NC STATE UNIVERSITY

ENGINEERING ONLINE

Lecture Notes

Course Number: CSC 513

Instructor: Dr. Singh

Lecture Number: 19

© North Carolina State University, All Rights Reserved

Outline

Challenges of Electronic Business

Architecture in IT

Contracts and Governance
- Contracts Conceptually
  - Commitments
  - Organizational Concepts
  - Modeling Engagements
  - Pulling Concepts Together
- Policy
- Case Study: OOI

XML Concepts and Techniques

XML Modeling and Storage

Summary and Directions

Challenges for Policies and Decision Making

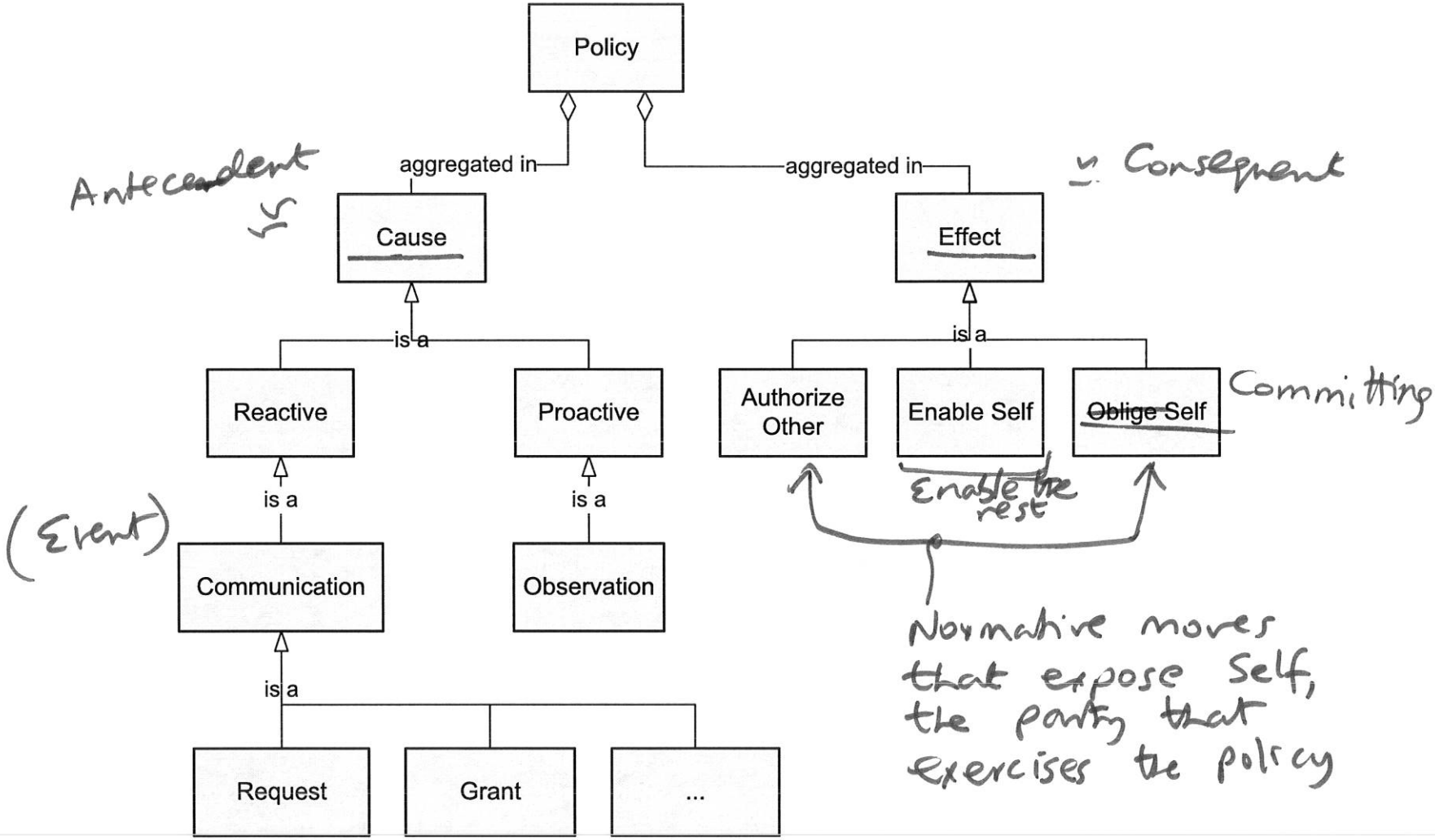
specific to each party

