

# Exploring the research potential of Virtual Labs

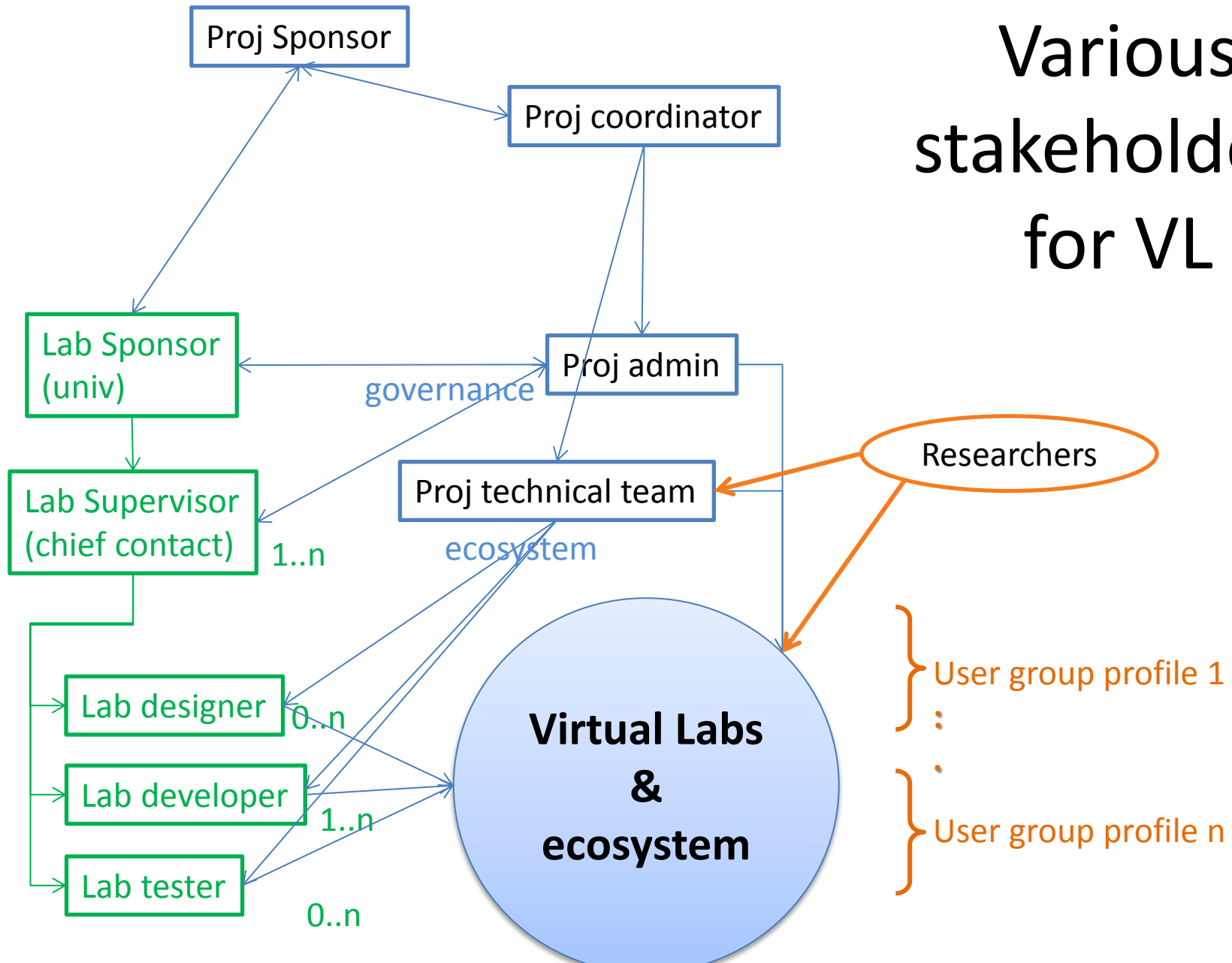
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# Goal of this ppt deck

- To start the discussion on what we can potentially explore (in research) with Virtual Labs (VL)
- This ppt should help in the discussion ... which could lead up to a good proposal
- VL is a big concept, implementation, project.  
What we are discussing here is the VLEAD type VL effort being rolled out here at IIIT-Hyd/SERC

# Various stakeholders for VL



# Areas of potential research

1. End-user uptake angle
2. Technical (back-end) angle
3. Social angle

Each of these above three points are now discussed in a separate section.

# **END-USER UPTAKE OF VL**

# Aims & Objectives

- How to make VL a “killer app” amongst tier 2/ tier 3 students at least?
- How to increase uptake?
- How to increase its reach? Also into new geographies beyond India (e.g. Africa)?
- Assumption that is driving this thread:
  - We feel that VL uptake is not yet in the 1000s level that MSHRD or other stakeholders are expecting. So, what is the problem and how to overcome it?

