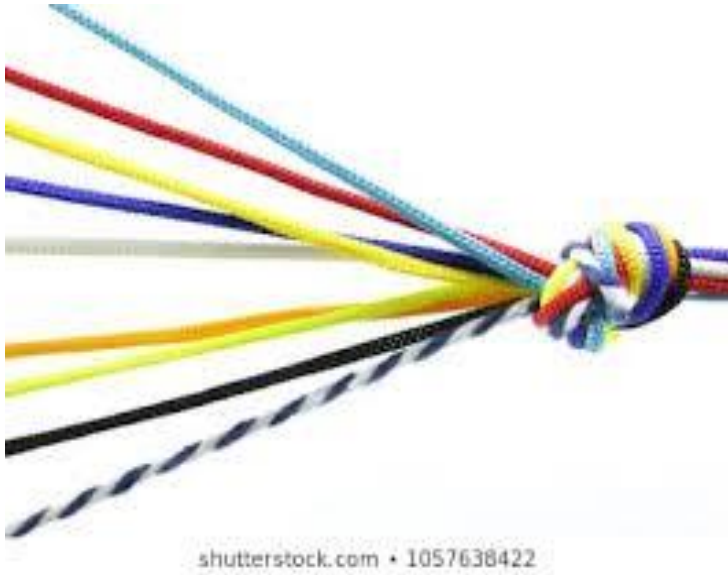


Round Trip Review Process Improvement



Said Belhadj Software System Engineer,
MM-MIS, MBA
Huntsville AL

Round Trip Review Process Improvement from the Discipline(Enterprise View) to the Activity (Project View)

A Gap in the Review: Root Cause of accidents

- AECL 's Therac 25 Radiation Machine involved in six radiation overdose accidents.
- First Root Cause cited : AECL did not have the software code independently reviewed. <https://en.wikipedia.org/wiki/Therac-25>
- “Fatal Defect” book cites the UI Code was in one man’s head



```
PATIENT NAME: John
TREATMENT MODE: FEA          BEAM TYPE: X          ENERGY (keV): 10

UNIT HATT/MINUTE          ACTUAL          PRESCRIBED
ROTATION UNITS           300.000000     300.000000
TIME (MIN)                0.270000      0.270000

GANTRY ROTATION (DEG)    0.000000      0.000000      VERIFIED
COLLIMATOR ROTATION (DEG) 300.000000    300.000000    VERIFIED
COLLIMATOR X (CM)        14.000000     14.000000     VERIFIED
COLLIMATOR Y (CM)        27.000000     27.000000     VERIFIED
WEDGE NUMBER             1.000000      1.000000      VERIFIED
ACCESSORY NUMBER         0.000000      0.000000      VERIFIED

DATE: 2002-04-14          SYSTEM: BEAM READY      OP.MODE = TREAT          AUTO
TIME: 11:00:00           TREAT: TREAT PAUSE     R-RAY                    170770
OPN ID: 030-0000p        REASON: OPERATOR       COMMAND: █
```

Software Industry relies heavily on Reviews

- Google, Facebook and Microsoft adopt reviews, at Microsoft developers actively practice code reviews (Process Aspects and Social Dynamics of Contemporary code Review IEEE)
- 50,000 Microsoft developers actively practice code reviews
- How much can the software safety critical learn from the software business critical ?

