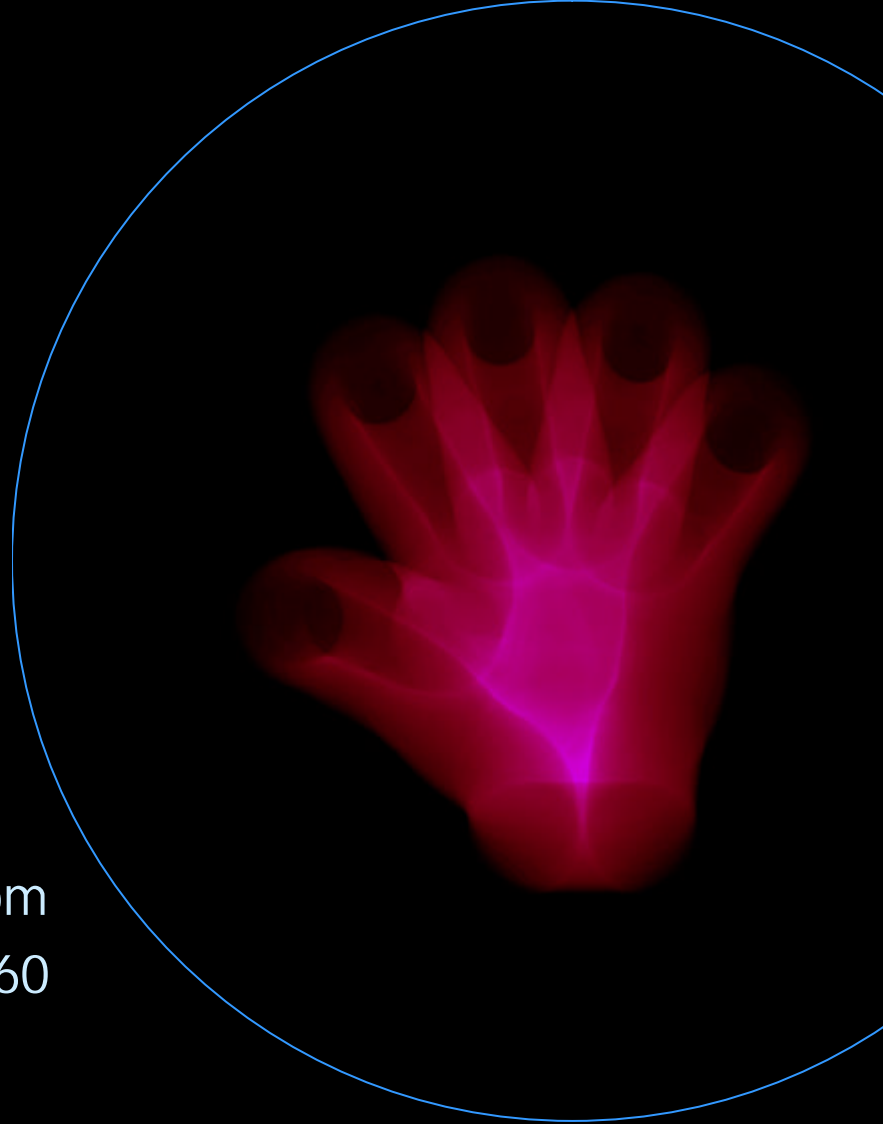
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Phone no: (+44) 7971 222160

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Achieving CMM Level 2&3 with RUP

Agenda

- Overview of Software Capability Maturity Model (CMM) Levels 2 & 3
- Overview of the Rational Unified Process (RUP)
- How does RUP support CMM Level 2?
- How does RUP support CMM Level 3?
- Summary – Where are the Gaps?

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About Me

- Ortia - Managing Consultant
  - SEI Approved CMM Lead Assessor
  - Almost 10 years experience of instituting Quality and Process Improvement programmes
  - Large & small scale programmes across multi-national companies

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Ortia provides a range of consulting and mentoring services including:

- RUP Implementation
- SEI Approved CMM Assessments
- Competence Management
- Process Improvement Programmes

Helping your business operate better, faster and cheaper through the practical application of management, finance and technology best practices

If you're doing SPI..know who your friends are!

- CMM is a journey..know who your friends are!!

Who

When

What

Why

Where

How
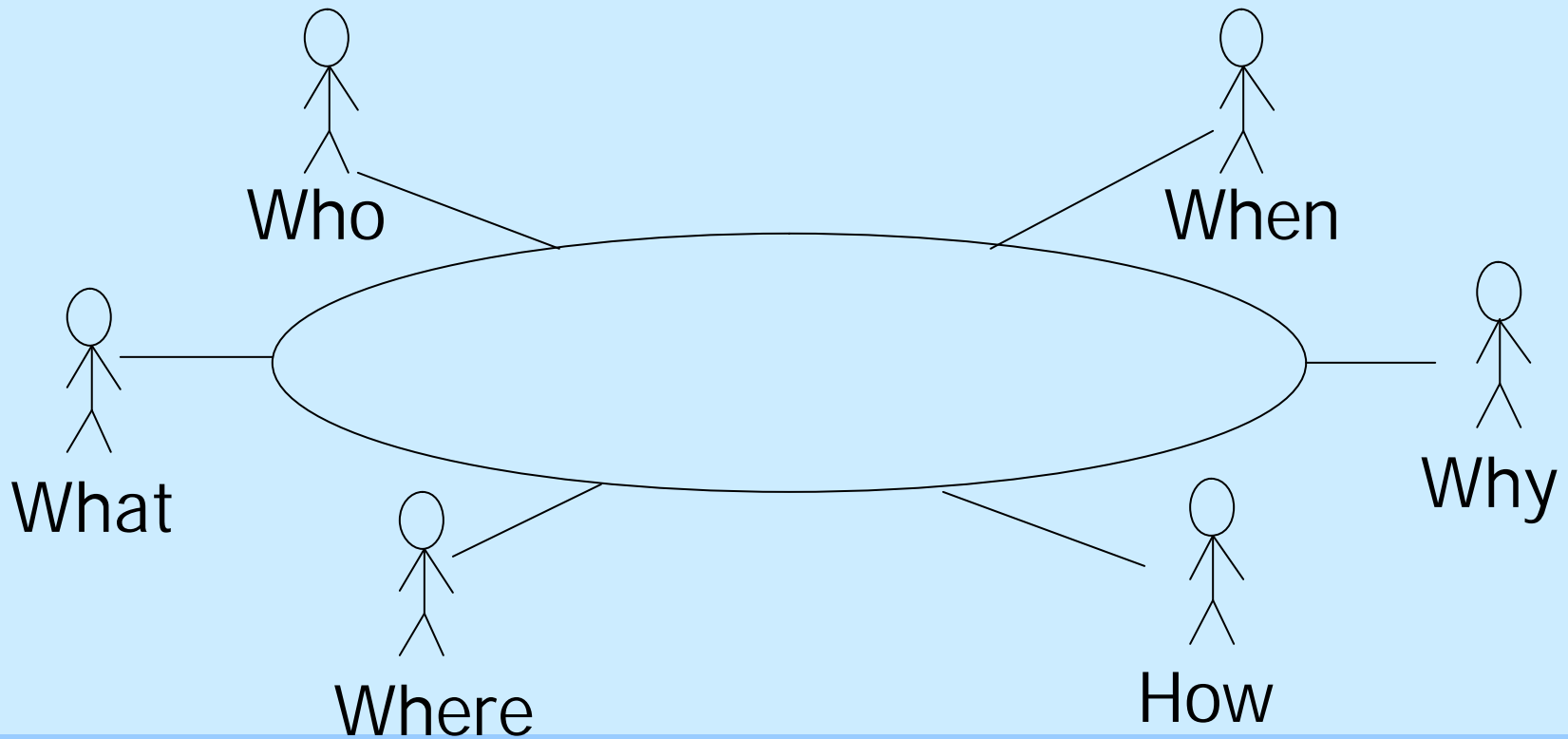
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Can you reach CMM Level 3 using RUP alone?

