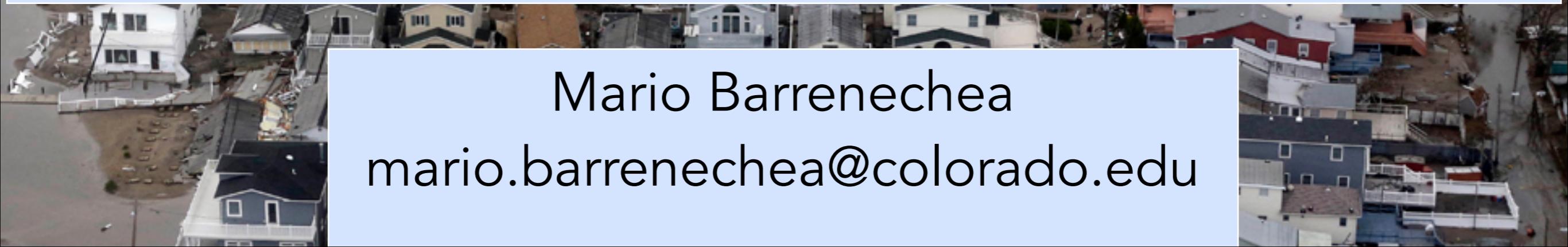




# Engineering for Disaster Management: A Human-Centered Software Process for Designing and Developing Interactive Systems for Mass Emergency Events



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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*

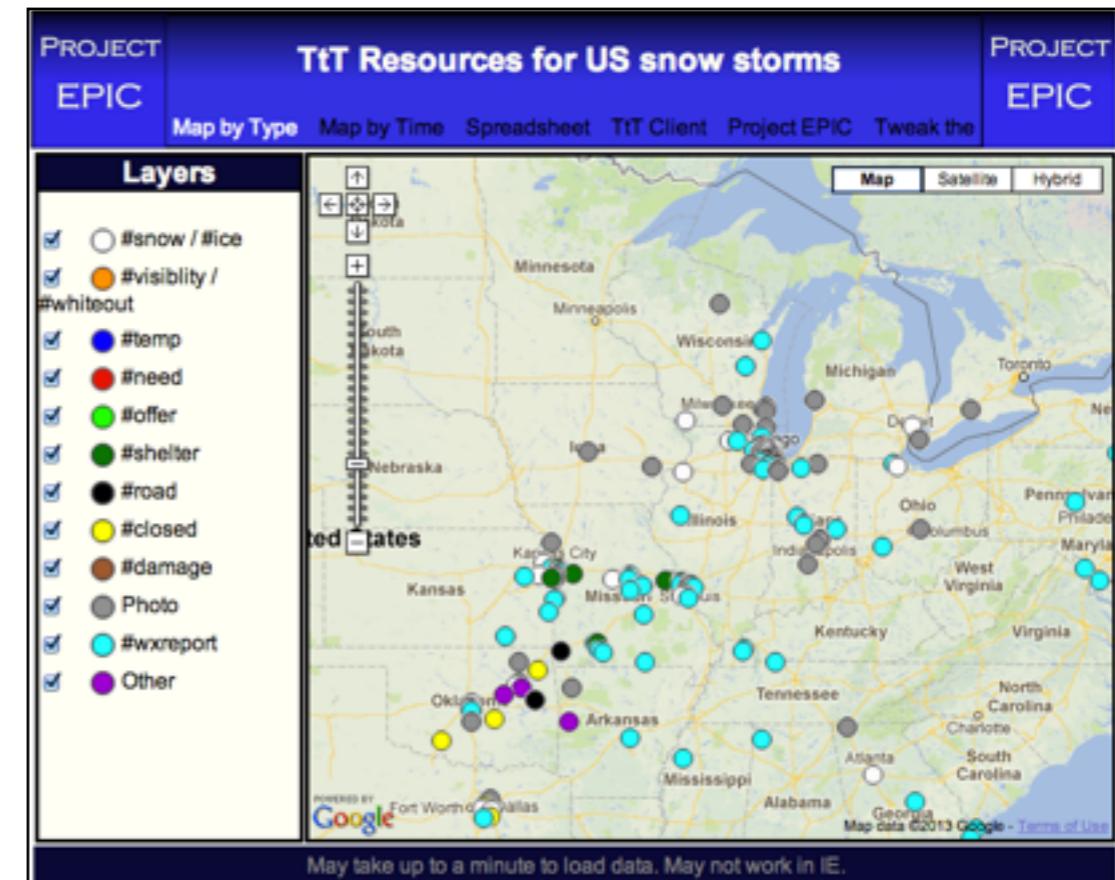
One Pet at a Time!