- *No unique locus:* separate policies for each autonomous participant
- *Dependence on business relationships* : Help Realize interactions wit norms
- *Complexity of modeling*
  - Specifying vocabulary pertinent to service engagements
  - Determining where policy decisions apply
- *Idea:* Architecture for governance centered on interactions viewed as conversations
  - *Domain-specific policies:* Incorporate monitoring and responding to events
  - *Generic policies:* Altering business relationships

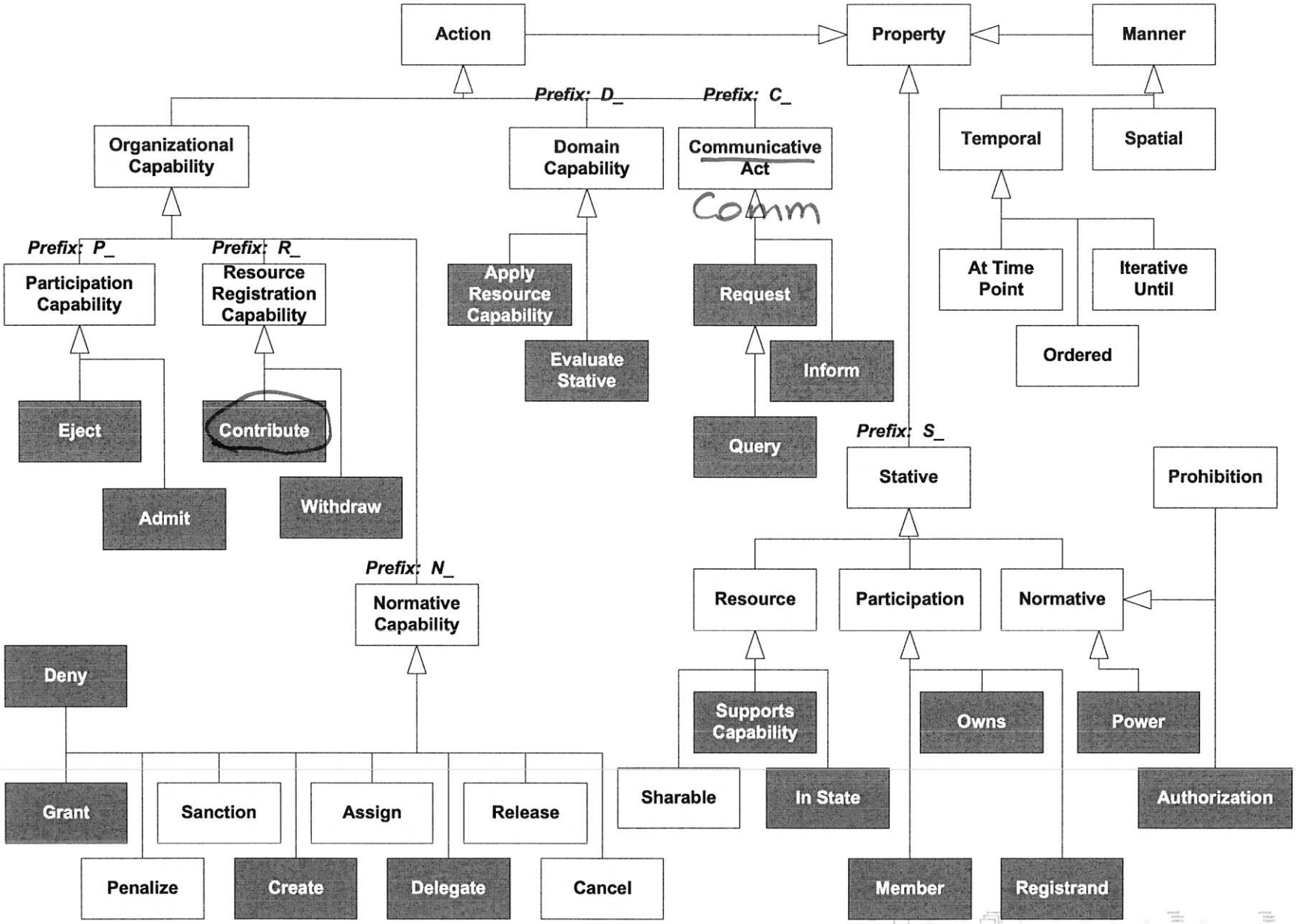
Policy Model: Types

Provide a basis for achieving governance; hence must go beyond traditional access control