# Potential reasons for not having uptake

1. Language barrier; i.e. digital divide; accessibility issues
2. Not social; content is too individualistic; end-users are not used to learning like this; make VL social web
3. Not interoperable; VL is an island of data; not enough linking to other sites hosting similar /related and extended content
4. Current content is not compelling enough – the topics addressed are not of interest or of too high a level; need to see how the topics fit the curriculum
5. Delivery of content is not “usability” enough. UX is not compelling (-> gamification)
6. Content is not exhaustive enough. Lot of hullabaloo for too few a points... and that too not explained in a detailed enough way
7. No LMS links; student can't tell if learning is happening; instructor can not give / not give grades on the assessment... no assessment; no history; no persistence

- Experimentation can uncover the real issues
- The issues could be categorized into
  - accessibility and renarration related
  - Social Web
  - Usability
  - Digital Pedagogy techniques
  - Interoperability of content



# Accessibility / Renarration

- Tier 2 & 3 students may be faced with issues of Unfamiliarity & language
  - Unfamiliarity of subject – and they lack critical / analytical thinking to understand something foreign
    - Related to Lab, research, domain / content...
    - Related to web apps
    - Related to problem based learning, constructivist thinking... (mostly coming from paper based thought process, spoon fed, told what to think etc.)
  - Language: non-English speakers learning from English content.

# Renarration

- **Language**
  - English Vs. local vernacular (full L2, partial L2 with only instructions in L2)
- **Web Technology**
  - novel and intimidating... especially for those with little or no online exposure... those with maximum print exposure
- **Presentation Style**
  - too western; style diff may be required
  - Triangle models; direct Vs. Indirect;
- **Level of maturity**
  - Author assumes level X; consumer level might be lower than X
  - Indian T2 students may be lower grade level than western peers
- **Modality**
  - Some content is best presented in one of the many choice modalities (Text, Audio, Video)... some mathematical concepts (eg. Trends) are better represented as graphs than numbers... emotional content, for example, may do well as audio or video (instead of text)
  - User preferences also matter

# Social Web

- VL is not a social web app
- Traditional techniques to increase the social networking, collaborating may help in the uptake
- Research and development can drive this thread
- FOAF type Semantic Web technologies can be used

# Usability

- Gamification / Serious Games
- UX
- Funology
- These are individual app level techniques. Could bring in Semantic Web by making the content (ie. Topic) interoperable with other web sources (like wikis, khan academy, youtube) etc.
- Research on means & ways to make data interoperable; Ontology to allow for interoperability ...

# Digital Pedagogy

- Again, this could be about what makes e-learning effective
- Serious Gaming is about how to make topic fun for end user
- Gamification can be about incorporating playful elements to make subject dissemination easy
- However, since India is a collective society (unlike most of the west)... we could explore group games (e.g. for class participation, for sharing of screen at net café etc)

# Interoperability of content

- Currently VL is limited to author's control
- Can we expand this by interlinking data with other sources like Wikis, Blogs, Khan Academy, YouTube etc?
- Also, can we interlink it with University databases? Could help instructor link grades database to this
- Semantic technologies for interoperability, data portability can be leveraged.

# TECHNICAL ANGLE

- About cloud computing, performance...
- About creating SWING like widgets that would enable easy deployment of ideal VLs
- Automating the creation, testing of labs
- Automating the linking of subjects to other web sources; Pedagogy helper tool
- Automating the creation of communities, tests, scoring etc. (academic circles of interest – social web)



# **SOCIAL ANGLE**

# Beyond the technology, social angle can help...

- Instructor guides / hand-holds the students for some time
- Instructor teaches the students how to use the lab (and thru the lab teaches critical thinking, analytical thinking and problem solving approach)
- Instructor first gives basic problems to get the students habituated
- Instructor then gives higher order problems to lead them thru the learning of the higher order skills
- Can the instructor be virtual? E.g. avatar or video?

# SUMMARY

# Summary

- Many ways to conduct research in VLs
- We need to agree on many things
  - Our VL/VLEAD scope or MSHRD overall scope?
  - Technical, Non-technical?
  - S2W or just Semantic web?
- Also, how do we overlay research ontop of the existing Development effort? Who arbitrates priority differences? How do we allocate resources? Who should be involved in which part?
- Many open questions to explore

# Next steps for thought alignment

1. Let Devi & Chandan know that there is also a research dimension of VL work that is being explored. This may constraint their feature, resource or roadmap deployment. My initial PPT was for that purpose
2. This ppt should allow us to align on thoughts. What are you thinking? Where do you think we should put the emphasis?
3. We also need to figure out how this fits into my (SaiGO) PhD directions? Will it complicate my work or enable a easier completion? In the past I have learnt that collaboration could potentially lead to priority mismatches and potential delays – which ought not to effect my PhD timelines.