Updating IEEE 1471

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WICSA 2008 Working Session 4
http://wwwp.dnsalias.org/wiki/WICSA2008_WS4_ArchitectureDocumentationFrameworks

Background

- IEEE Std 1471-2000, **Recommended Practice for Architectural Description of Software-intensive Systems**
- Became ANSI standard, 2001
- ISO adopted IEEE 1471 on a fast-track ballot, March 2006
  - published as international standard, July 2007

ISO/IEC 42010:2007

INTERNATIONAL STANDARD

ISO/IEC 42010

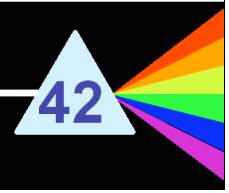
IEEE Std 1471-2000

First edition
2007-07-15

Systems and software engineering — Recommended practice for architectural description of software-intensive systems

Ingénierie des logiciels et des systèmes — Pratique recommandée pour la description architecturale des systèmes exigeant beaucoup de logiciels

Reference number
ISO/IEC 42010:2007(E)
IEEE
Std 1471-2000



Revision by ISO/IEC JTC1/SC7 WG 42

- ISO & IEEE will jointly revise the standard as...
  - ISO/IEC 42010 : Systems & Software Engineering — Architectural Description
- Revision basis:
  - 184 comments from fast-track ballot

Revision: must do

- Align with ISO life cycle process models:
  - ISO 15288 (systems)
  - ISO 12207 (software)
- Change scope from “software-intensive systems” to include “general systems”