*Lost & Found Pets*

Hurricane Sandy Lost and Found Pets

27,906 likes · 7,284 talking about this

Liked Message



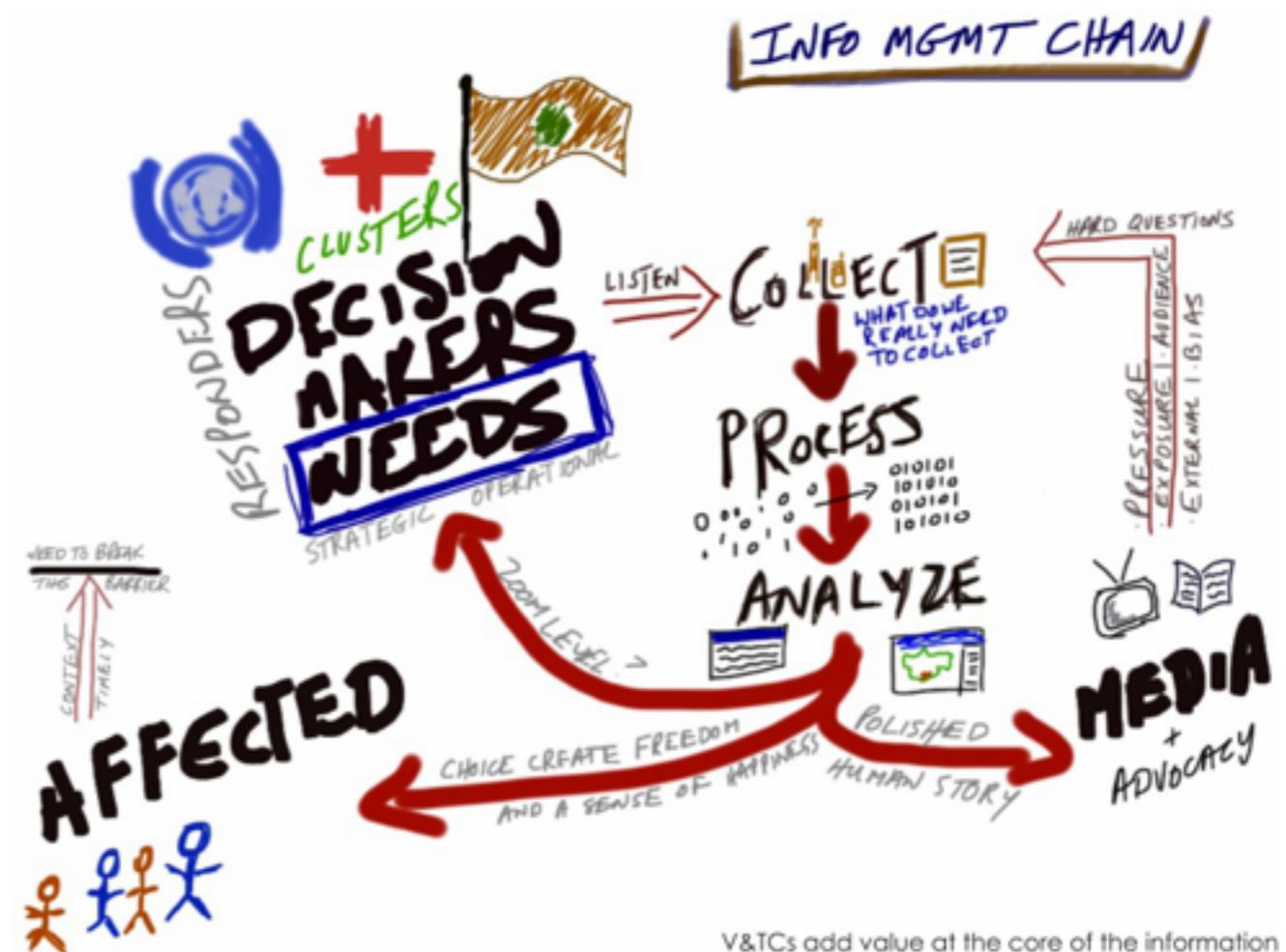
OpenStreetMap  
The Free Wiki World Map



# 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](#)

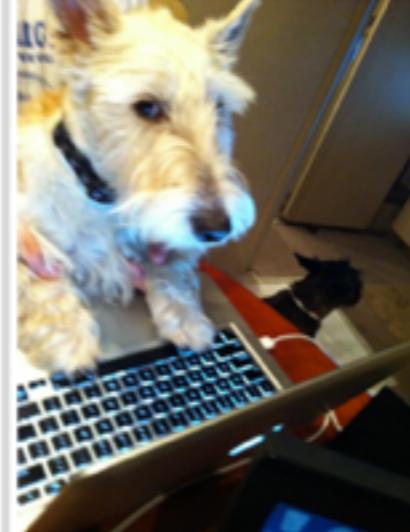
### Apollo

Found: Dog  
Contact : Sahar14



### Apollo

Lost: Dog  
Contact : mario



### Dandy

Lost: Dog  
Contact : Dave45



### Candy

Found: Dog  
Contact : Leysia15



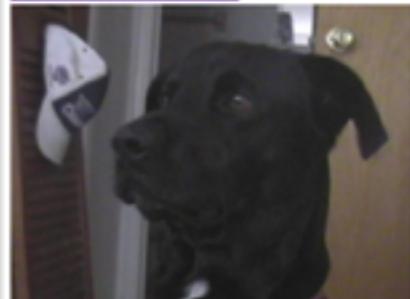
