How Software Developers Mitigate Collaborative Friction with Chatbots

Carlene Lebeuf, Margaret-Anne Storey, Alexey Zagalsky
CHISEL Group, University of Victoria, Canada

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WHAT IS A CHATBOT?

An application that performs **automated**, **predefined**, and often **repetitive** tasks.

They act as conduits between users and services, typically through a conversational interface.

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CHATBOTS IN SOFTWARE DEVELOPMENT

Software teams use bots to fill **development roles** (Storey & Zagalsky, 2016)

- Code Quality
- Testing
- Development Operations
- Customer Support
- Documentation
- Entertainment

...but what about **Collaboration?**

How can chatbots support **collaboration** *in software development?*

- **RQ:** What **collaboration friction points** can chatbots help **mitigate** in software development, and how?

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COLLABORATIVE FRICTION

We derived a set of **collaborative friction points** in software development from...

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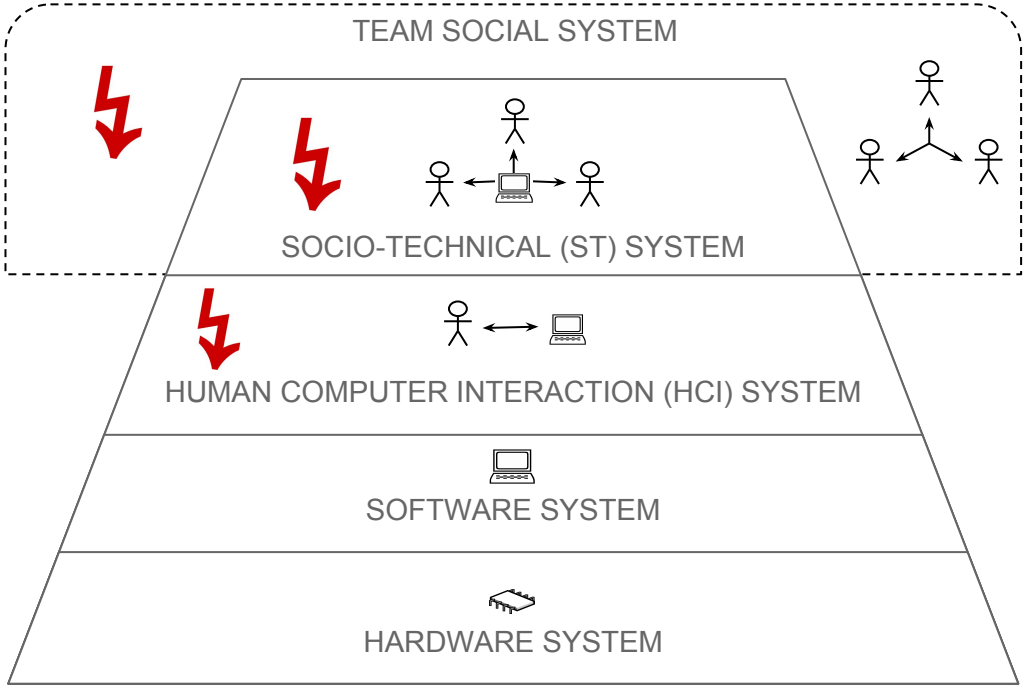
WHERE DO COLLABORATION BREAKDOWNS OCCUR?

The **Model of Socio-Technical Systems for Collaborative Software Development**, based on Whitworth's Model of Socio-Technical Systems (2008).



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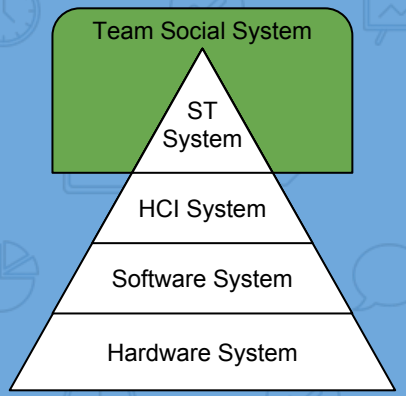
FRICTION IN TEAM INTERACTIONS