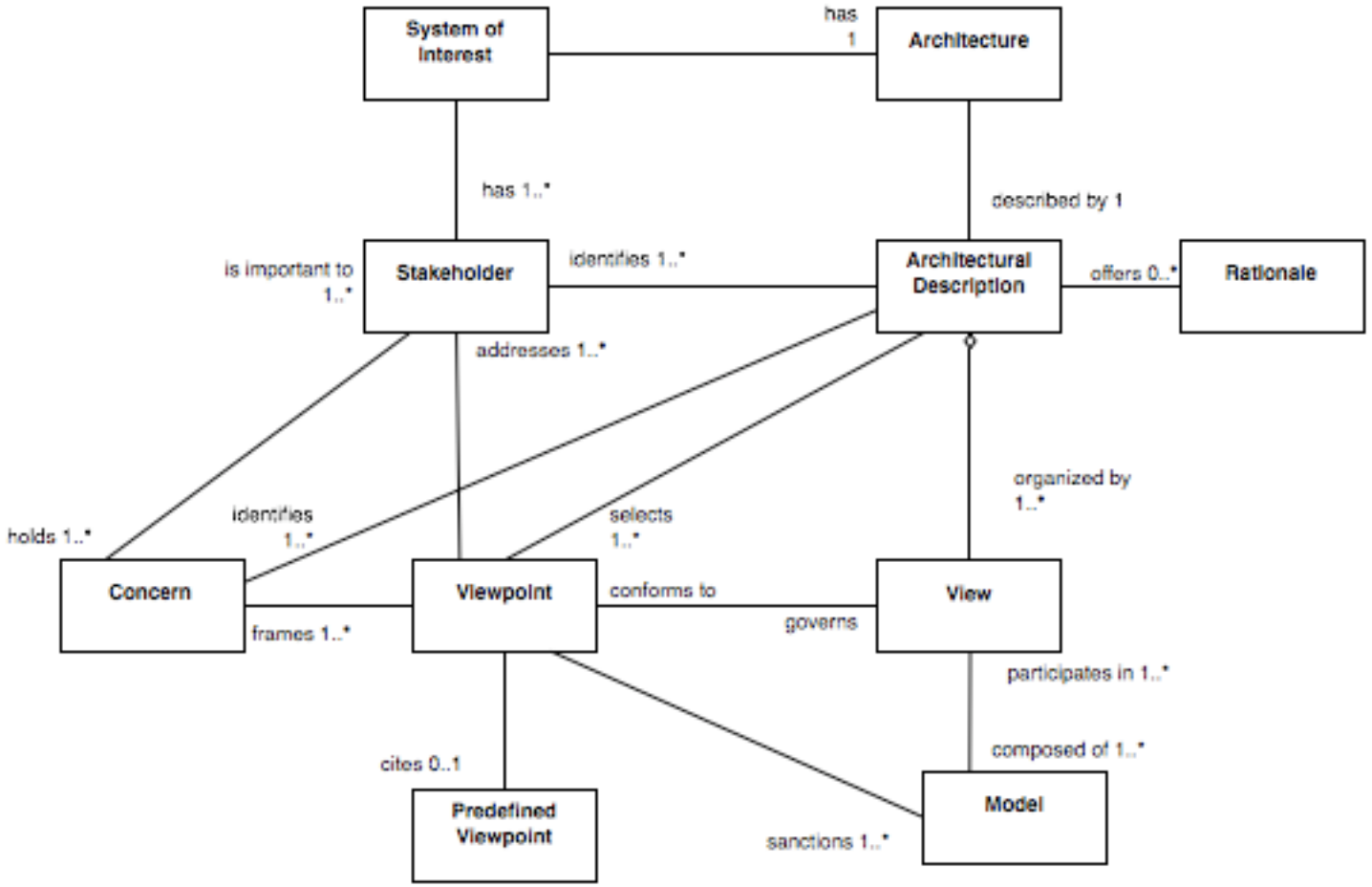
Revision: play nice with ISO

- Harmonize with other ISO "architecture-related" standards
  - RM-Open Distributed Processing (ISO 10746*)
  - Enterprise Architecture ("GERAM" ISO 15704*)

Revision: Timeline

- Moscow SC7 Plenary
  - WD1 (July 2007)
- Montréal SC7 Interim (Oct 2007)
  - WD2 (March 2008)
- Berlin SC7 Plenary (May 2008)
  - joint with TC 184 (GERAM)
  - CD1
- China SC7 Interim (Oct 2008)
  - CD2
- India SC7 Plenary (May 2009)
  - FDIS 42010