- Each policy can be understood in terms of its cause and its effect
- Cause
  - *Reactive:* triggered by a request from another stakeholder
  - *Proactive:* triggered by local observations
- Effect
  - *Authorization* of action to be taken on behalf of requester
  - *Enablement* of action, which would otherwise not be taken
  - *Obligation* of action, which would now be performed


Policy
aggregated in
aggregated in
Antecedent
Consequent
Cause
Effect
is a
is a
Reactive
Proactive
Authorize Other
Enable Self
Oblige Self
Committing
Enable the rest
is a
is a
(Event)
Communication
Observation
Normative moves that expose Self, the party that exercises the policy
is a
Request
Grant
...

(Policy and) Contracts Vocabulary



Policy Model: Information

Each policy relies upon certain information in order to produce a decision

- Attributes of the parties involved
  - Qualifications, affiliations
- Attributes of the capabilities involved
  - Interactions to be carried out upon resources
  - Collated as interaction types and resource types
- Attributes of the relationships among the parties involved
  - Participations in different Orgs
  - Arrangements among institutions (captured as participations)
  - Ongoing conversations

Outline

Challenges of Electronic Business

Architecture in IT

Contracts and Governance
- Contracts Conceptually
  - Commitments
  - Organizational Concepts
  - Modeling Engagements
  - Pulling Concepts Together
- Policy
- Case Study: OOI

XML Concepts and Techniques

XML Modeling and Storage

Summary and Directions

DoDAF and Friends

Department of Defense Architecture Framework

- A standardized way to organize and document an enterprise architecture
- Lists 26 *views* organized into four categories
- Roughly, a software methodology
  - How to capture requirements: user activities
  - How to develop solutions: meet performance criteria
  - How to consider technical standards
- Best for large systems with lifetimes of decades as supported by norms (lacking explicit representation in current approaches)
- Relates to MoDAF and TOGAF and to OMG's MDA

DoDAF View Sets

NCSU

- All Views (AVs)
  - Two overall views
  - Include the terminology used in the remainder of the views

Student ~~Course~~ Faculty interest or courses, degrees

- Operational views (OVs)
  - Seven
  - Describe the working of the system as visible to its stakeholders
  - Formalized using technical notations such as UML Activity Diagrams and UML Message Sequence Diagrams (lower-level and more technical than ideal)

How to - create a new course - register for a course

- Systems and services views (SVs)
  - Seventeen
  - Describe service interfaces, their performance and physical schemas, and the functioning of the system close to an implementation level

DB schema (conceptual model) insert a course, insert a student ...

- Technical standards views (TVs)
  - Two
  - Relate the system to potentially relevant standards and technologies

SQL, JDBC, ... JEE app server

Methodology for Developing an Enterprise Architecture

- Identify stakeholders
- Understand the stakeholders' requirements
  - Begin with the customers
- Identify interactions
- Identify the business services as offered by the enterprise
  - Business processes
  - Ongoing activities
- Identify architectural components needed to support the above business services.
  - Organization
  - Services
  - Data

[Relate to DoDAF]