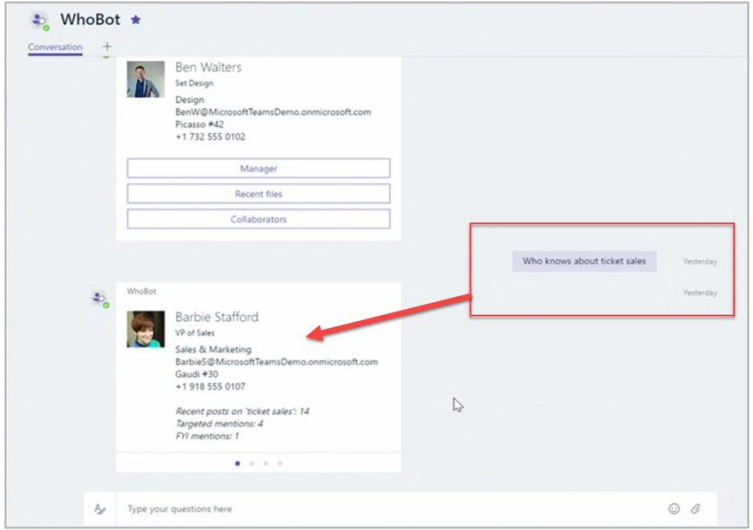
Friction in **team interactions**—the team's social system level—can occur when…

- Understanding team members' roles and expertise

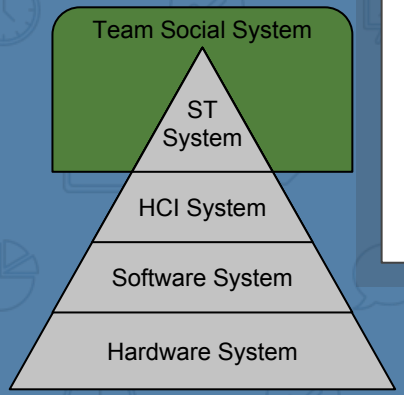
↯ Understanding team members' roles and expertise

Microsoft Teams' **WhoBot** can help!

"Who is… ?"
"Who knows about… ?"



https://www.onmsft.com/news/microsoft-teams-introduces-t-bot-and-who-bot



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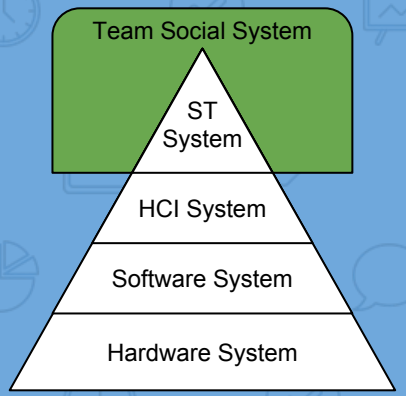
FRICTION IN TEAM INTERACTIONS



Friction in **team interactions**—the team's social system level—can occur when…

- Understanding team members' roles and expertise
- Adhering to team procedures and agreements
- Understanding and working towards team goals
- Coordinating team activities
- Managing trust and team cooperation

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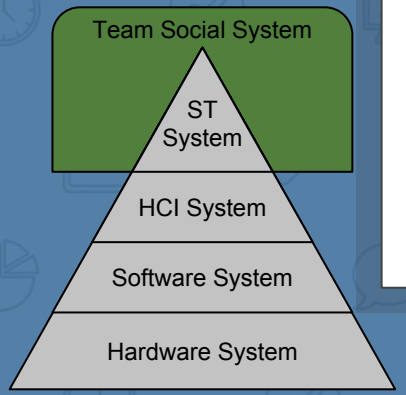
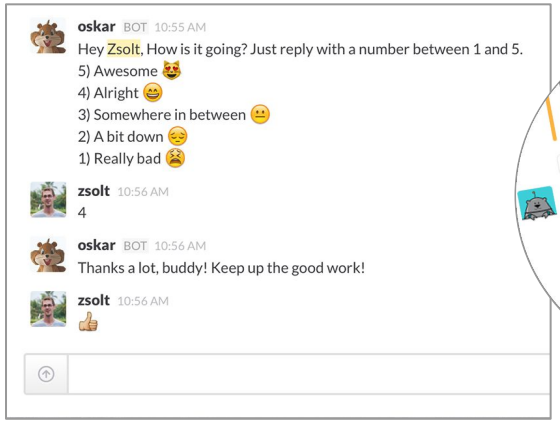
FRICTION IN TEAM INTERACTIONS