Core Conceptual Model

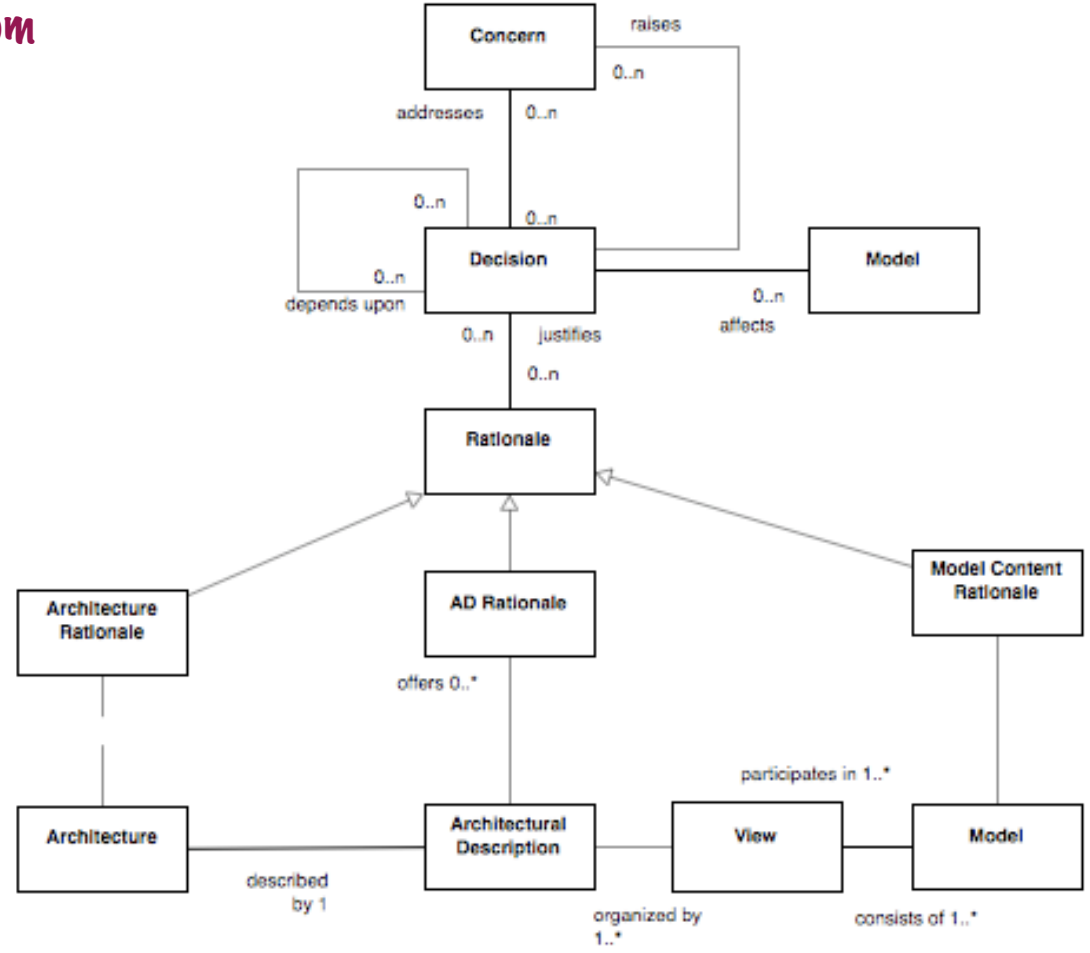


Advances in Architectural Description (since 2000)

- Refine architectural rationale, support decision capture
- Relations on views: inter-view consistency, other uses
- Architectural Descriptions for multiple systems of interest
- Aspects in architectural description

Architectural Rationale & Decision Capture

Based on work from SHARK 2007



Revision: Fixes and Clarifications

- Clarify architectural models as major parts of views
- Clean up terminology and the "metamodel"
  - tiers: conceptual, core; extensions
- documents v. repositories?
- "architectural" v. "architecture description"?

Revision: Annexes

- More & better examples!
- Standard viewpoints?
  - scenarios (= use cases, change cases & “stakeholder cases”)
  - component & connector
  - behavioral
- Evaluation of architecture descriptions