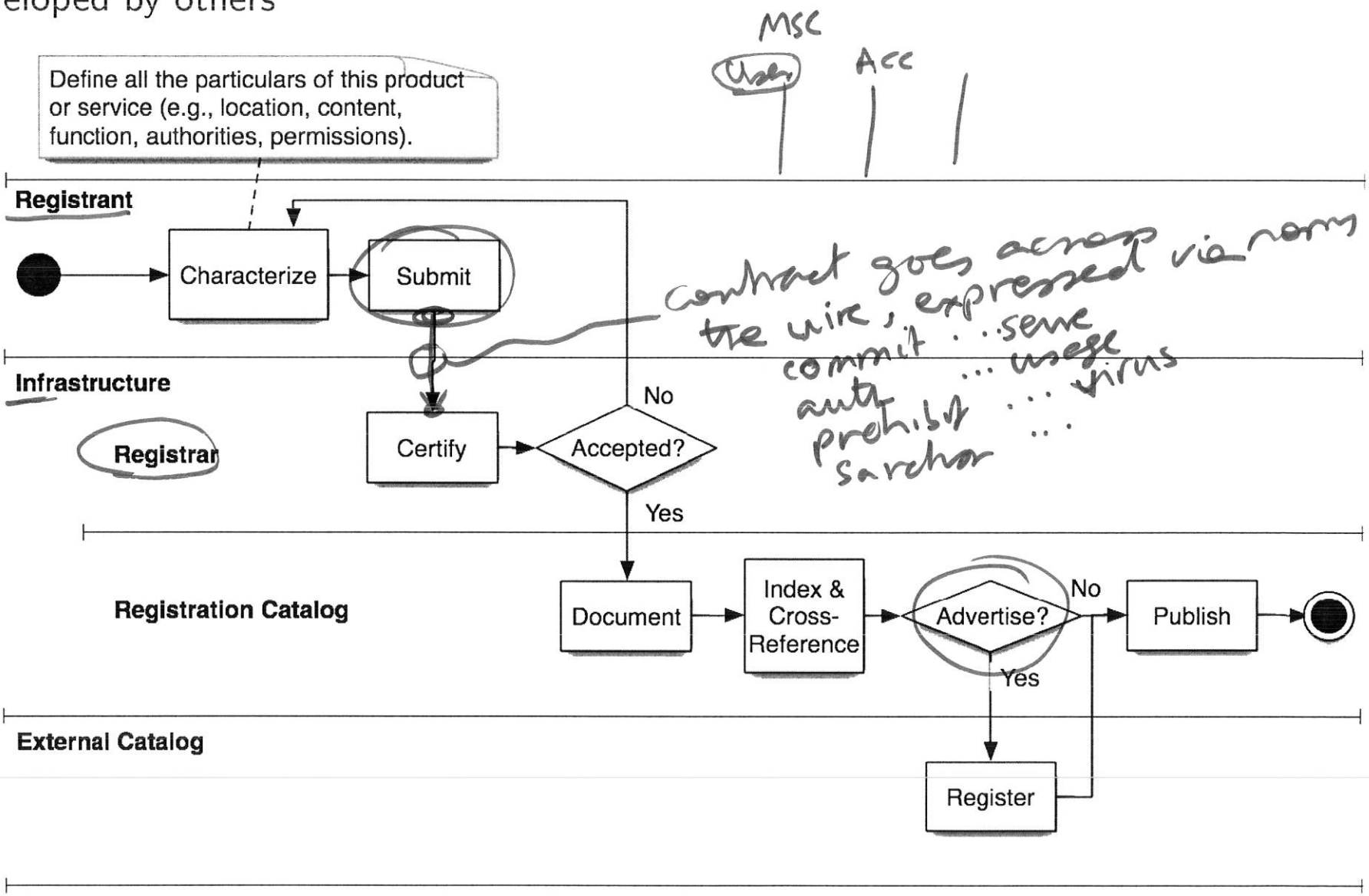
Ongoing Studies

Ocean Observatories Initiative (OOI)

- Primary: Operational Activity Model (OV5) document describing the entire life cycle via several use cases (of the 7)
  - Resources being created
  - Resources being registered and published
  - Resources being commissioned and decommissioned
  - Several more ...
- Secondary: OOI Concept of Operations document