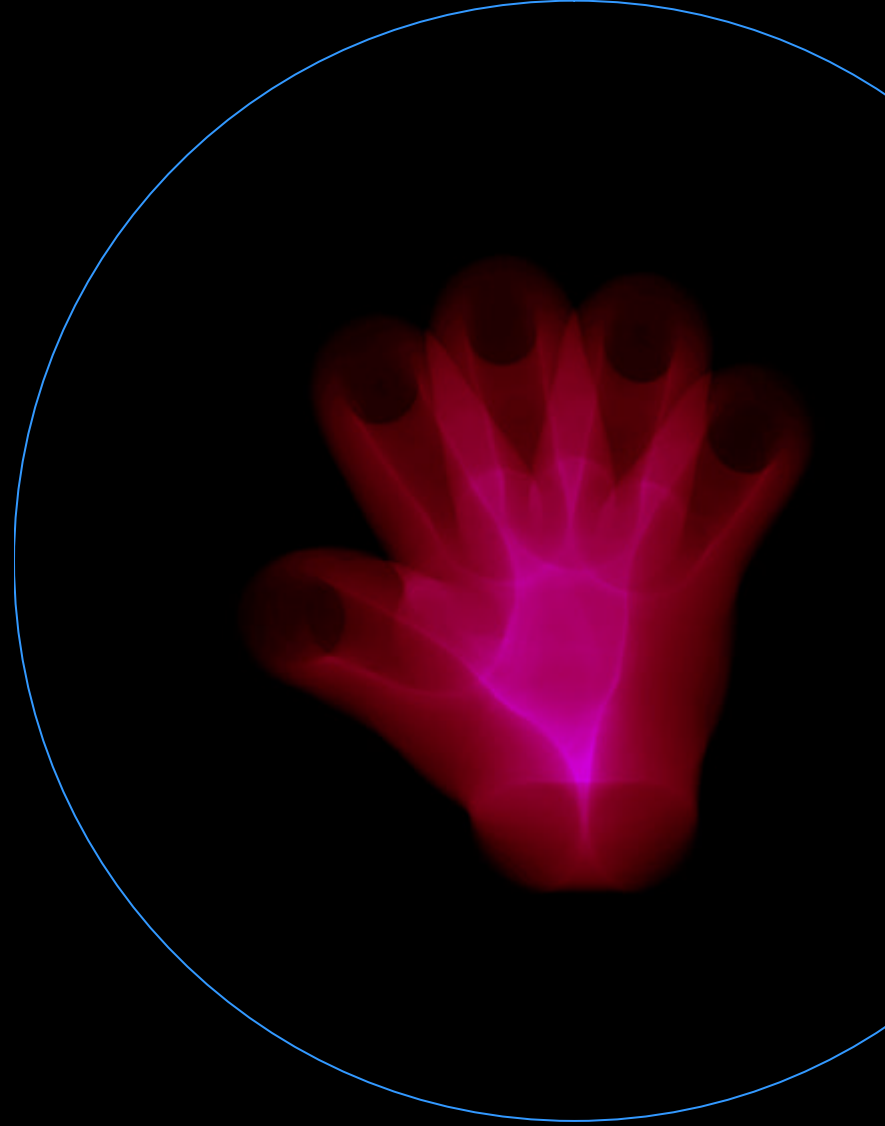*No, but…..*

RUP can provided a very significant enabler

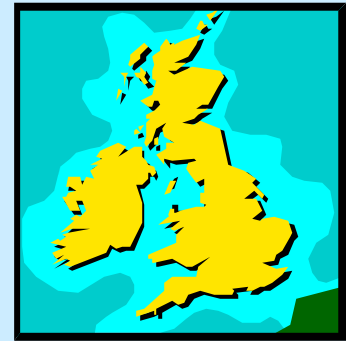*However it is deficient in key areas*

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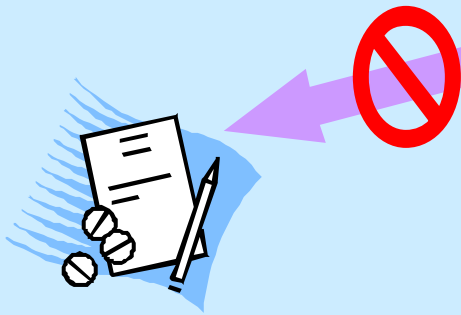Overview of the CMM Levels 2 & 3

What is the CMM?

Model for Improving SW Capability

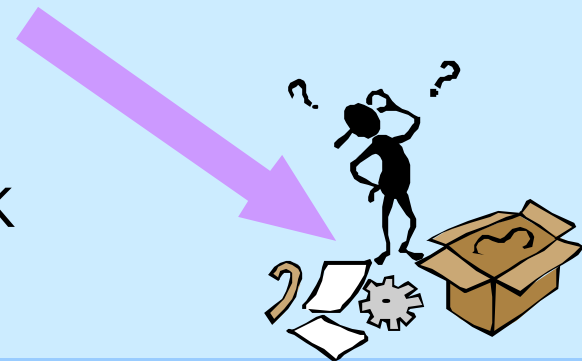Route map of improvement

Framework

Not Prescriptive

What needs to be done

Overview of the CMM Structure

Level 5 – Optimising
Defect Prevention
Technology Change Management
Process Change Management

Level 4 – Managed
Quantitative Process Management
Software Quality Management

Level 3 – Defined
Organisation Process Focus
Organisation Process Definition
Training Program
Integrated Software Management
Software Product Engineering
Intergroup Coordination
Peer Reviews

Level 2 – Repeatable
Requirements Management
Software Project Planning
Software Project Tracking & Oversight
Software Subcontract Management
Software Quality Assurance
Software Configuration Management

Level 1 - Initial

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Internal Structure of the Maturity Levels