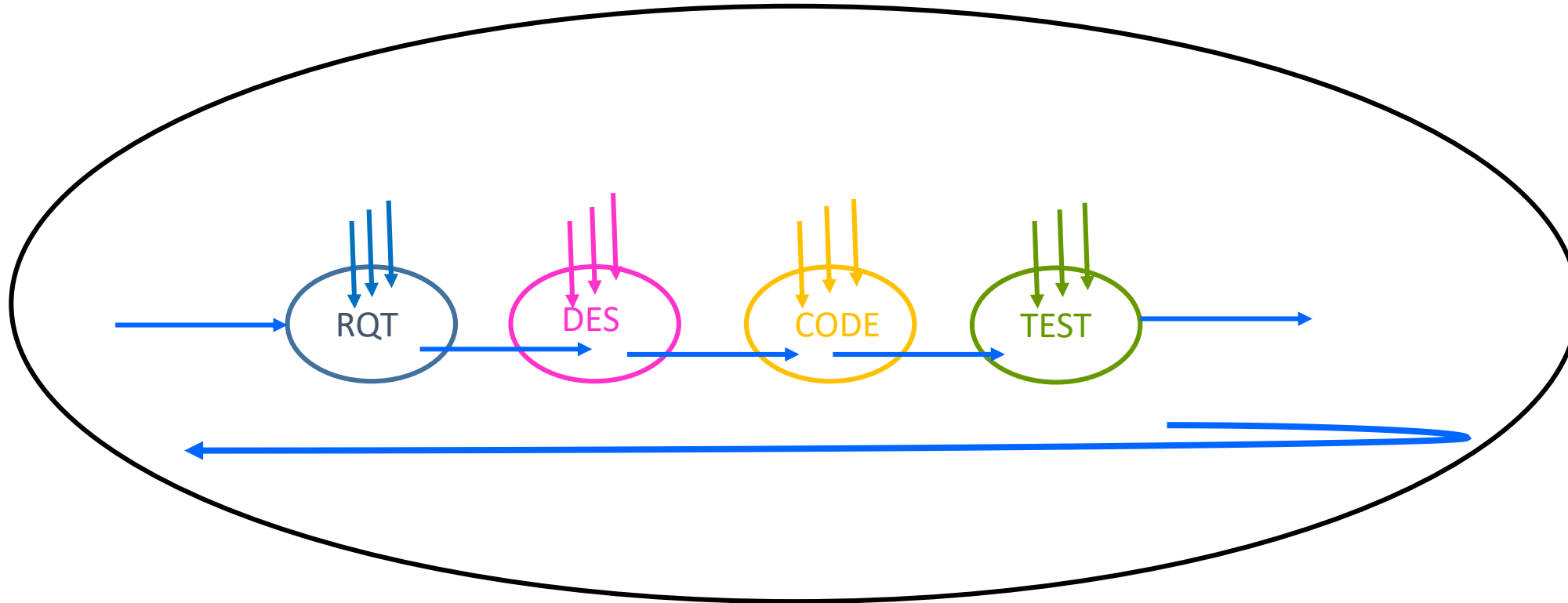
Review is a lower cost quality provider

- Reviews are lower-cost quality providers: “Code Review would have saved half the cost of fixing bugs” (Best Kept Secrets of Peer Code Review, J Cohen 2006)
- With small effort (i.e 10%) used in defect prevention activities (ie design and code reviews) almost one third of all defects could be removed --- The time required for testing was cut by 50% (IEEE The Personal Software Process: Experiences from Denmark)

