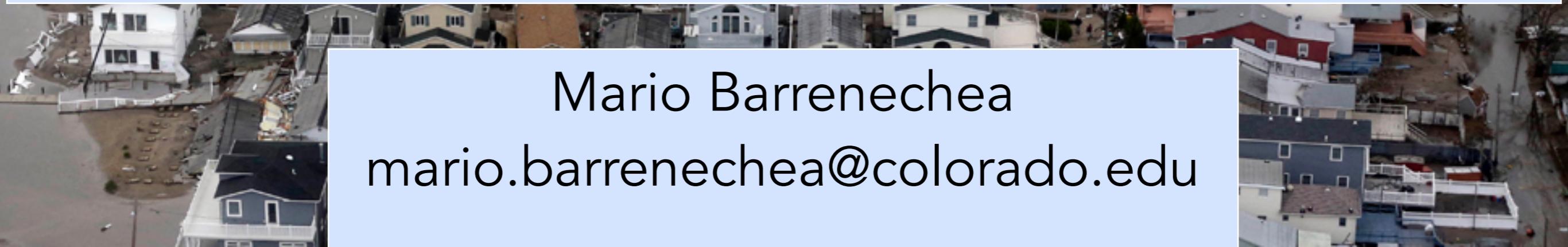




Engineering for Disaster Management: A Human-Centered Software Process for Designing and Developing Interactive Systems for Mass Emergency Events

A smaller, semi-transparent aerial photograph of a residential area, showing houses and debris, positioned at the bottom of the slide.

Mario Barrenechea

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After Hurricane Katrina,
200,000 pets were
displaced from their
families. Only 5% were
reunited [3].



Services to the Rescue



Hurricane Sandy

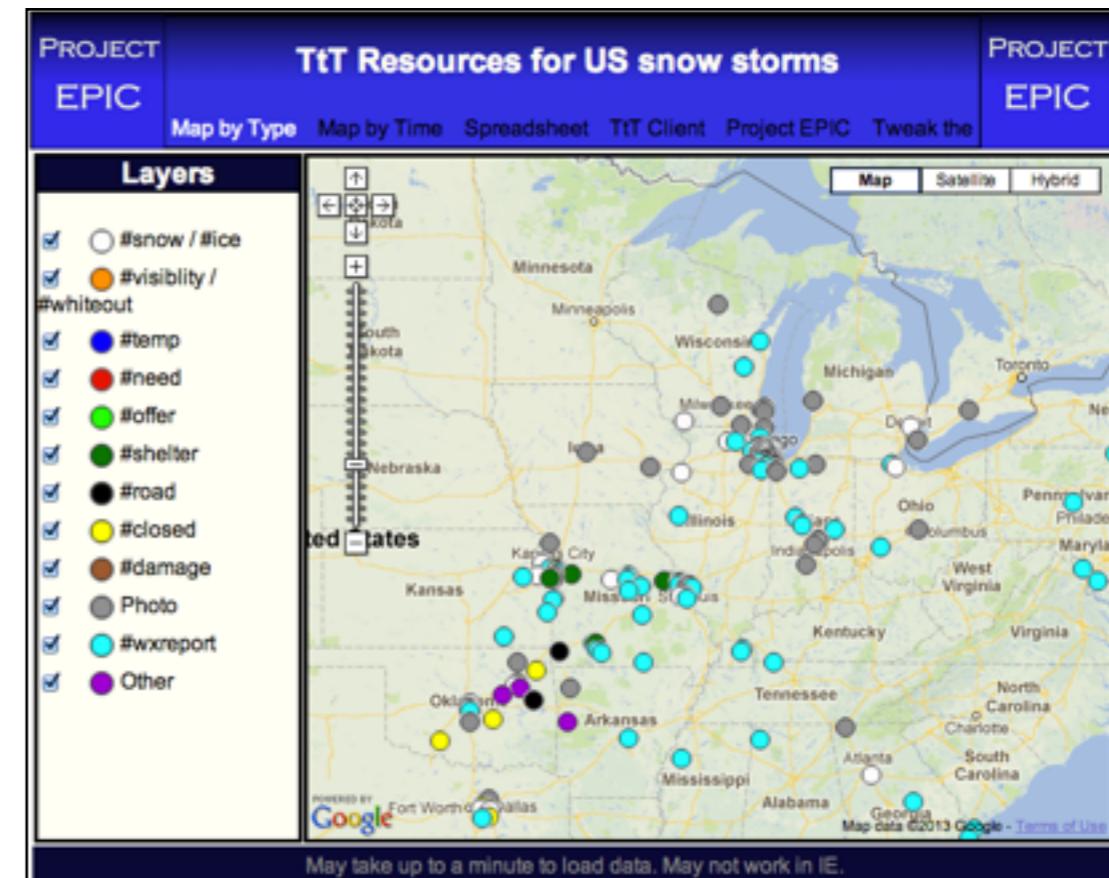
One Pet at a Time!