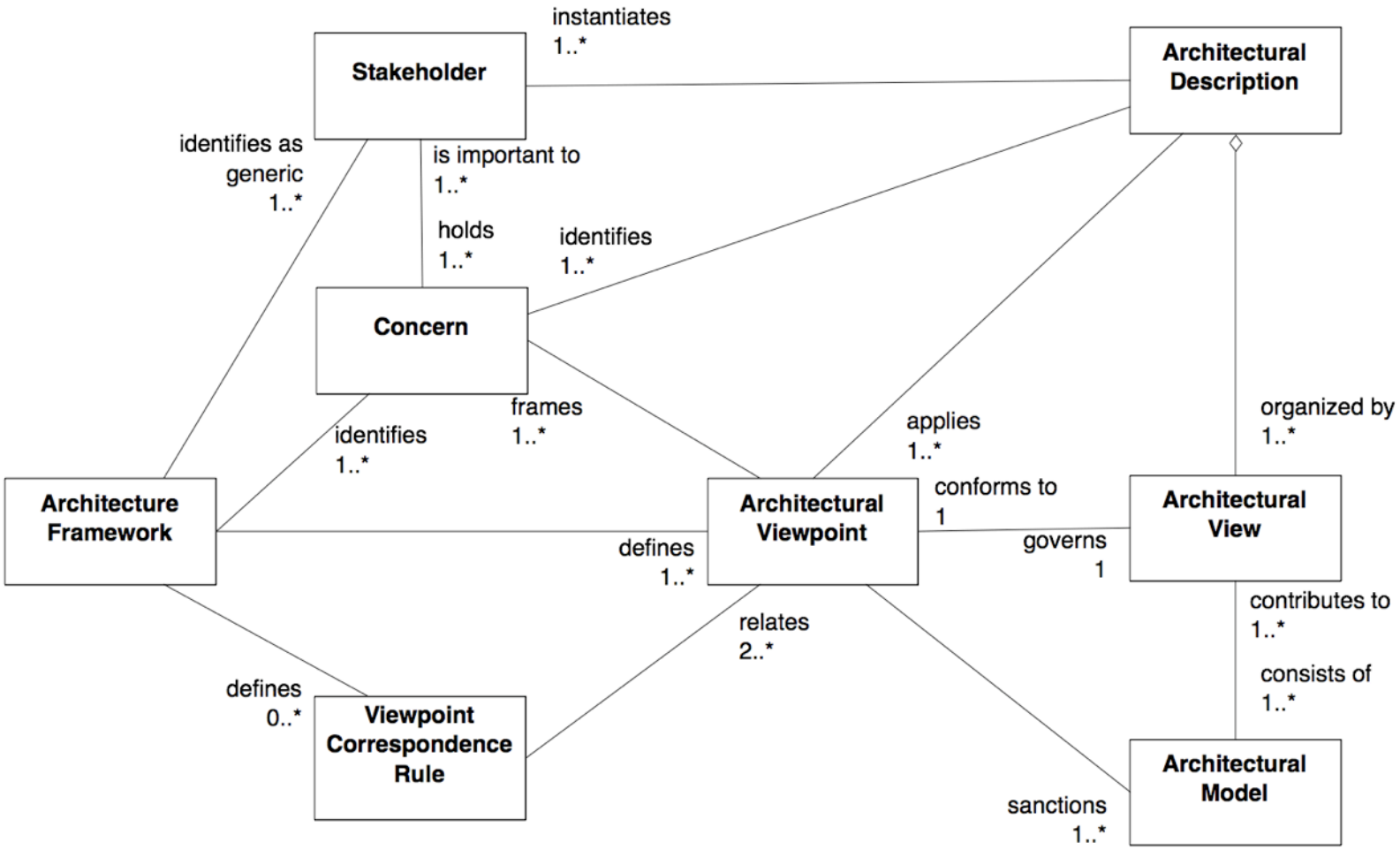
One more thing... Architecture frameworks

- Most Architects must work within an architecture framework
- Some existing frameworks
  - architecture methods: Kruchten's 4+1; Hofmeister, Nord & Soni; Rozanski & Woods; ...
  - Zachman, TOGAF, DoDAF, MoDAF, ...
  - RM-ODP, GERAM, ...

Architecture frameworks

- architecture framework:
  - a predefined set of concerns, stakeholders, viewpoints, and viewpoint correspondence rules; established to capture common practice for architecture descriptions within specific domains or user communities
- New conformance points (“shalls”) for the Standard

Architecture frameworks



Architecture frameworks & Conformance

- Conformance of a framework to Standard
  - identifies stakeholders, concerns, viewpoints, rules
  - metamodel reflects Standard metamodel
- Conformance of an AD to a framework
  - AD's data includes that specified by framework definition

For more information...

- Visit web site, join users email group
- To participate in revision:
  - become an IEEE reviewer of revision drafts, or
  - join your ISO national member body

http://www.iso-architecture.org/ieee-1471/

Reviewing Architectural Descriptions

WICSA 2008 Workshop

wiki: http://wwwp.dnsalias.org/wiki/Wicsa7:Workshop:Reviewing_Architectural_Descriptions

WG 42 Interests

- Is Review of Architectural Descriptions ripe for standardization?
- Can we consider this in on-going revision of ISO 42010 (né IEEE 1471)?
- Can we express it in a "process-neutral" manner?
- Is current conceptual model adequate to capture evaluation?