Maturity Levels

Indicate — Process Capability

Contain — Key Process Areas

Achieve — Goals

Organised by — Common Features

Address — Implementation & Institutionalisation

Contain — Key Practices

Describe — Activities or Infrastructure
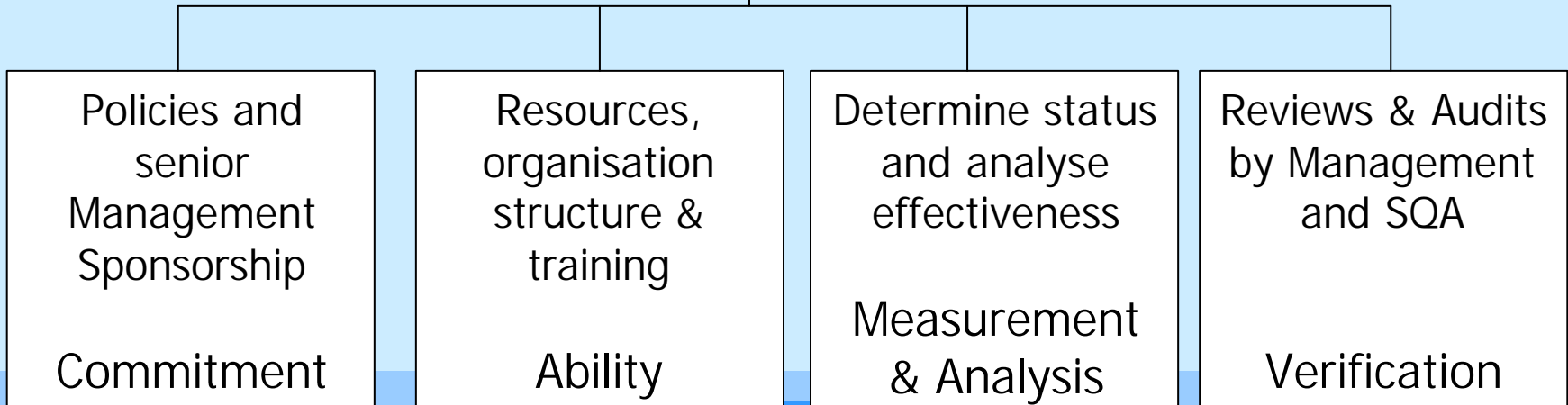
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©Ortia 2003
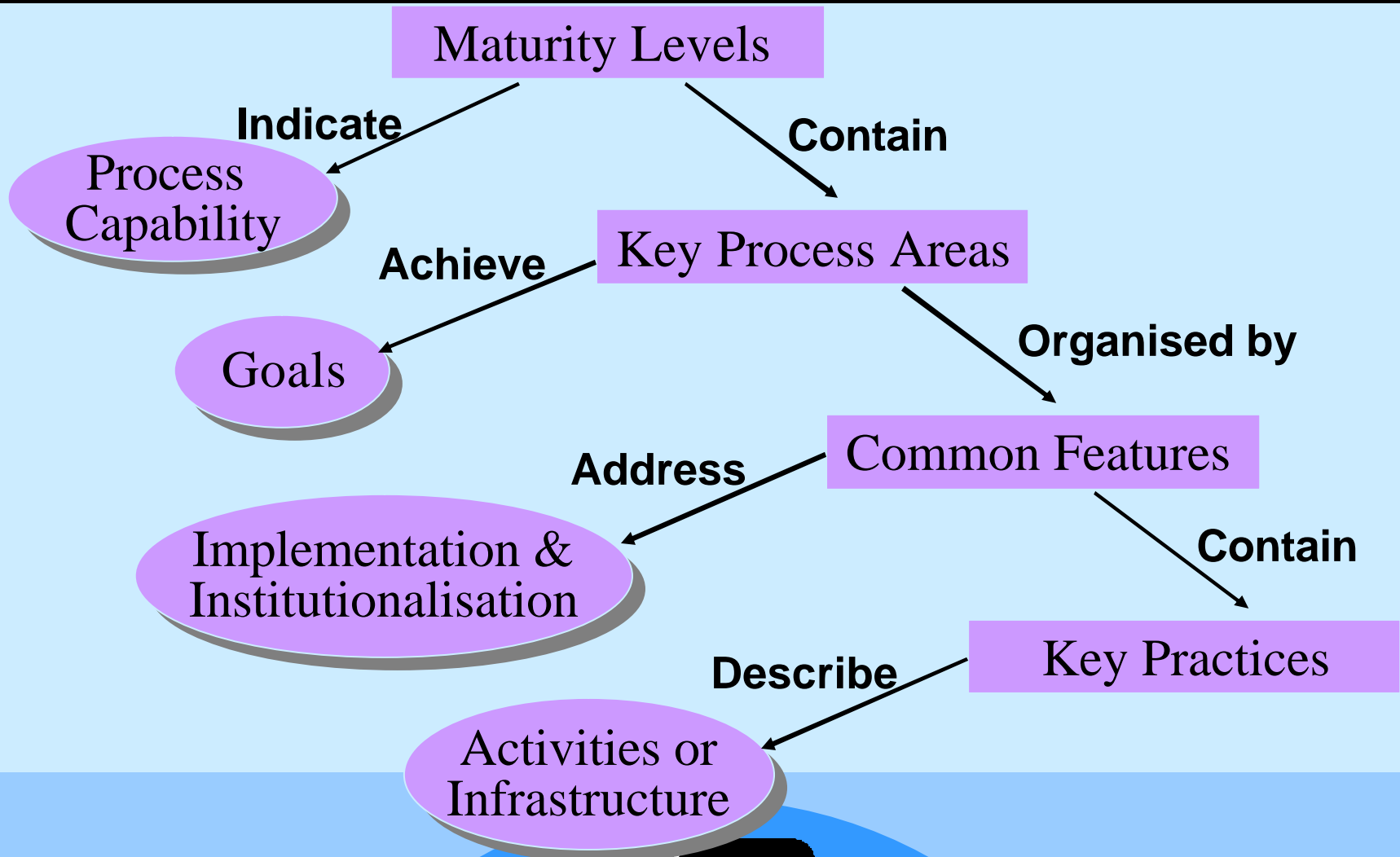
Common Features of the CMM

Goals

Activities

- Establish Plans
- Perform Work
- Track Work
- Take Corrective Action

Institutionalisation – ensures actions become second nature

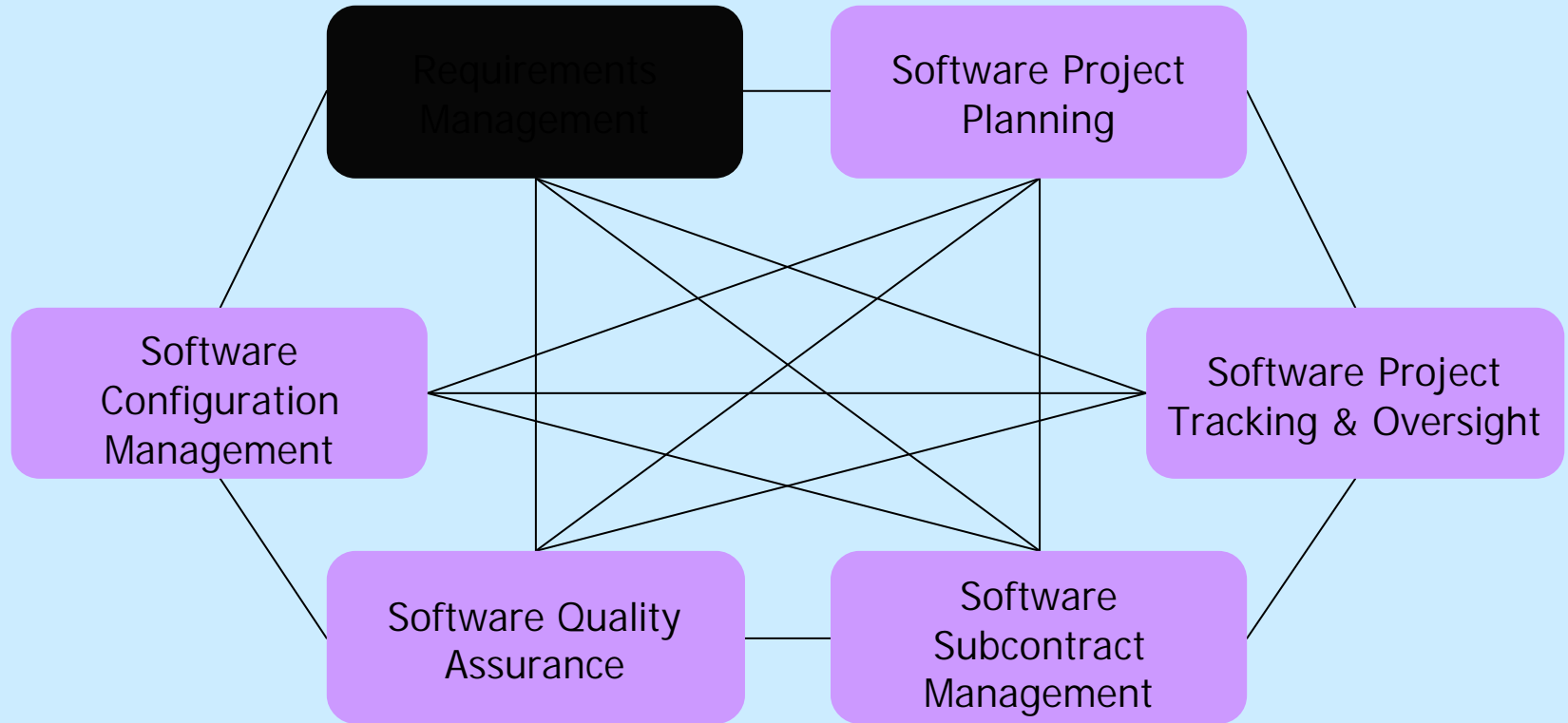| Policies and senior Management Sponsorship	Resources, organisation structure & training	Determine status and analyse effectiveness	Reviews & Audits by Management and SQA
Commitment	Ability	Measurement & Analysis	Verification