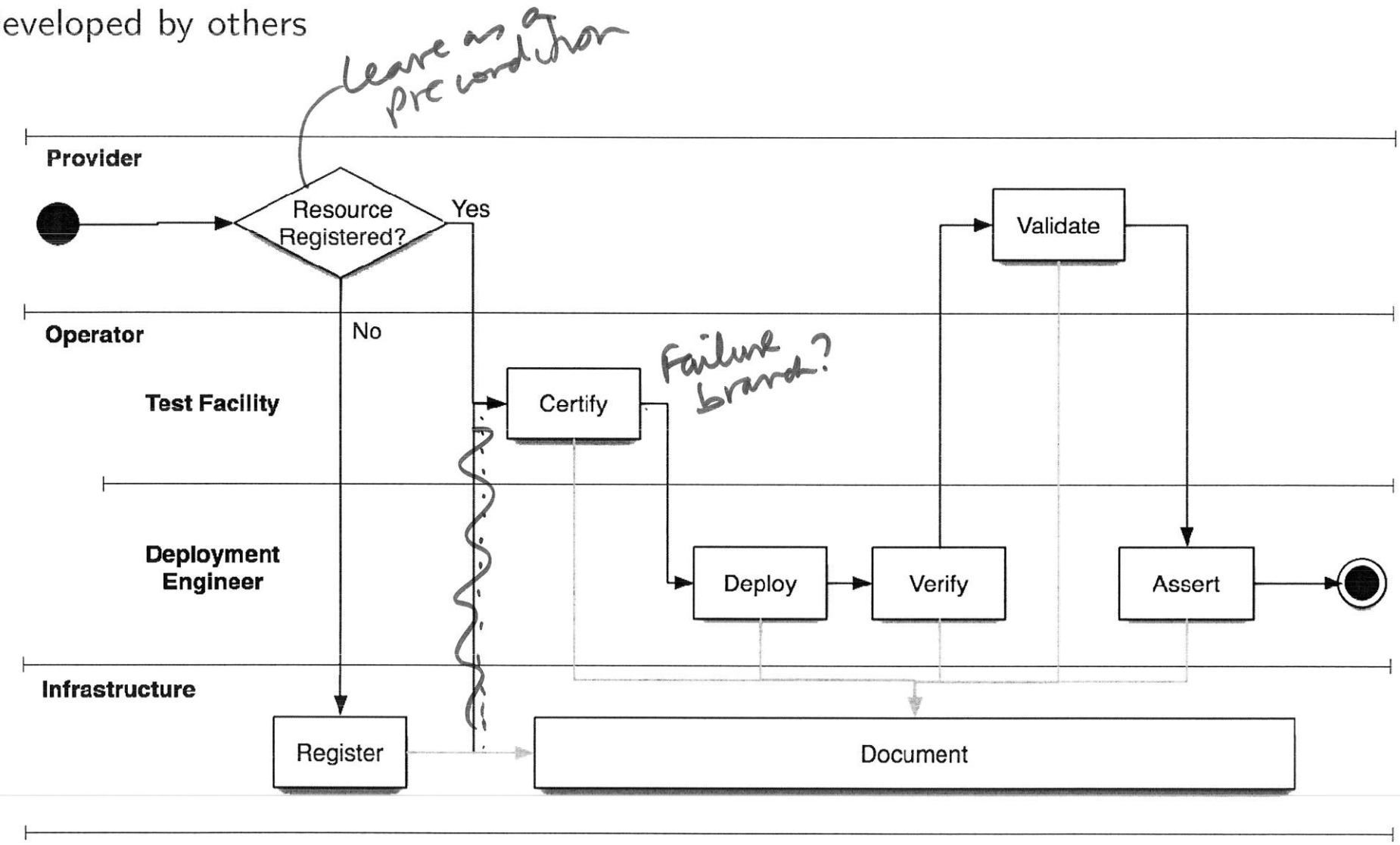
The OV5 Register Activity Diagram

Developed by others



The OV5 Commission Activity Diagram

Developed by others

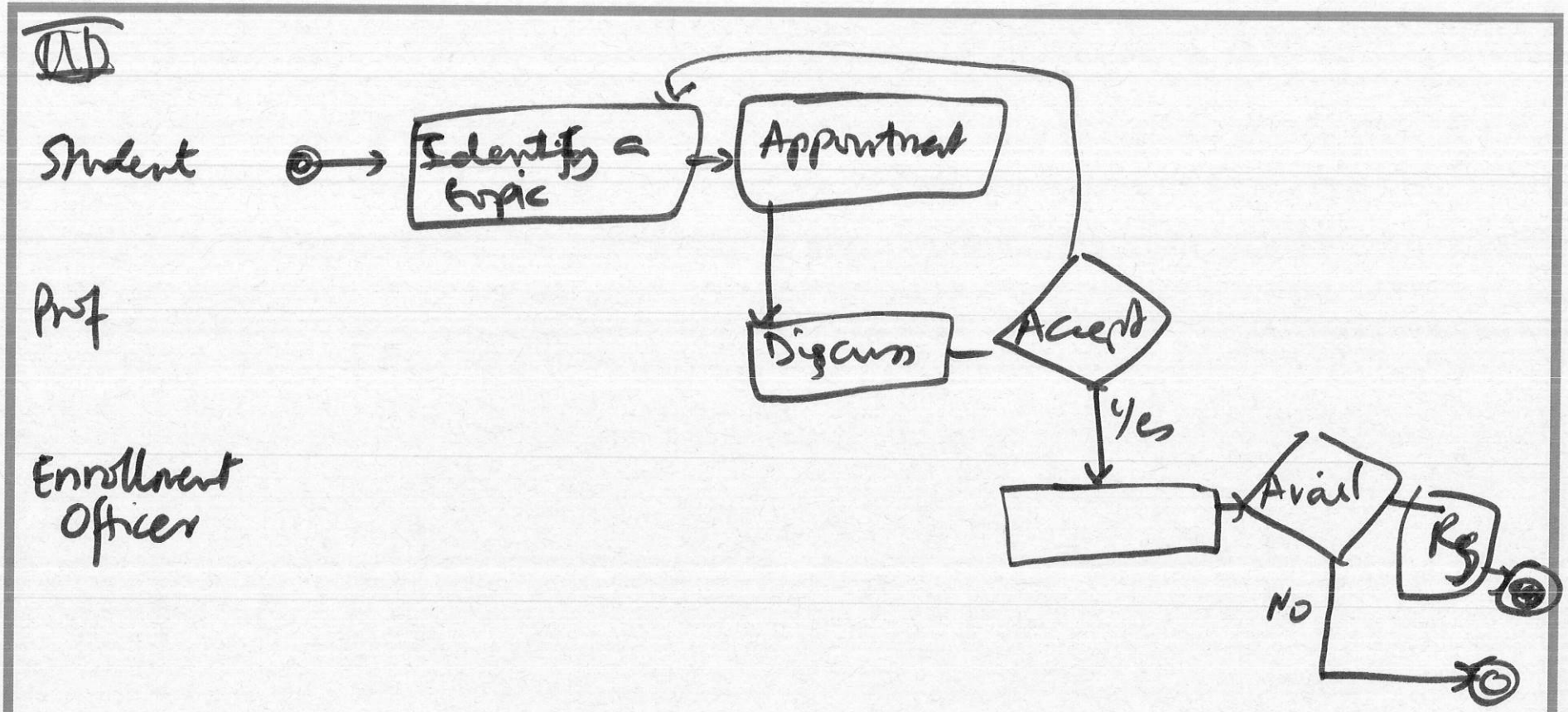


What We Extract from the OV5 Register Activity

those are the ones who apply policies

- Roles ⇒ prospective autonomous parties (discard catalogs & infrastructure)
  - Registrar (e.g., facility administrator)
  - Registrant (e.g., a researcher)
- Main interactions
  - Registrant registers (submits) a new resource (e.g., a data stream) to make it available to others
  - Registrar advertises a registered resource
  - > few more
- Policy points for the registrar : wherever an interaction occurs
  - Whether to accept the registrant's request
  - Whether to advertise a registered resource