### Marley

Found: Dog  
Contact : Emily16



### Sparky

Found: Dog  
Contact : Joshua19



### Sydney

Lost: Dog  
Contact : Jacob40



### Toodle

Lost: Dog  
Contact : Emily16



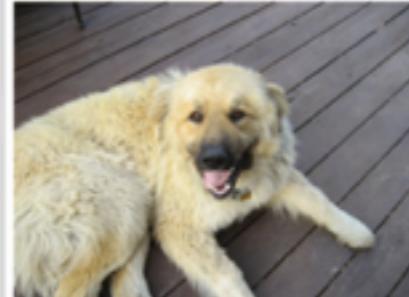
### Princess

Lost: Dog  
Contact : Emily16



### Fousey

Lost: Dog  
Contact : Jacob40



### Fousey

Lost: Dog  
Contact : Kenneth31



### Libby

Lost: Dog  
Contact : Daniel17



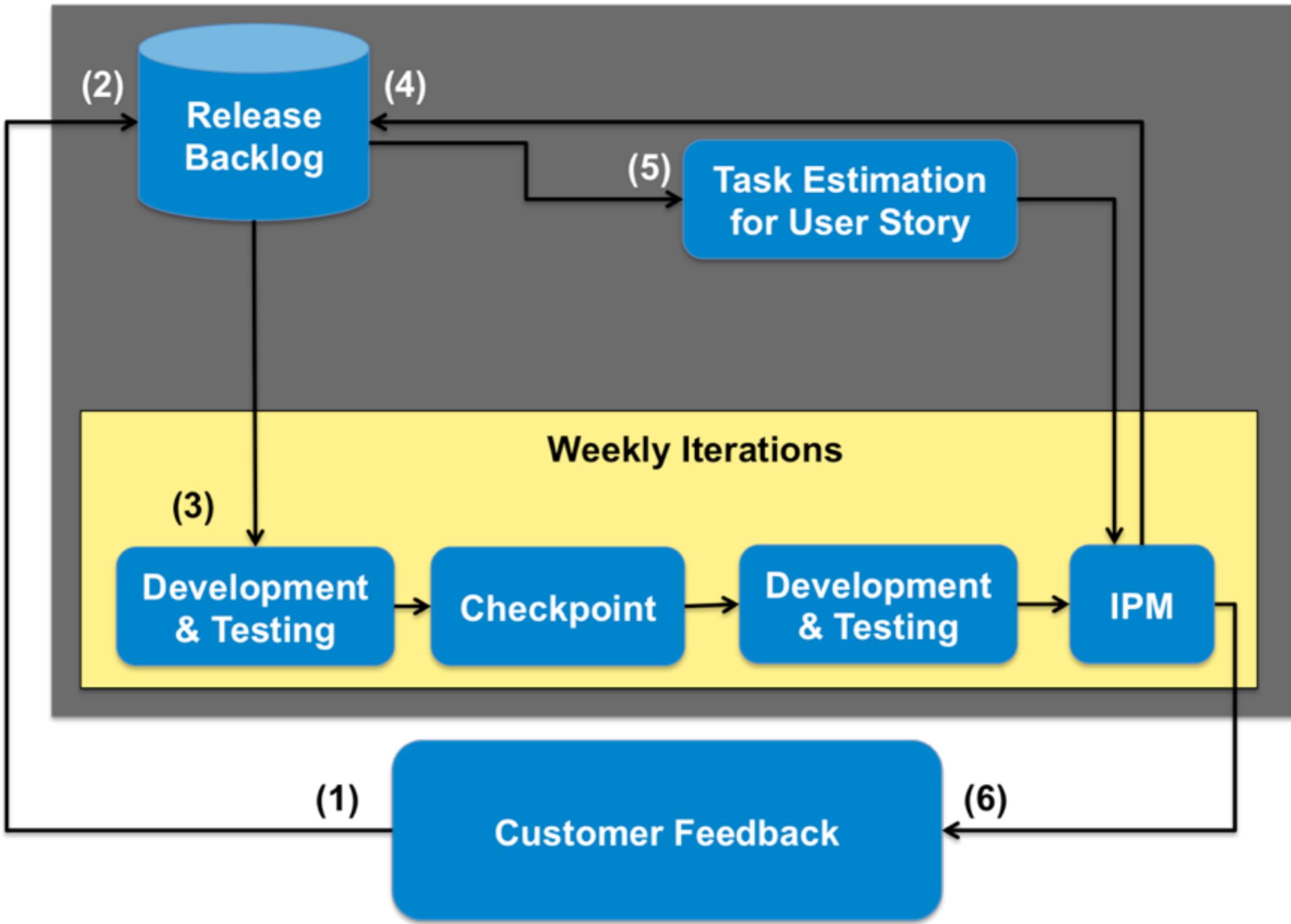
### Missy

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.