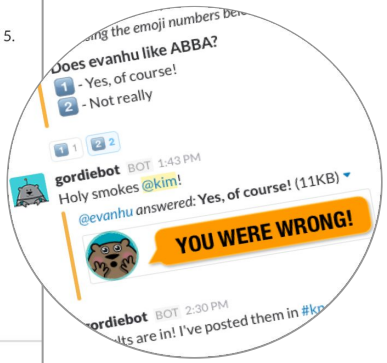


↯ Managing trust and team cooperation

Oskar checks in to see how you are doing, allowing teammates to offer support.



http://oskar.hanno.co/



Knelf is a team building trivia chatbot.

http://www.knelf.com/slack.html

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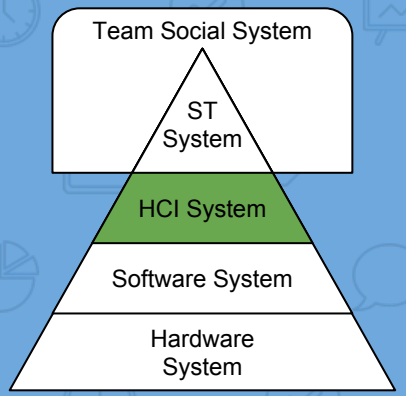
INDIVIDUALS' INTERACTIONS TECHNOLOGY



Friction from **individuals' interactions with technology**—the HCI system level—can occur when…

- Using distracting and interruptive technologies

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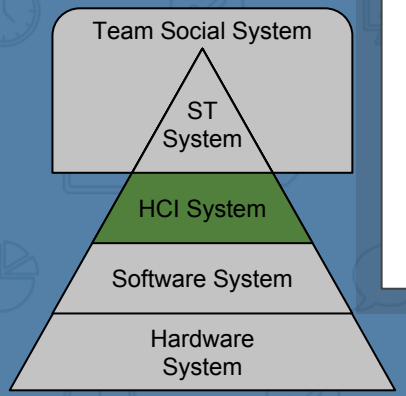
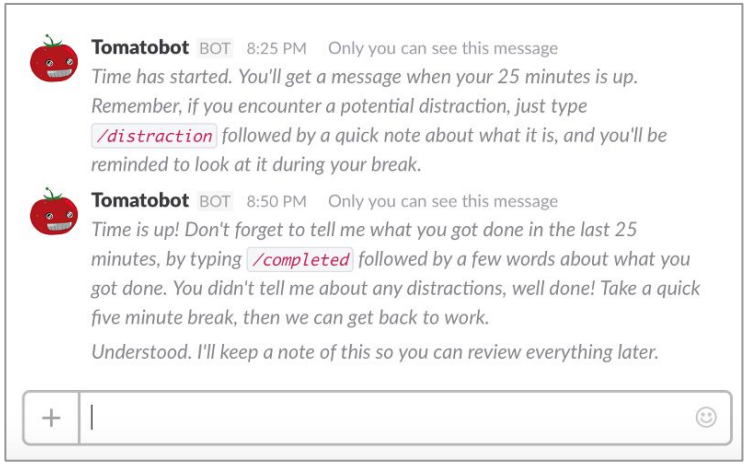
INDIVIDUALS' INTERACTIONS TECHNOLOGY



↯ Distracting and interruptive technologies

`Tomatobot` helps you reduce distractions and increase your productivity using the Pomodoro Method.