Lost & Found Pets

Hurricane Sandy Lost and Found Pets

27,906 likes · 7,284 talking about this

Liked Message



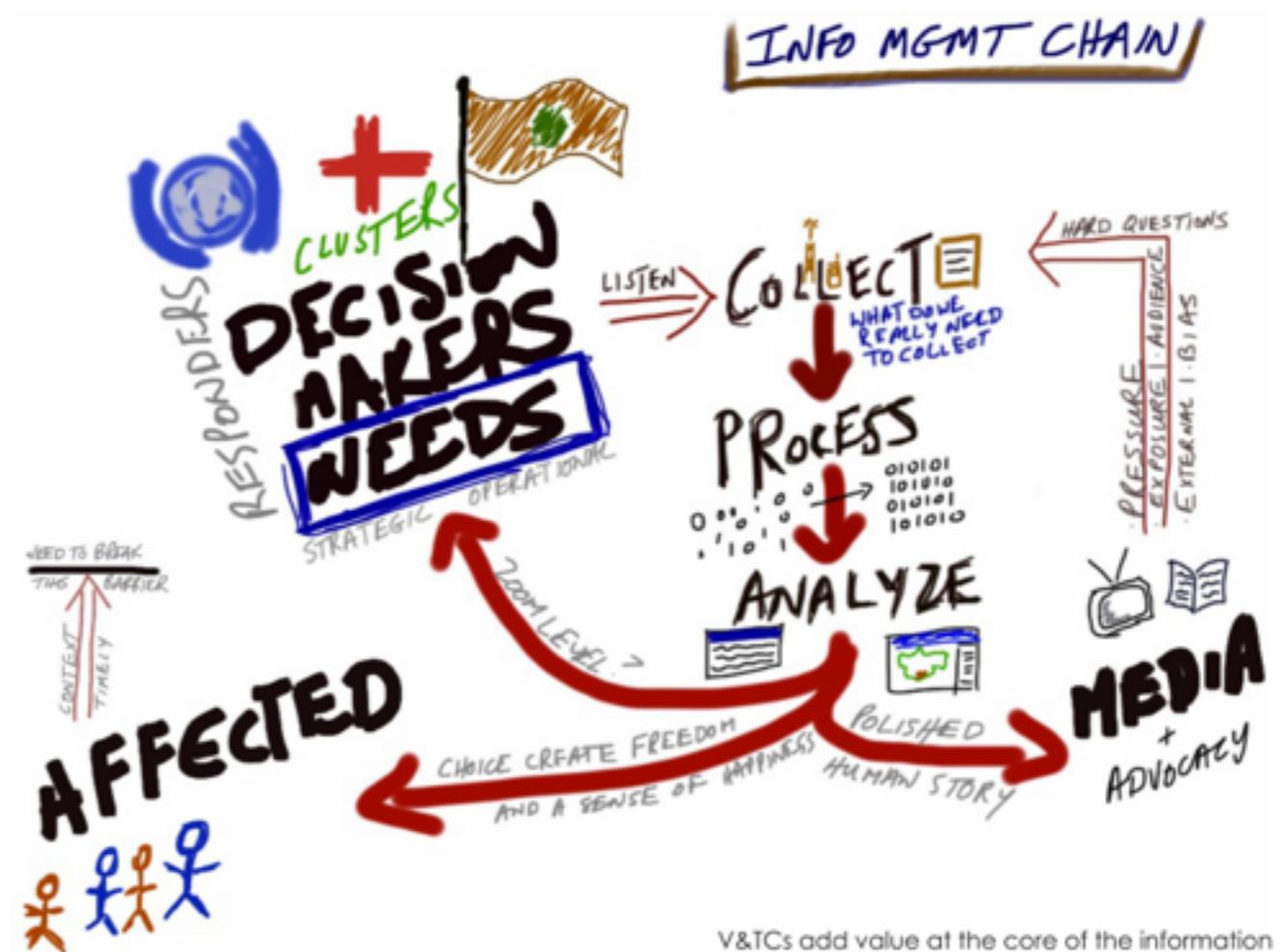
OpenStreetMap
The Free Wiki World Map



Disaster response extends itself to many opportunities for development.

- **Open Development [1]:**

- Open Source
- Horizontally-flat organizational structure
- Movement of technologists to help solve humanitarian-related problems:
 - Volunteer Technology Communities (VTCs) like RHOK and Ushahidi are people from all over the world that want to solve important problems.
 - Big organizations sponsor these efforts (Google, Yahoo!, Microsoft, NASA, World Bank, etc).