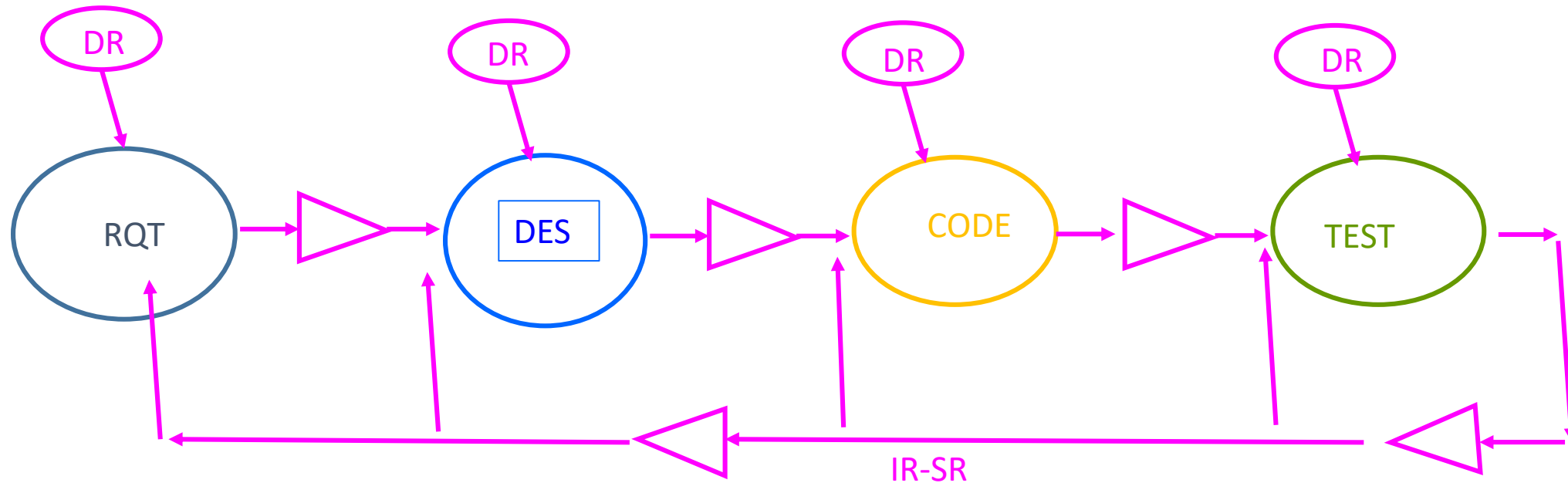
Improving, Reviewing, Evaluating The Review

- The Review activity/process needs to be reviewed as any other activity/process in the project life cycles and across projects
- The review process in the firma as any other is subjected to changes in workforce, in management and in technology?
- I believe that the Review Process become an Enterprise Discipline in its own right i.e. a concern and a focus at the programmatic/mid management level.
- I believe that the Review Process as any benefits from recent studies in Design Thinking or Artificial Intelligence and even Neurology
- This presentation will focus on the Review as a Discipline and Activity to benefit the whole Enterprise

Reviews As Project Quality Gates



Review Space, Single Loops, Double Loops

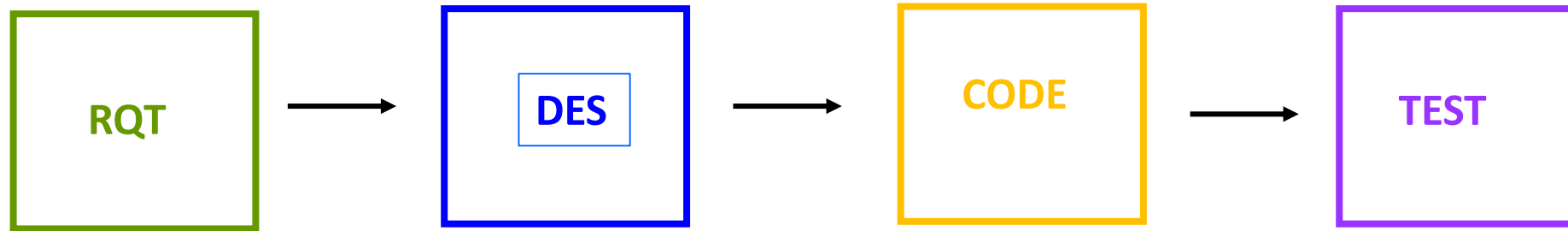


DR: Discipline Review

IR,SR: Inter-Discipline Review, System Review

Inspired from “single loop learning and double loop learning, developed by [Chris Argyris](#) and [Donald Schön](#)”