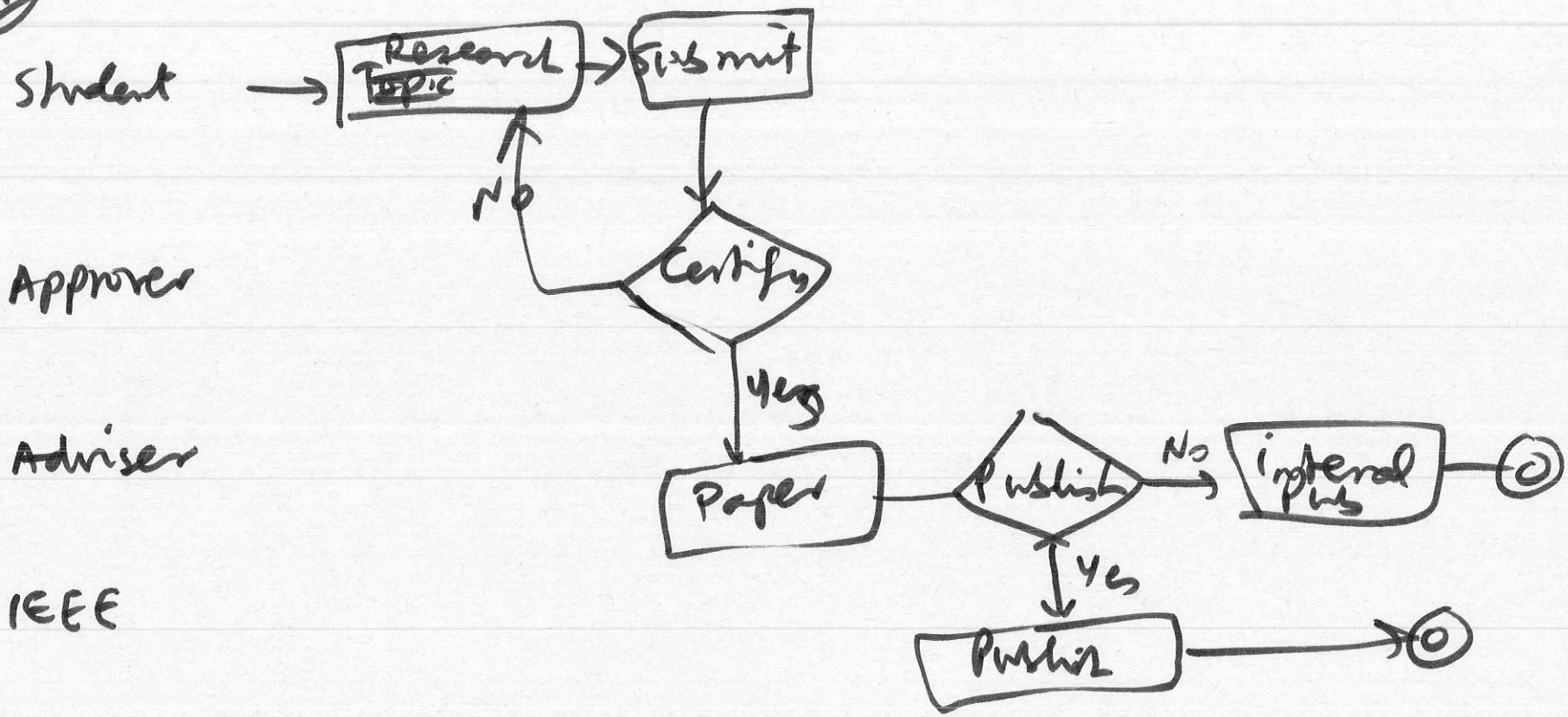
Build on the above:
Normative meanings of the interactions
(rules of encounter)



© North Carolina State University, All Rights Reserved

Proceeding with an already registered course

IV



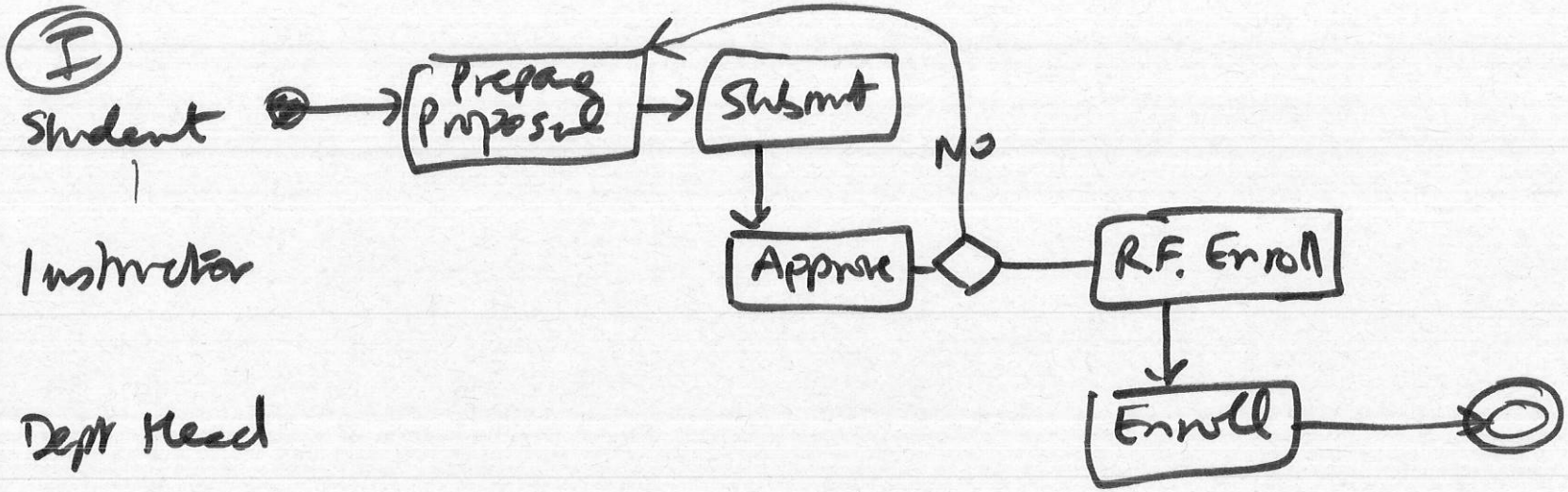
© North Carolina State University, All Rights Reserved