https://tomatobot.matthewhiggins.me/

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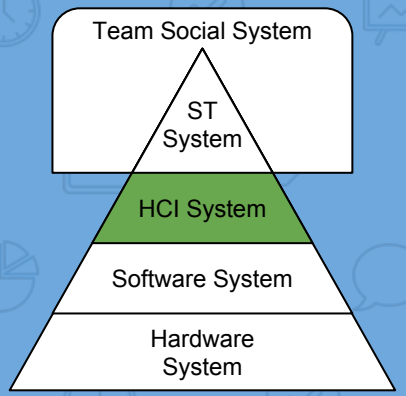
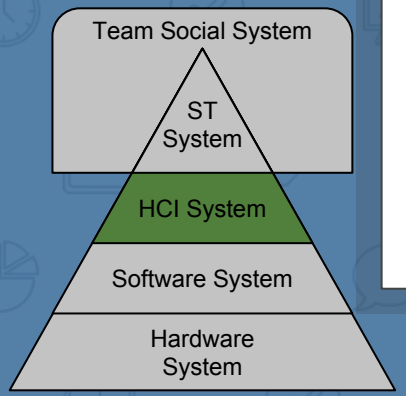
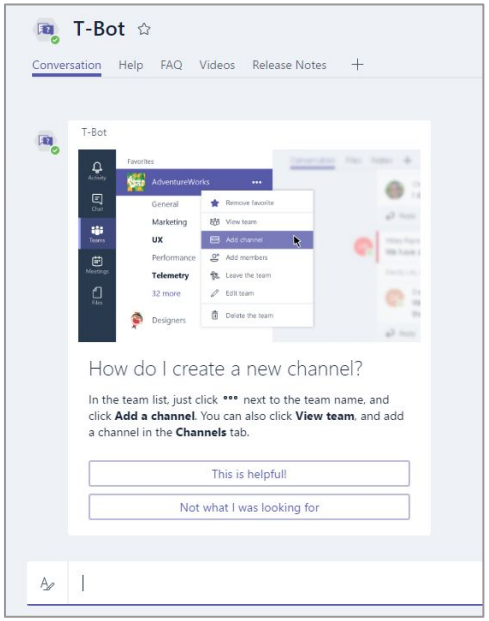


Friction from **individuals' interactions with technology**—the HCI system level—can occur when…

- Using distracting and interruptive technologies
- Maintaining awareness of new technologies
- Understanding channel affordances



↯ Understanding channel affordances



https://www.onmsft.com/news/microsoft-teams-introduces-t-bot-and-who-bot

T-Bot helps users understand how to use the Microsoft Teams platform.

"How do I... ?"

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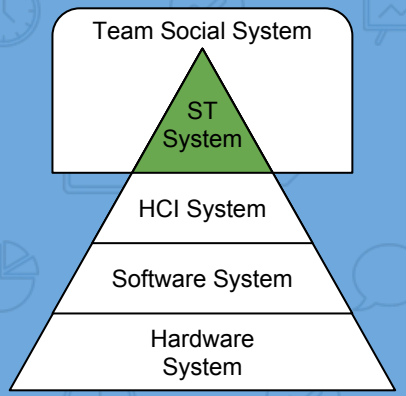
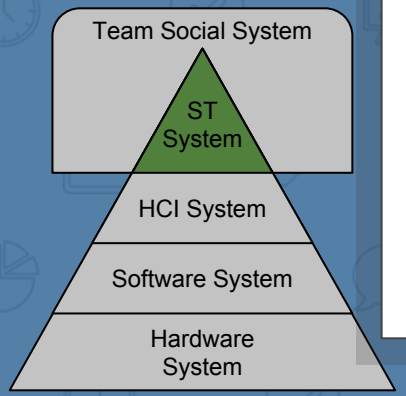
TEAMS' INTERACTIONS WITH TECHNOLOGY



Friction from **teams' interactions with technology**—the ST system level—can occur when...

- Experiencing information overload

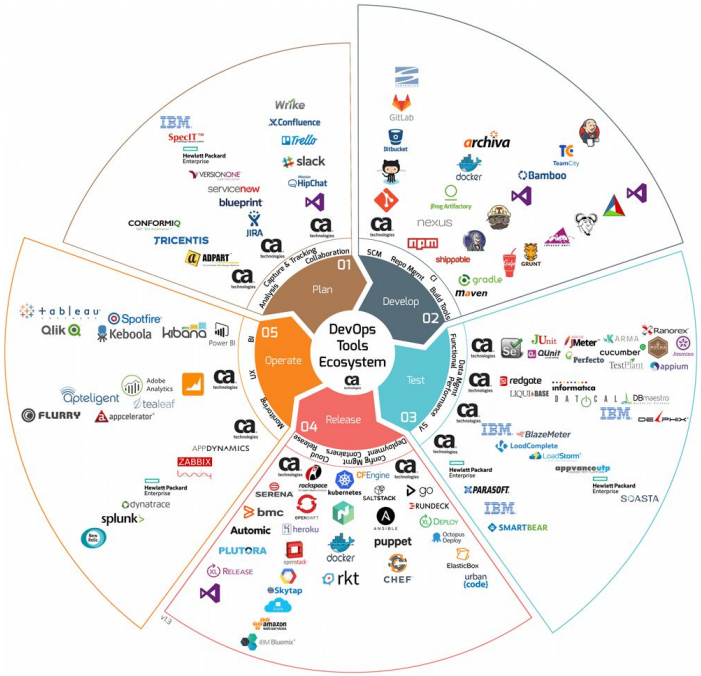


Information overload

Developers use chatbot-style integrations for their **everyday tools**.