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Key Level 2 Characteristics

- Effective Software Project Management
- Project Management Procedures documented and followed
- Organisational Policies Guide Projects
- Previous Successful Practices Can be Repeated

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CMM Level 2 KPAs

Requirements Management

Software Project Planning

Software Configuration Management

Software Project Tracking & Oversight

Software Quality Assurance
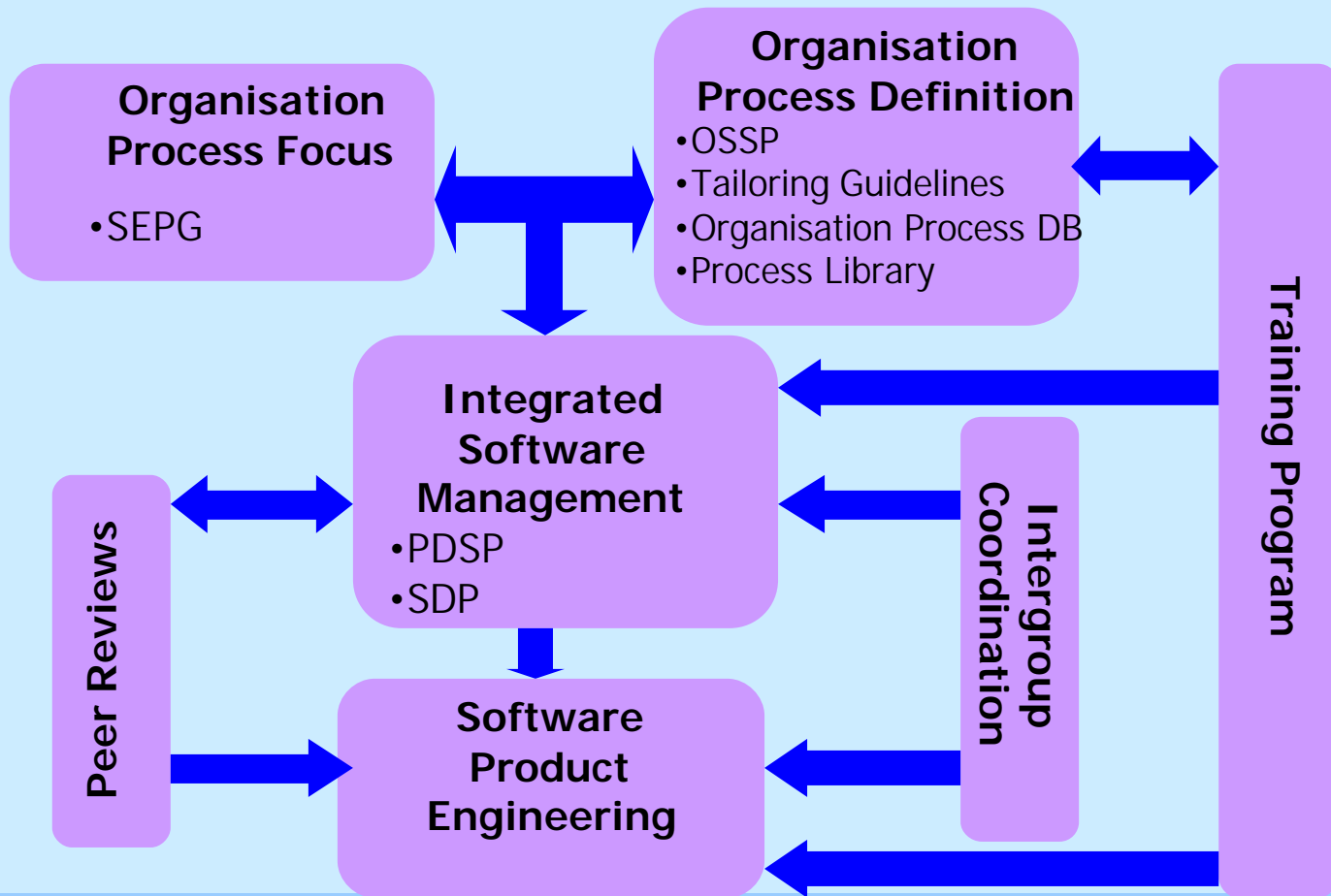
Software Subcontract Management
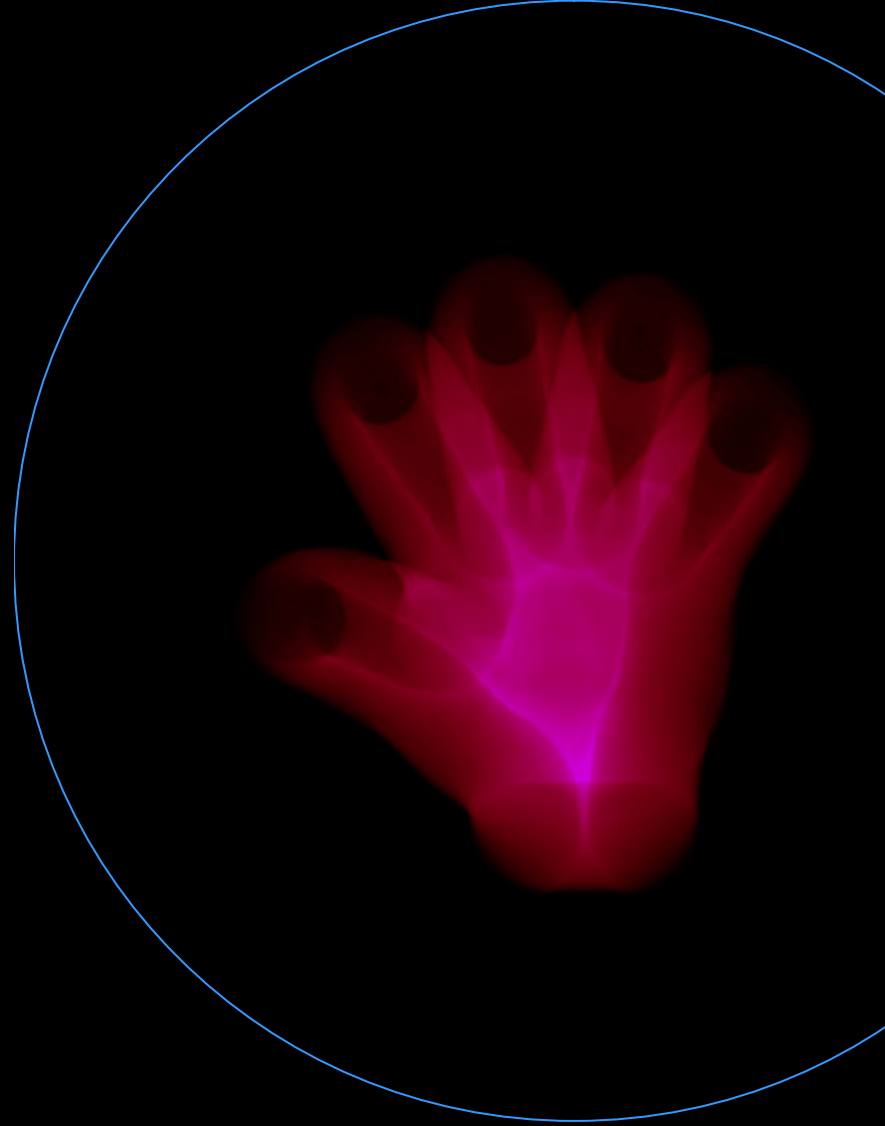
Key Level 3 Characteristics

- Organisationally based approach to managing processes
- Communication and governance exists across projects
- Required staff competence is assured
- Standardisation provides individual flexibility
- Process changes driven by empirical data