A project outside of the Review Space



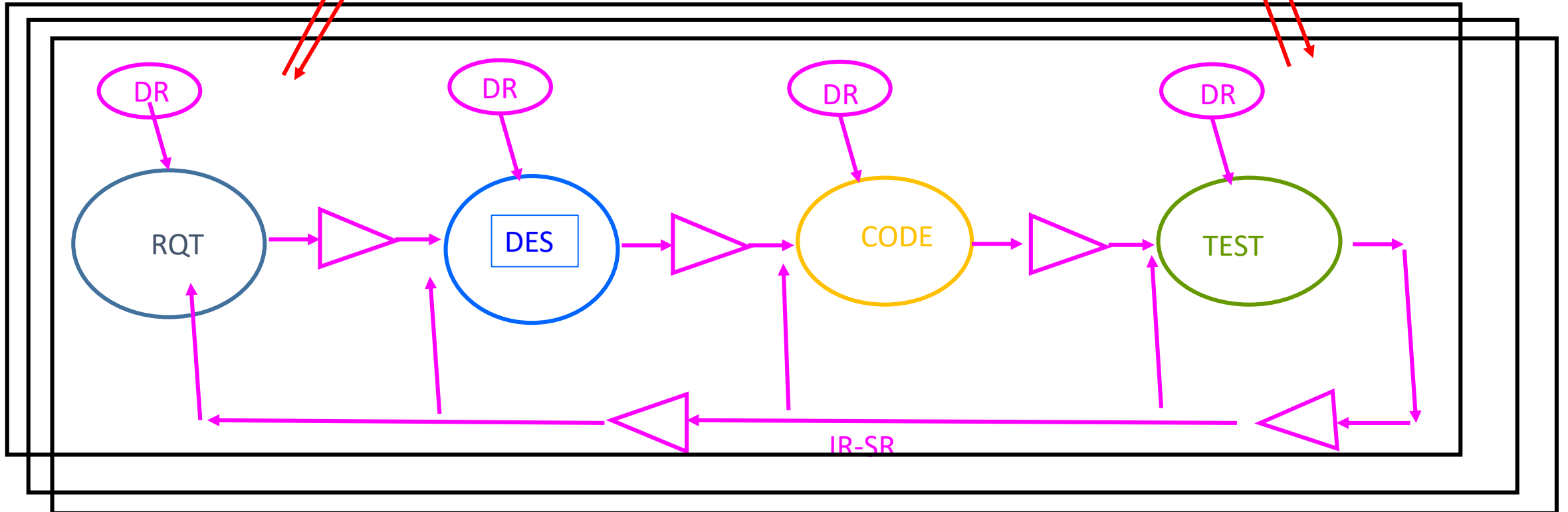
Individual Limits and Group Limits driving the work flow
Boxes with disconnects