"You take Slack out of the equation and all of these integrations that we have tied into it …. We'd have to have all of those notifications open in tabs... and some of them we can't get that way. … **We're blind**."

- Software Developer (Startup, 2012)



https://dzone.com/articles/the-ultimate-devops-tools-ecosystem-tutorial-part

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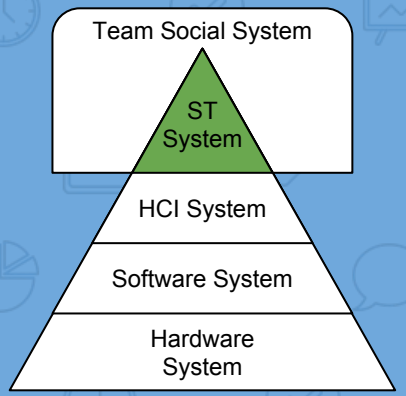
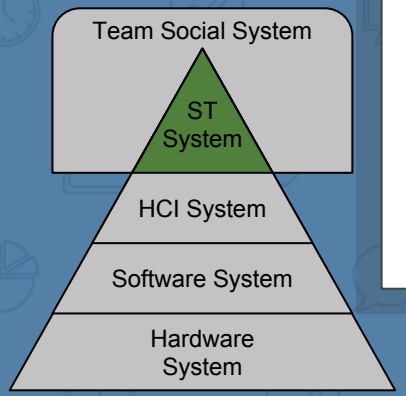
TEAMS' INTERACTIONS WITH TECHNOLOGY



Friction from **teams' interactions with technology**—the ST system level—can occur when...

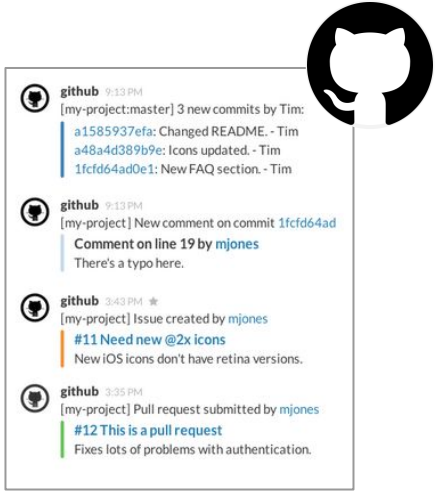
- Experiencing information overload
- Adopting and understanding tool usage in the team's context
- Maintaining awareness of project activities



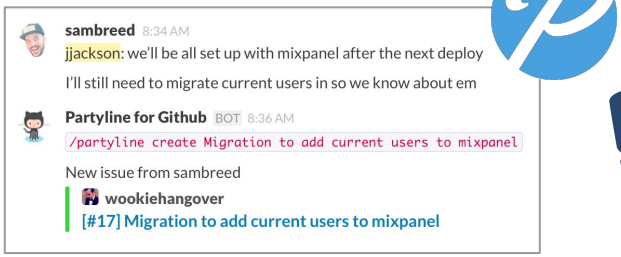
↯ Maintaining awareness of project activities.

"We have all of our public facing GitHub repos <integrated with Slack>, so <we can get notified> and also chat about it inside Slack."

- Software Developer (Startup, 2016)

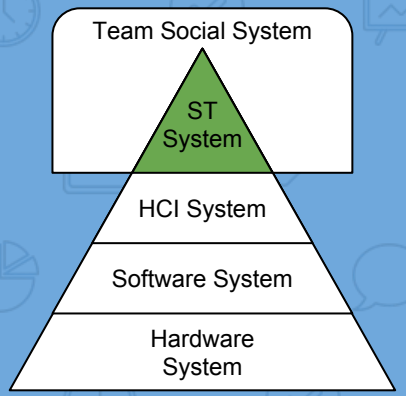


https://github.com



http://partyline.rocks

TEAMS' INTERACTIONS WITH TECHNOLOGY



Friction from **teams' interactions with technology**—the ST system level—can occur when...