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CMM Level 3 KPAs

Organisation Process Focus

- SEPG

Organisation Process Definition

- OSSP
- Tailoring Guidelines
- Organisation Process DB
- Process Library

Training Program

Integrated Software Management

- PDSP
- SDP

Peer Reviews

Intergroup Coordination

Software Product Engineering

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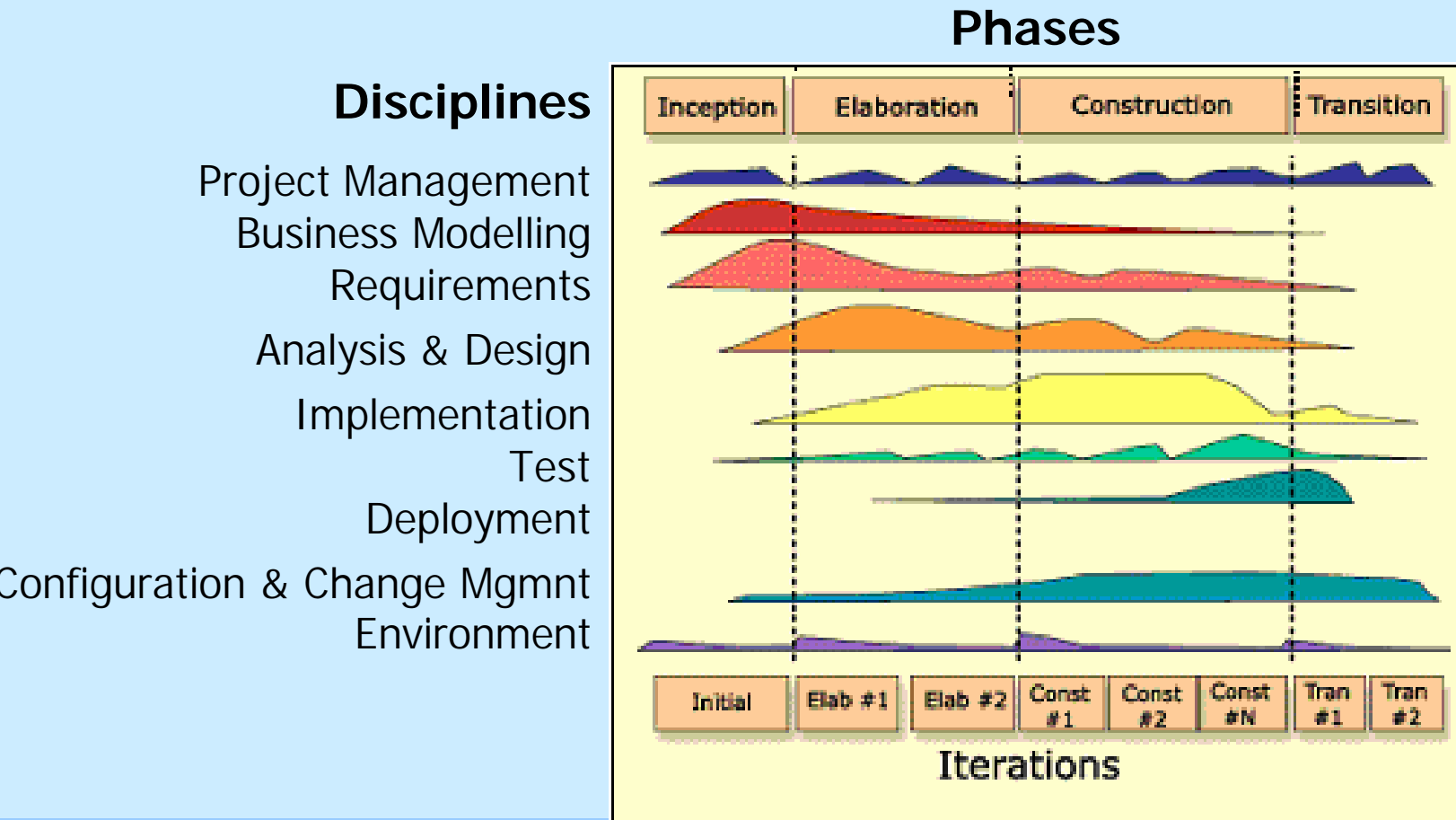...make it happen

Overview of the RUP

What is RUP?

- A Body of Knowledge - a Repository of Best Practice
- The RUP is a Software Engineering Process Framework
  - Risk driven
  - An Iterative approach to Product Development
  - Use-Case driven
  - Visual approach to modelling processes
  - Identifies Roles, Activities, Artifacts and Workflows
    - i.e. Who, How, What and When

The CMM provides a route map (the what) for process improvement (project and organisation)
The RUP provides one variation of how to achieve it! (the how)

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Key Principles of RUP

Phases

Disciplines

	Inception	Elaboration	Construction	Transition

Project Management
Business Modelling
Requirements
Analysis & Design
Implementation
Test
Deployment
Configuration & Change Mgmnt
Environment

Initial	Elab #1	Elab #2	Const #1	Const #2	Const #N	Tran #1	Tran #2

Iterations

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Iterative Approach

- How do you eat an elephant?
- One Bite at a time!

- Breakdown waterfall-type approach into a succession of small iterations <careful>
- Each Iteration
  - Address some requirements (baseline)
  - Design to meet those requirements
  - Implement them
  - Validate it
- Addresses Risks Early
- Builds increasing product stability with each iteration

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Goals of The Phases

- Inception
  - Understanding the overall requirements
  - Determining the scope of the development effort
- Elaboration
  - Focus is still on requirements
  - But some software design & implementation
  - Elaboration iterations produce executable production quality architecture
  - Mitigating risks
- Construction
  - Focus on design and implementation
  - Evolve architecture into first operational product
- Transition
  - Focus on ensuring the right level of quality
  - Produce and deliver the product

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RUP Needs Tailoring!

- The RUP provides a framework - however, each individual process environment is slightly different
- "One size fits all" will fail!
- The RUP must be tailored to fit your individual situation
- "Out of the box" RUP assumes
  - Single Project development
  - This is a new product/greenfield development
  - The process is use case driven
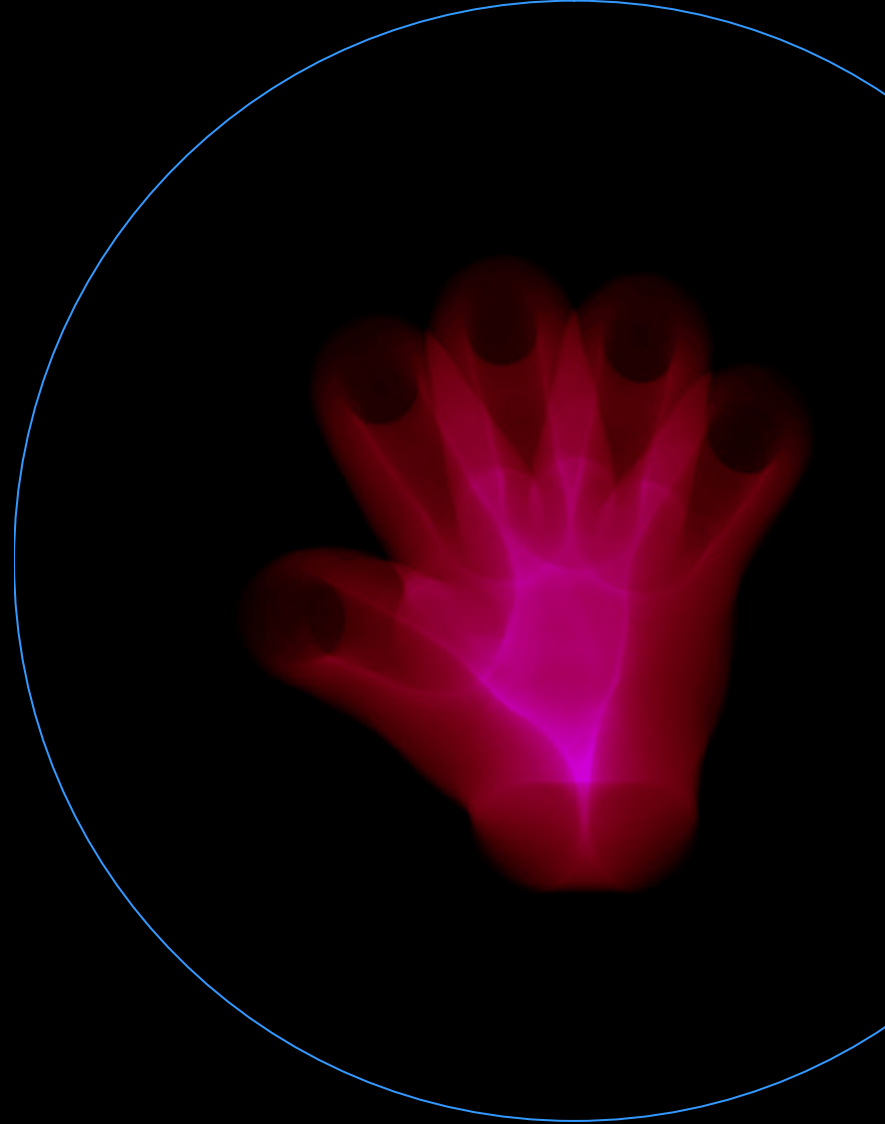- But Rational are working on this..(I hope!)