WG 42 Work Program

- 42000 series on architecture
- possible future work
  - standard viewpoints
  - architecture evaluation/ assessment
  - processes for architecting
  - ontologies
  - 42000 branded items

ISO/IEC 42000 Certification

- Guarantees high quality architecture practices
- Suggests risk-reduction for both suppliers and acquirers
- “Improves World trade”

WICSA BoF

Relations between Views

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http://wwwp.dnsalias.org/wiki/Wicsa7:BOF:Relations_between_Views

Relations between Views

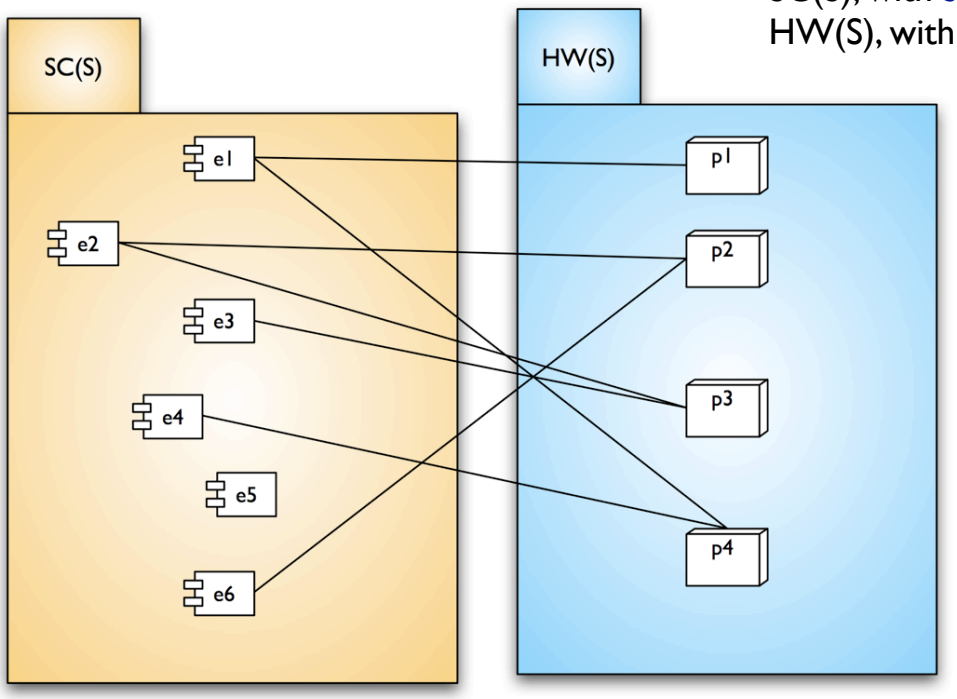
- IEEE 1471:2000 requires analysis and recording of any inconsistencies between views
- Can we do better in ISO 42010 revision?

Current proposal (WD1)

- Introduces new mechanism, view correspondences (VC)
  - records a relation between two architectural views
  - used to capture: a consistency relation, a traceability relation, a constraint or obligation of one view upon another

Current proposal: VC example

Consider two views of a system, S, a software component view, SC(S), with software elements, e1, ... e6, and a hardware view, HW(S), with hardware platforms, p1, ... p4