Single Loops, Double Loops, Outer Loops

Review Process from enterprise View

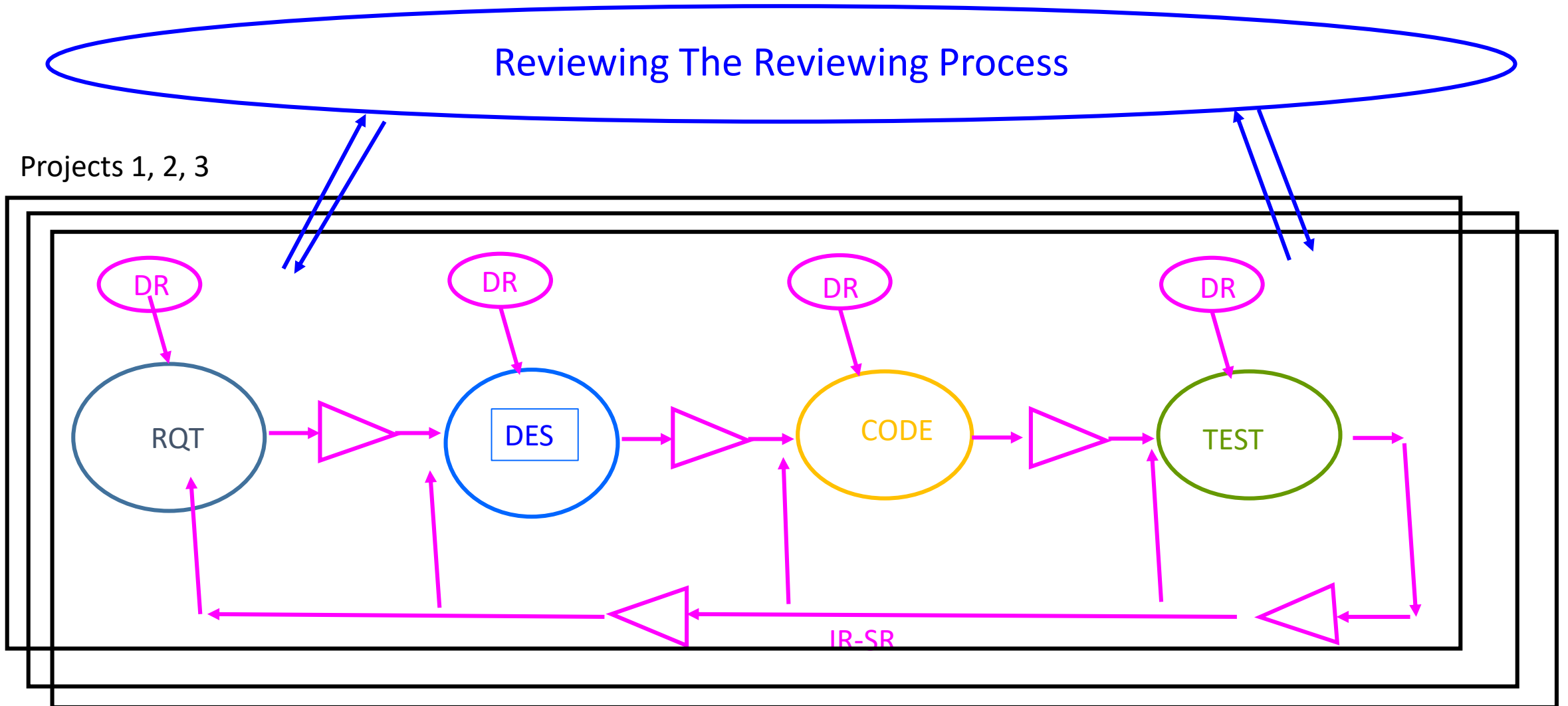
Projects 1, 2, 3



DR: Discipline Review

IR,SR: Inter-Discipline Review, System Review

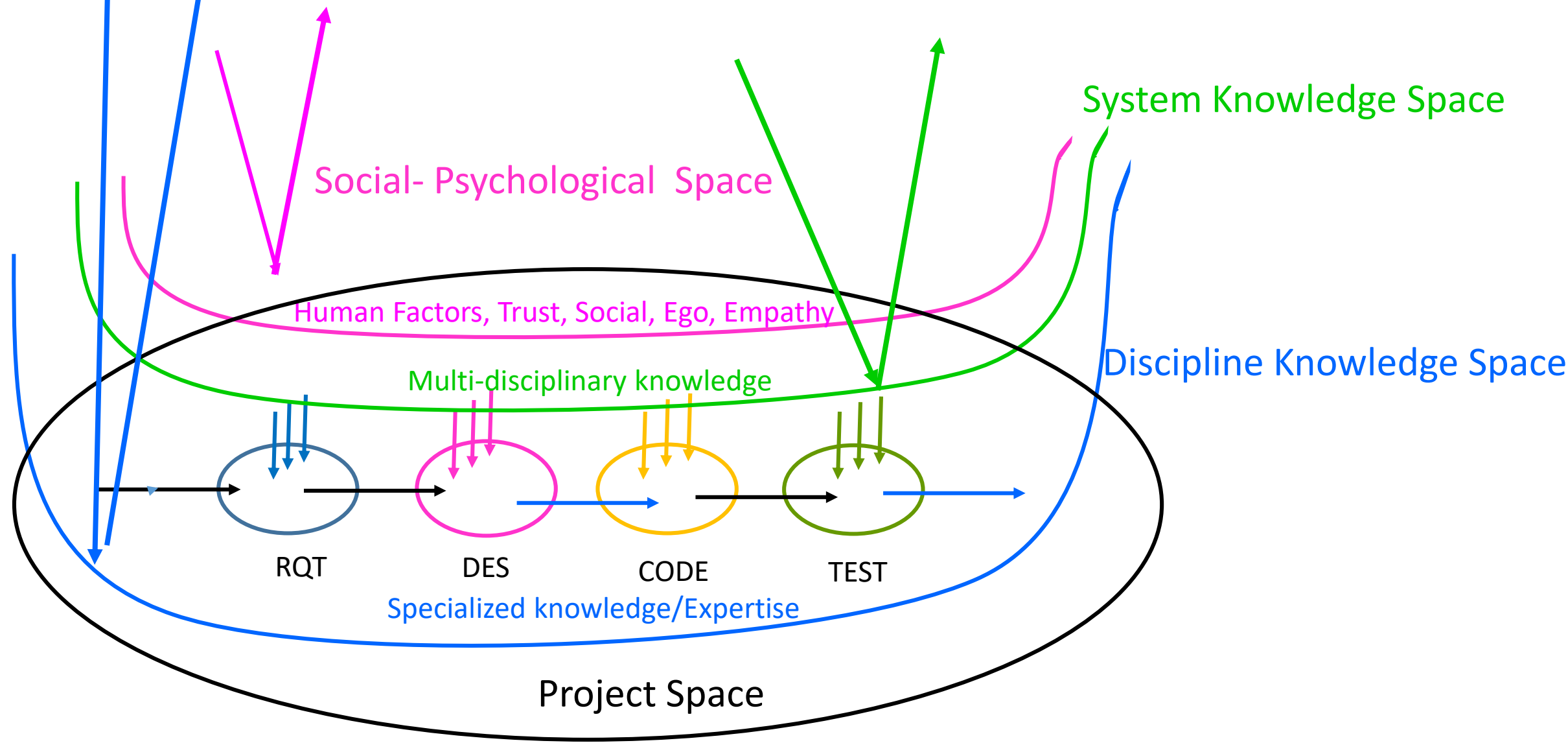
Single Loops, Double Loops, Outer Loops



DR: Discipline Review

IR,SR: Inter-Discipline Review, System Review

Reviews The Other Multi-Spaces



System Knowledge Space

Social- Psychological Space

Human Factors, Trust, Social, Ego, Empathy

Multi-disciplinary knowledge

Discipline Knowledge Space

RQT

DES

CODE

TEST

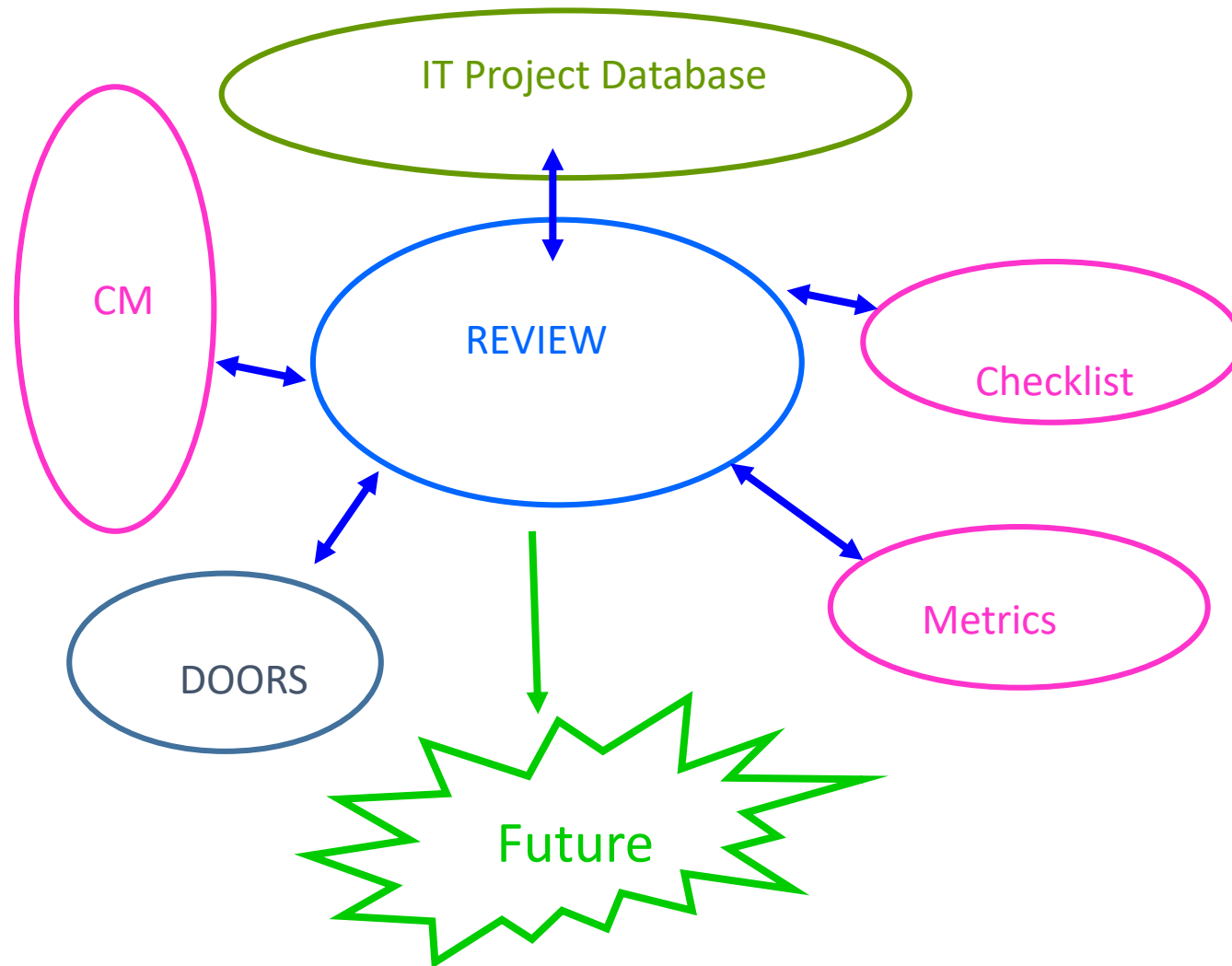
Specialized knowledge/Expertise

Project Space

Solutions: 1 The Chief Review Officer

- Actually: The review wisdom distributor rather than CRO
 - CRO as Teacher: Teaches Review Process to all new employees
 - CRO as Facilitator: introducing new bees to the hive (reviews)
 - CRO as Optimizer: optimizes Review Flow and Review docs-formats
 - CRO as Observer: travels to the projects and behaves more observer and not controller to rebuild wisdom in process
 - Review part of Gemba(1): Review process not idle in documents or standards
-
- Gemba: in Japanese, Hot Place ie where the work takes place

Review As The Center of Work Flow



Integrate Workers to IT,
Project, Work, tools

Display, automate,
customize, control, archive,
ready-to-connect-with
Future

Solutions 2: The Review Tool

- All Review data from roles, Deltas, files, history at the finger tips
- No worthy review material in embedded emails
- A flexible tool that can change with business needs and other project tools changes
- Customized Review checklists
- No “individual limits” flowing through the system to the edge of the system

Other Results From The Review: Multi-Capital Builder

- From Isolationists to Collaborators
- Review builds social capital: get to know people
- Review builds emotional capital: get to understand people
- Review builds knowledge capital: get to learn from others: Microsoft sees Knowledge Sharing as primary purpose of Code Review
- Can develop mentor/mentee relationships