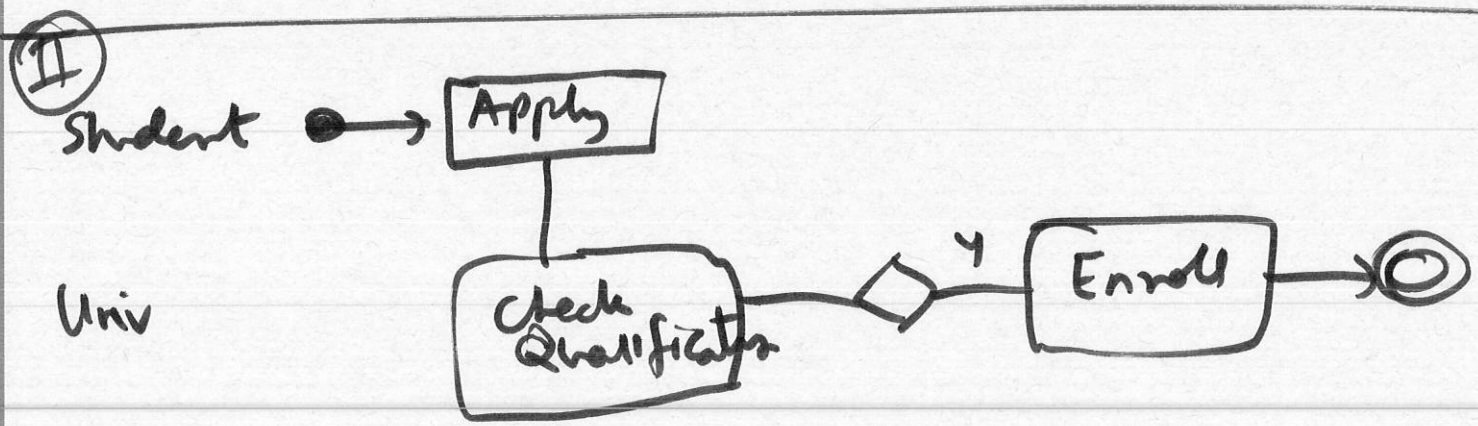
What We Extract from the OV5 Commission Activity

- Roles
  - Operator (e.g., a test facility or deployment engineer)
  - Provider (e.g., a researcher)
- Main interactions
  - Provider requests the operator to certify a data stream from a sensor
  - Operator completes verification of deployment of a sensor that has been requested for commissioning
- Policy point for the operator
  - Whether to accept the provider's request
- Policy point for the provider
  - Whether to proceed to validate the deployment

NCSU Student (setting up or enrolling in)

OVS for an independent study course (CSC 630)





© North Carolina State University, All Rights Reserved

Build a Governance (norms & policies) representation of (I)

Roles: Students Instructor, Dept Head

Interactions: Submission, Approval, Enrollment

(not always obvious)

- What is internal

external ← interactions

Meaning e.g. Enrollment: Dept commits grades are official

Submission: Student commits ...

auto Instructor to find req

prob self not cheating

Approval: Instructor commit grading/teaching

Policy Points

© North Carolina State University, All Rights Reserved