- Experiencing information overload
- Adopting and understanding tool usage in the team's context
- Maintaining awareness of project activities
- Inadequate collaboration tooling
- Miscommunication on text-based channels

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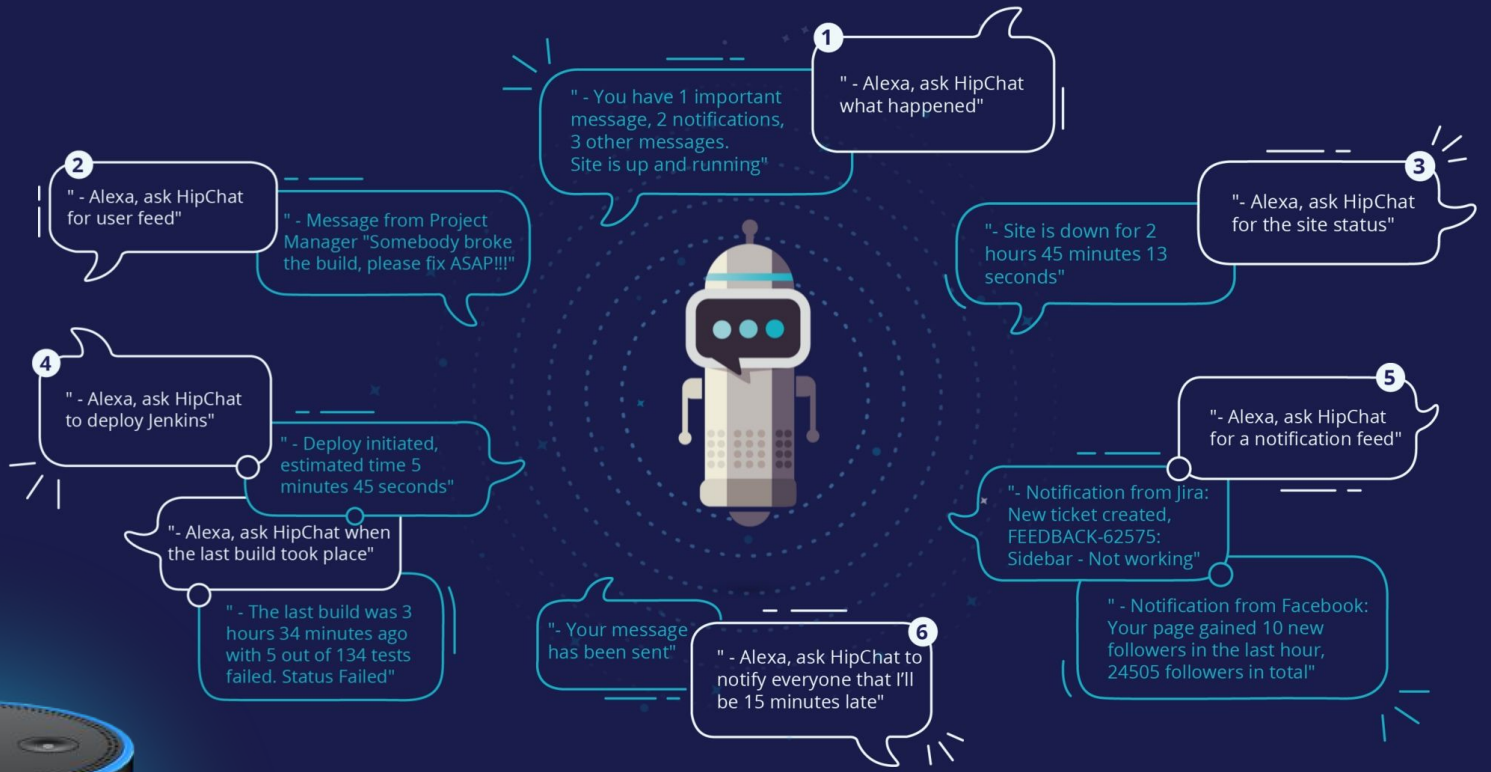
BRINGING “VOICE” INTO SOFTWARE DEVELOPMENT