V&TCs add value at the core of the information management chain: the collection, processing, and analysis of data.
Information Management Chain, Andrej Verity, 2010.

Problems

- **Pet information is spread everywhere.**
 - Need to consolidate it for specific lost and found pets.
- **Generic information structures vs. Specific ones.**
 - Facebook/Twitter help manage this information, but they don't focus on the particular problem at hand (in particular, pet matching).
- **Supporting massive scale online and collaborative use.**
 - No easy feat! Developers need to be so-called dev-ops.
- **Usability is key!**
 - Otherwise, who will use the system?
 - Developers also need to become designers.

EPM Design

Newly Added Bookmarked

Activity Feed

[Daniel17](#) has just joined EPM!

[Mario25](#) has just joined EPM!

[Chris29](#) has just joined EPM!

[Kenneth31](#) has just joined EPM!

[Mario37](#) has just joined EPM!

[Dave45](#) has just joined EPM!

[Andrew49](#) has been followed by [Abe0](#)

[Andrew49](#) has been followed by [Andrew6](#)

[Andrew49](#) has been followed by [Dave11](#)

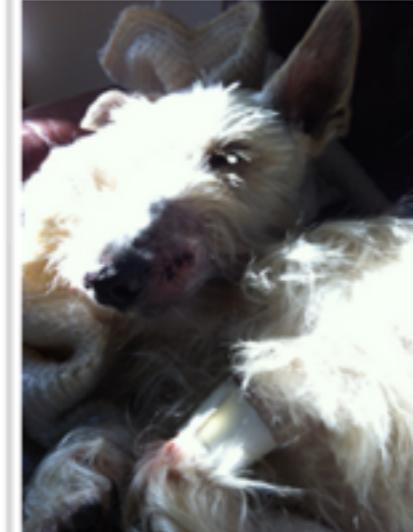
[Andrew49](#) has been followed by [Olivia13](#)