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Caveat Emptor

This assessment has been completed assuming a complete implementation of the all core RUP activities
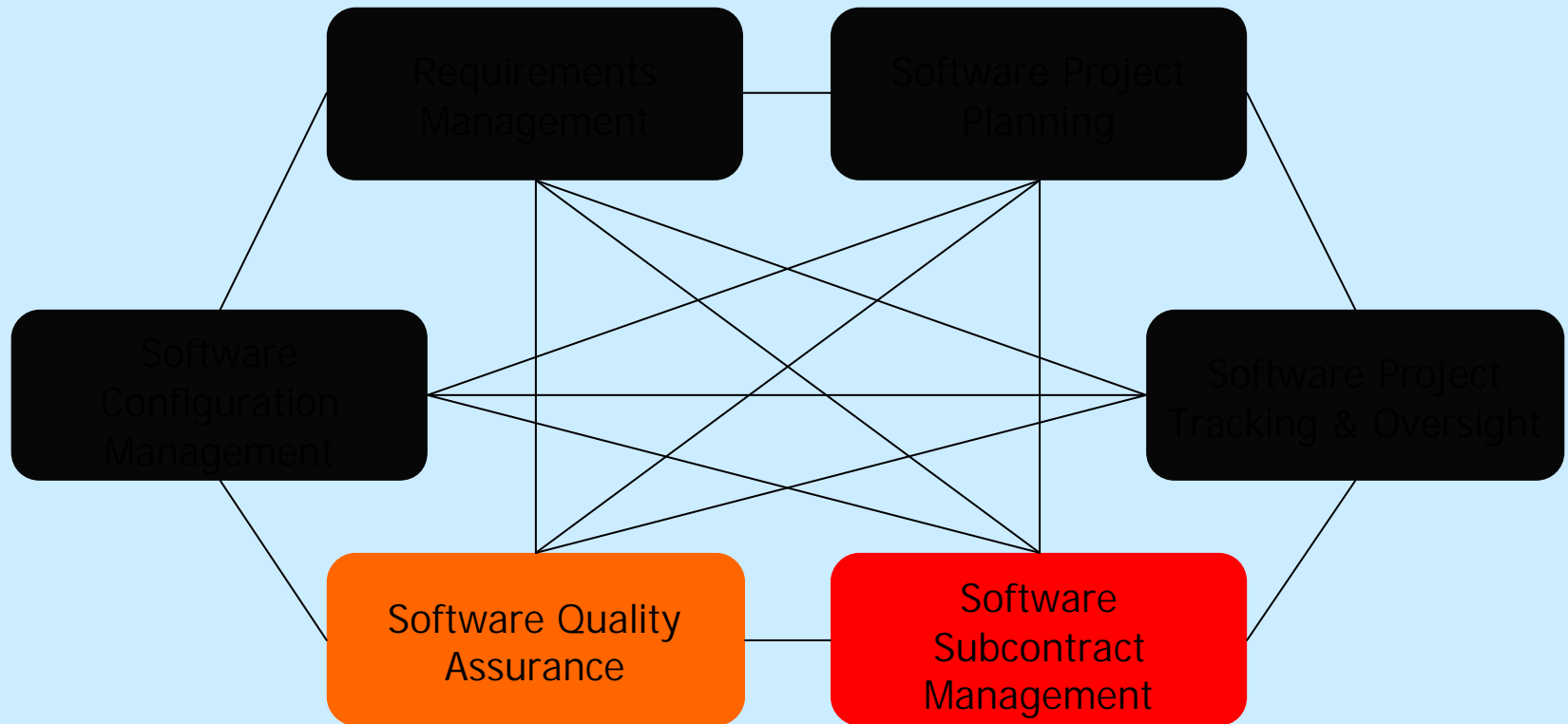
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RUP and Level 2 KPAs

CMM Level 2 KPAs

Requirements Management

Software Project Planning

Software Configuration Management

Software Project Tracking & Oversight

Software Quality Assurance

Software Subcontract Management

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RUP Support for CMM Level 2

- Detailed workflows support many key practices
  - In particular in RM and SCM
- Iterative Approach gives better handle on managing requirements and plans as the project develops
- Use Cases with Scenarios provide;
  - A useful lever on size metrics
  - Indication of how requirements map to product functionality
- RUP provides templates for some important process artifacts
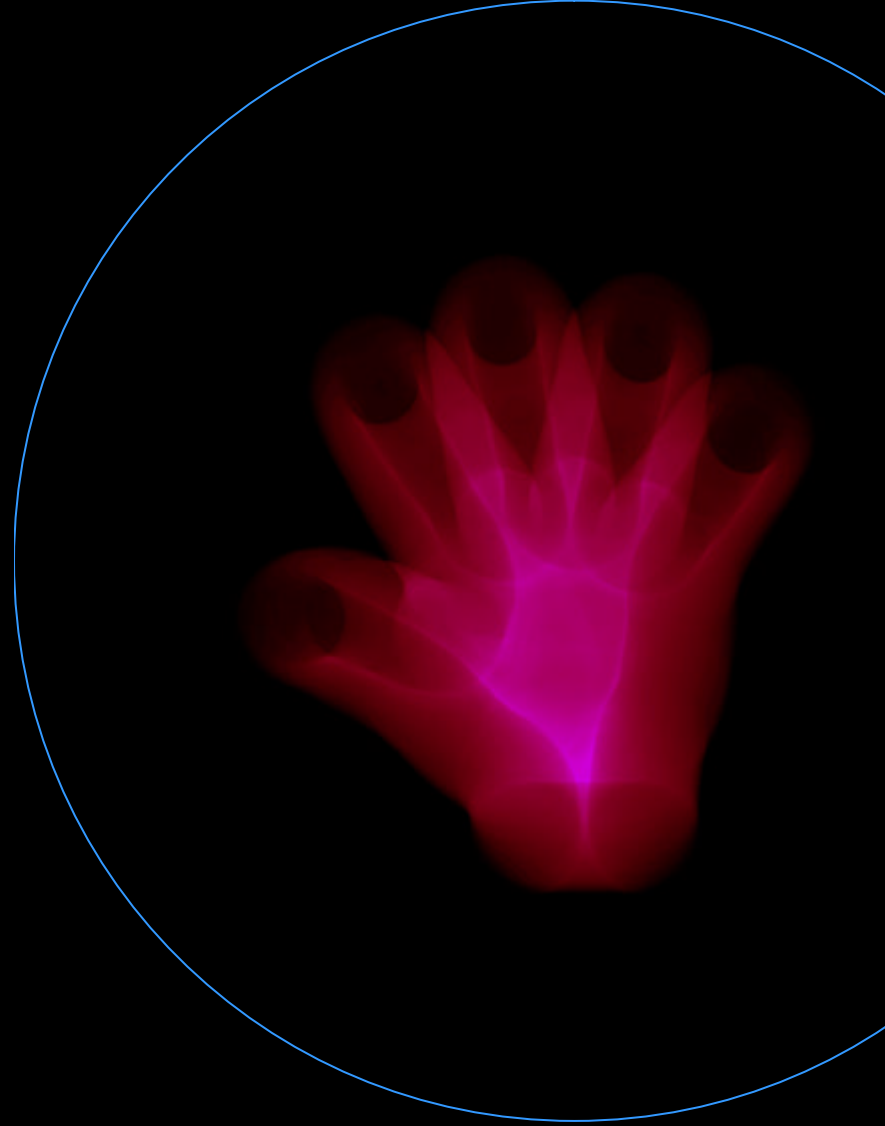 - E.g. SDP & SCM Plan