softserve

http://demo.softserveinc.com/voicemybot

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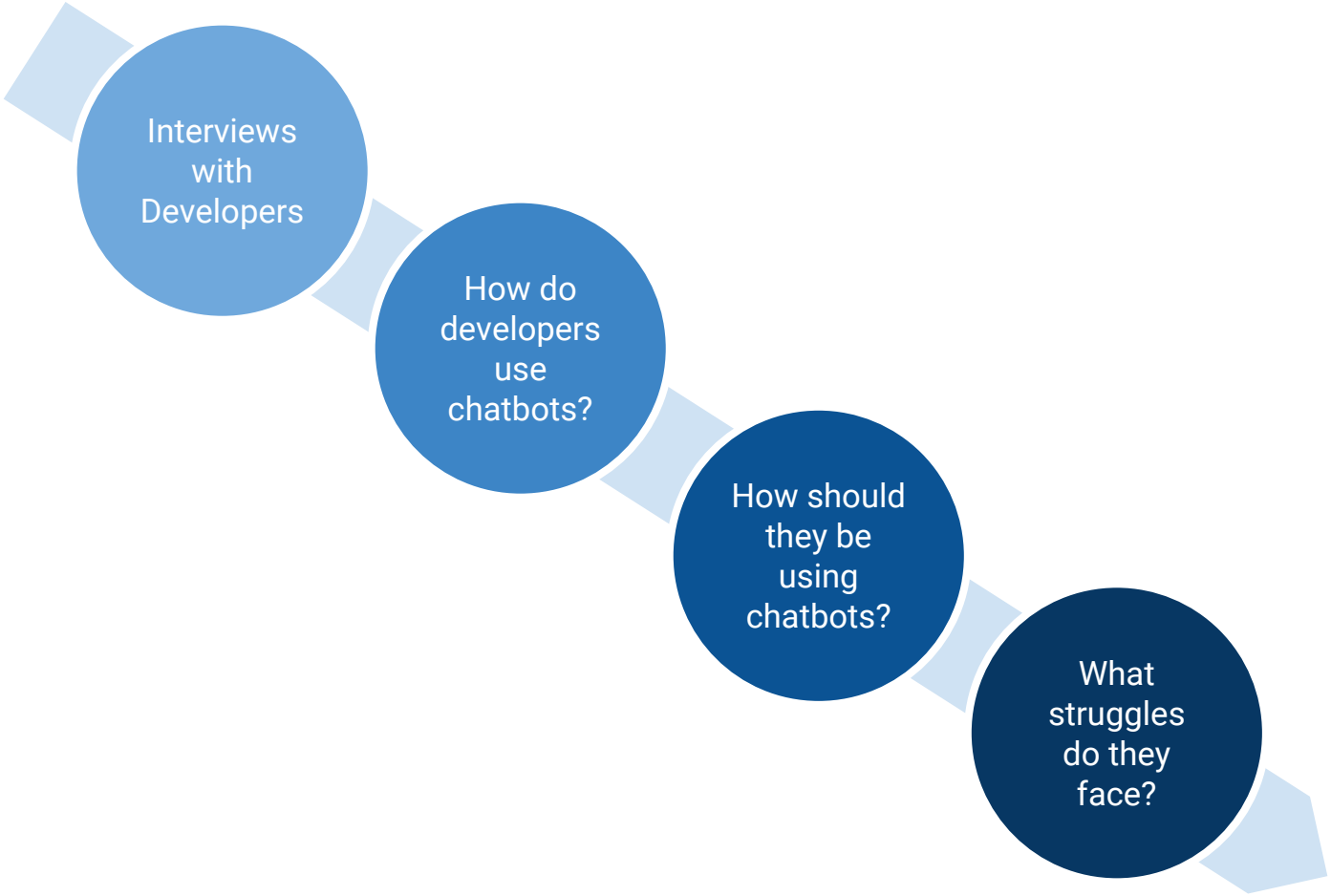
BRINGING “VOICE” INTO SOFTWARE DEVELOPMENT

https://youtu.be/Fa6iMosg3hM

NEXT STEPS


Interviews with Developers
How do developers use chatbots?
How should they be using chatbots?
What struggles do they face?

Thanks!

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Points for Discussion...

1. How should we **study** chatbots? Can existing models and theories of collaboration help explain how chatbots are being used?
2. What **other collaborative friction points** can be addressed with new or existing chatbots?
3. With rapid progress being made in the fields of AI, ML, and speech interfaces, how might this **change the use of chatbots** in the future?
4. What **risks** are introduced by adopting chatbots in software development?