[Sydney](#)
Lost: Dog
Contact : Jacob40



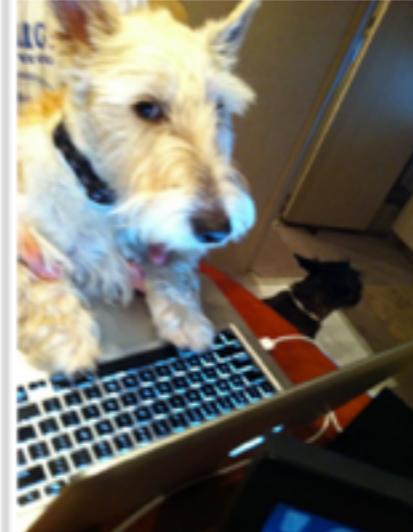
Apollo

[Found: Dog](#)
Contact : Sahar14



Apollo

[Lost: Dog](#)
Contact : mario



Dandy

[Lost: Dog](#)
Contact : Dave45



Candy

[Found: Dog](#)
Contact : Leysia15



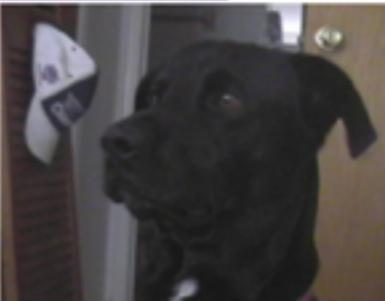
Marley

[Found: Dog](#)
Contact : Emily16



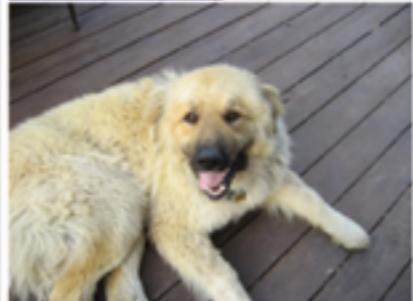
Sparky

[Found: Dog](#)
Contact : Joshua19



Fousey

[Lost: Dog](#)
Contact : Jacob40



Fousey

[Lost: Dog](#)
Contact : Kenneth31



Toodle

[Lost: Dog](#)
Contact : Emily16



Princess

[Lost: Dog](#)
Contact : Emily16



Libby

[Lost: Dog](#)
Contact : Daniel17



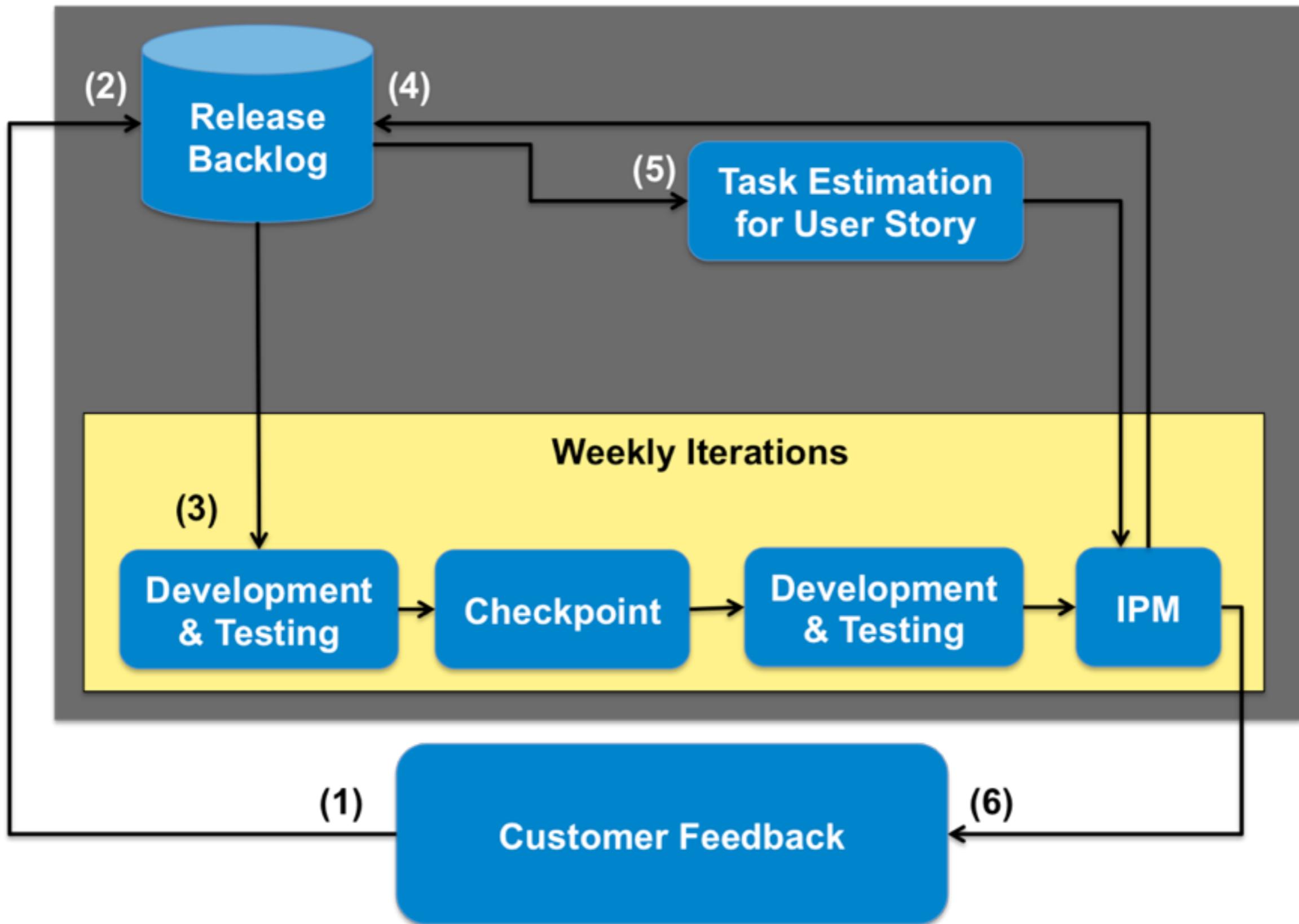
Missy

[Found: Horse](#)
Contact : Isabella9



Dandy

EPM Development



Four Key Principles

- **Usability:** Design a system with knowledge and understanding of the targeted user.
- **Adaptability:** Devise feedback loops between system and user that promote responsiveness to users' needs through monitoring their behaviors.
- **Time-sensitivity:** Prepare a deployment environment that facilitates quick scaffolding of application at a moment's notice, and maintain its availability for the duration of the disaster.
- **Reliability:** Keep the system up at all costs; users depend on the system to perform their intended goals.

What's Next?

- **Software Process Validation** - Can the EPM Process be used by other engineers to build similar interactive systems for disaster?
- **Observations** and **collaborations** with non-profits, rescue shelters, VTCs, and other disaster-thinking people.
- **UX-Agile Workflows**: Need to have more conversations about fusing them together.
- More **EPM Design and Development**

References

- [1]: Blanchard, H., & Chapman, K. (2012). *Volunteer Technology Communities: Open Development*. Global Facility for Disaster Reduction and Recovery (GFDRR)
- [3]: Lowe, S. R., Rhodes, J. E., Zwiebach, L., & Chan, C. S. (2009). The Impact of Pet Loss on the Perceived Social Support and Psychological Distress of Hurricane Survivors. *Journal of traumatic stress*, 22(3), 244–247. doi: 10.1002/jts.