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Gaps with RUP and CMM Level 2

- **Software Quality Assurance**
  - There are two distinct components of SQA
    - Product Verification
    - Process Verification
  - RUP does a lot on test, which is geared to Product Verification
  - But RUP does little on Process Verification or Who should do it
- **Software Subcontract Management**
  - RUP does not deal with Subcontract Selection Process
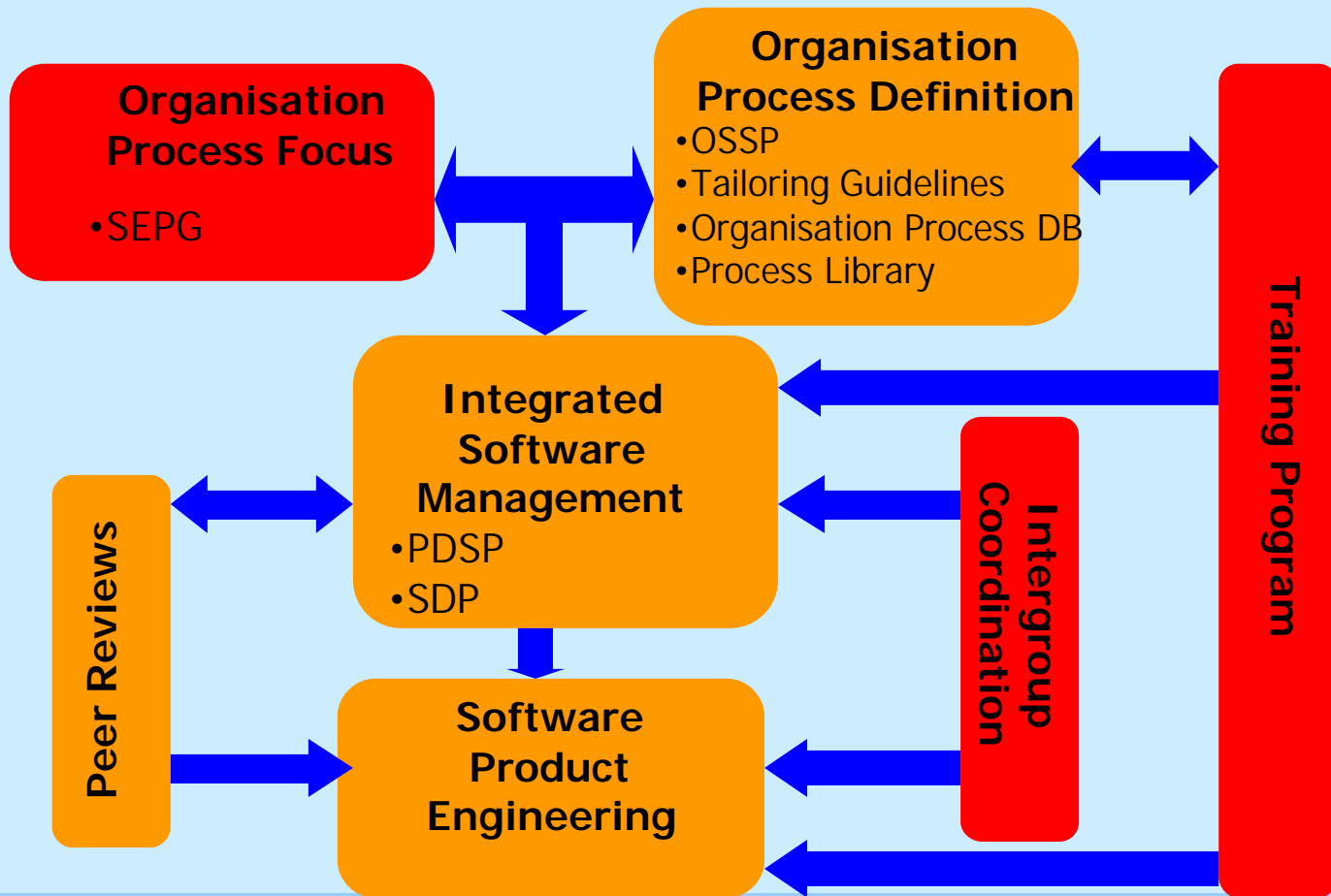 - RUP does not deal with managing the interface between the Prime and Subcontract during the project

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RUP and Level 3 KPAs

CMM Level 3 KPAs

Organisation Process Focus

•SEPG

Organisation Process Definition
•OSSP
•Tailoring Guidelines
•Organisation Process DB
•Process Library

Training Program

Integrated Software Management
•PDSP
•SDP

Peer Reviews

Intergroup Coordination

Software Product Engineering

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RUP Support for CMM Level 3

- RUP provides a good basis for the Organisational Standard Software Process
- With all the white papers, templates, etc. RUP provides a good basis for the Process Library
- Reviews are incorporated into the workflows
  - E.g. Requirements, Design and Code Reviews
- RUP must be tailored
- RUP provides much support on performing the engineering and management activities
 - (i.e. helps towards SPE)

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Gaps with RUP and CMM Level 3

- The Software Engineering Process Group SEPG and managing process development organisationally is missing from RUP
- RUP doesn't provide the organisational specific tailoring guidelines
- RUP specifies the metrics are captured but it does not fulfil the concept of a CMM level 3 process database
- The aspect of developing organisational competency through a training programme is missing from RUP
- RUP has no specific means of managing intergroup coordination
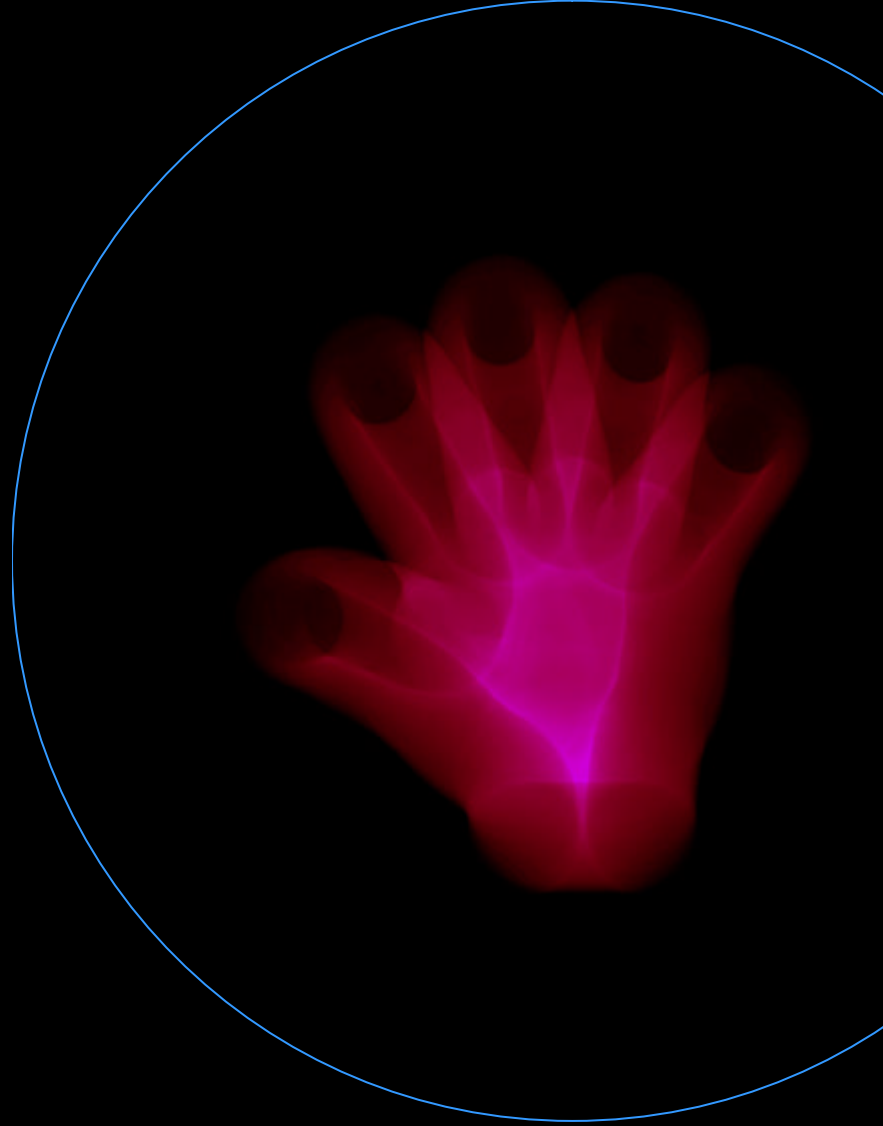- RUP does not cover Programme Management