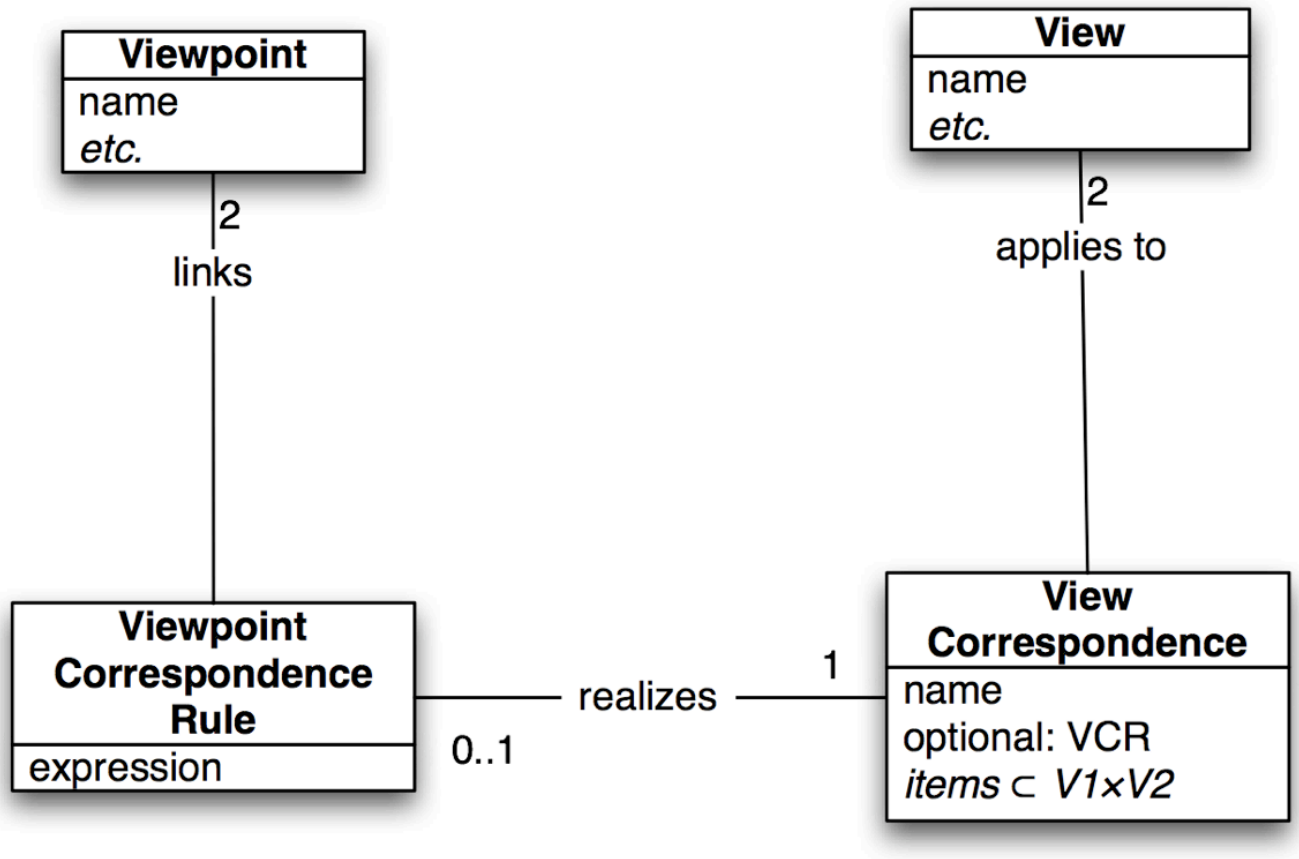


A view correspondence expressing which software elements execute on which platforms might be:
ExecutesOn = { (e1, p1), (e1, p4), (e2, p2), (e2, p3), (e3, p3), (e4, p4), e6, p2) }

Current proposal: VCs & VCRs

- A viewpoint correspondence rule (VCR) expresses a contract between two architectural viewpoints, realized by a VC
- VCR either holds in its VC, or is violated by the VC
- Example: Every software element, e_i, as defined by SC(S), must execute on one or more platforms, p_j, as defined by HW(S)

Beginnings of a model



Issues to consider

- Have we got the right (all) use cases?
  - Can we make a taxonomy of VCs and use cases?
- VCs are binary mathematical relations
  - functions too restrictive
- What is the language for expression of VCRs?
- Terminology (e.g., some folks don't like "correspondence")