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The dominos fall without an OSSP
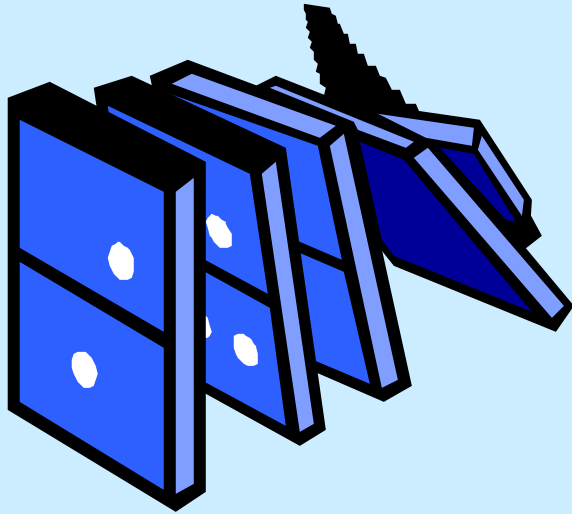
- The OSSP is essential to CMM Level 3
- Without it full implementation of the level 3 KPAs is not possible
- The RUP provides a significant starting point in developing your OSSP and your capability to address CMM Level 3

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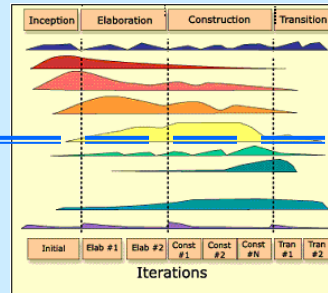Ortia

Gaps in RUP at each level

Level 3

Software Engineering Process Group

Competence Program (Baselining & Assurance)

Organisational Process Tailoring Guidelines

Inter-Group Comms (Program Management, Governance)

RUP

Level 2

½ of SQA

Subcontract Management

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Summary

- CMM provides the what for a Software Process Improvement programme
- RUP provides some (but a significant amount) of the what for CMM Level 2&3 requirements
- RUP does need tailoring by those who understand it
- Get to know the 6 wise men!!
- The gaps can be filled by using best practice from industry

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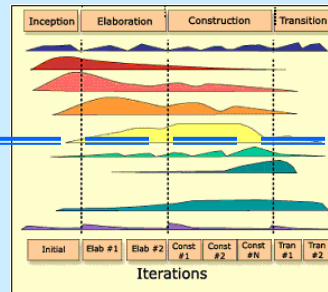# But within a real organisation .... For example

Level 3

Software Engineering Process Group

Competence Program (Baselining & Assurance)

Organisational Process Tailoring Guidelines

Inter-Group Comms (Program Management, Governance)

RUP

Inception	Elaboration	Construction	Transition

Iterations

| Initial | Elab #1 | Elab #2 | Const #1 | Const #2 | Const #N | Tran #1 | Tran #2 |

Level 2

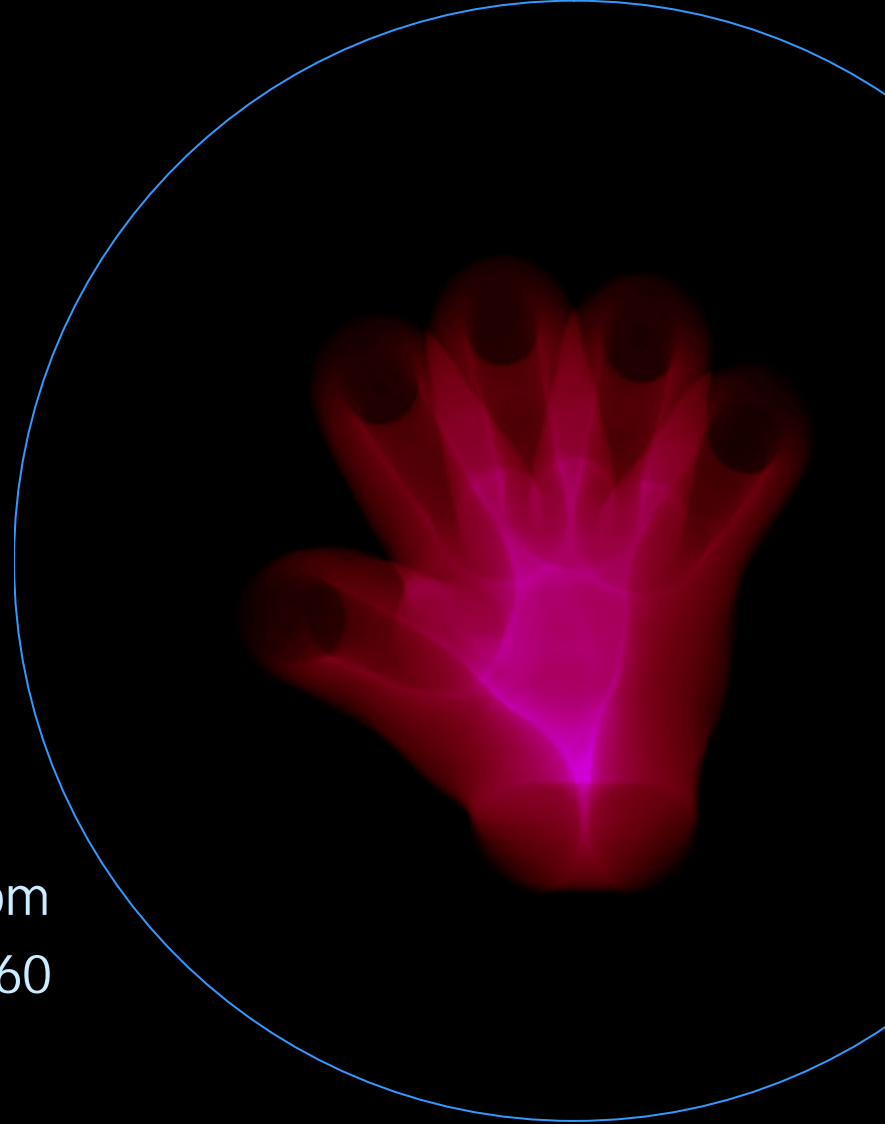½ of SQA

Subcontract Management

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RUP can provide a significant enabler to reach CMM Levels 2 & 3

however it is deficient in key areas

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