SyPet: Component-based synthesis for complex APIs

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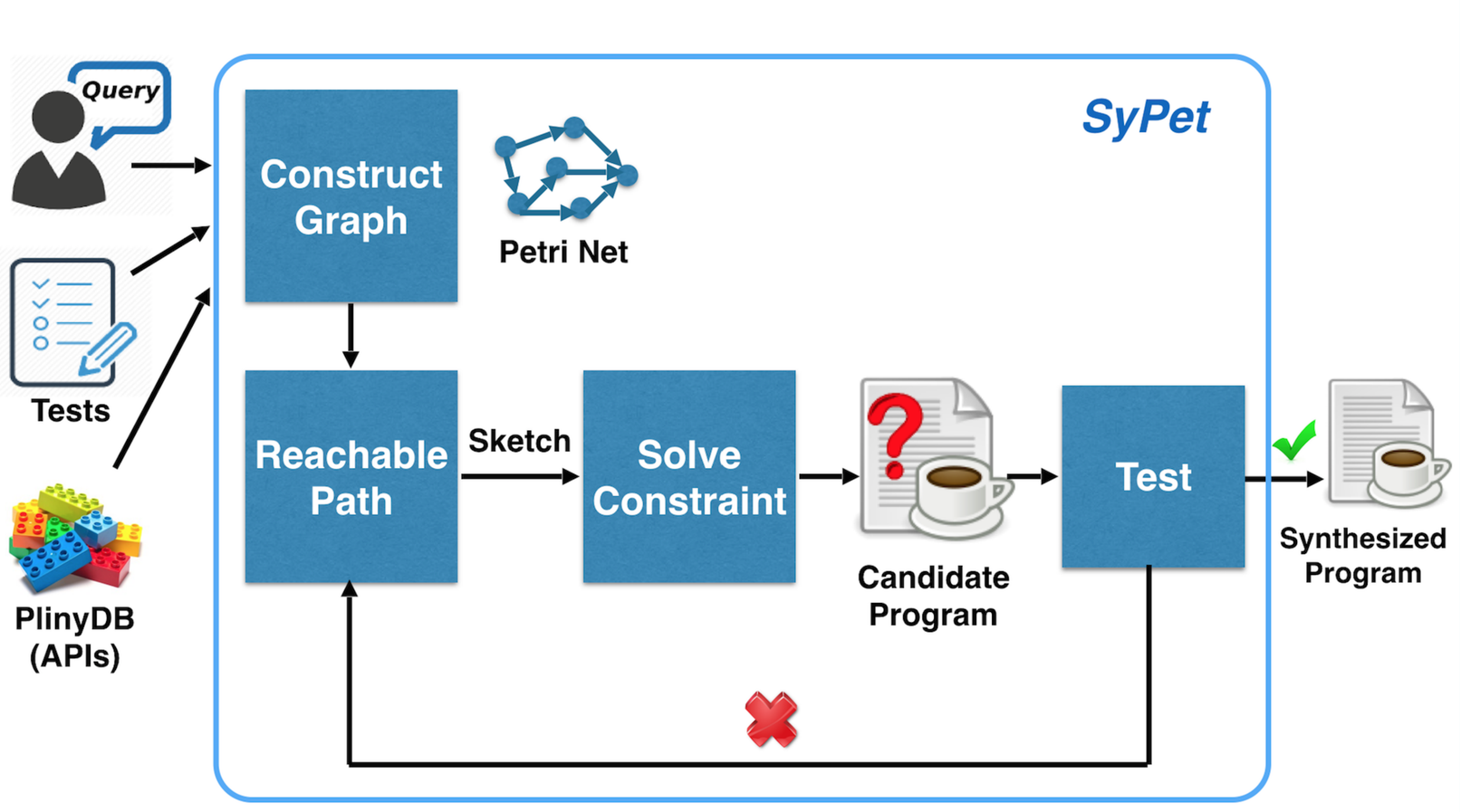
Goal

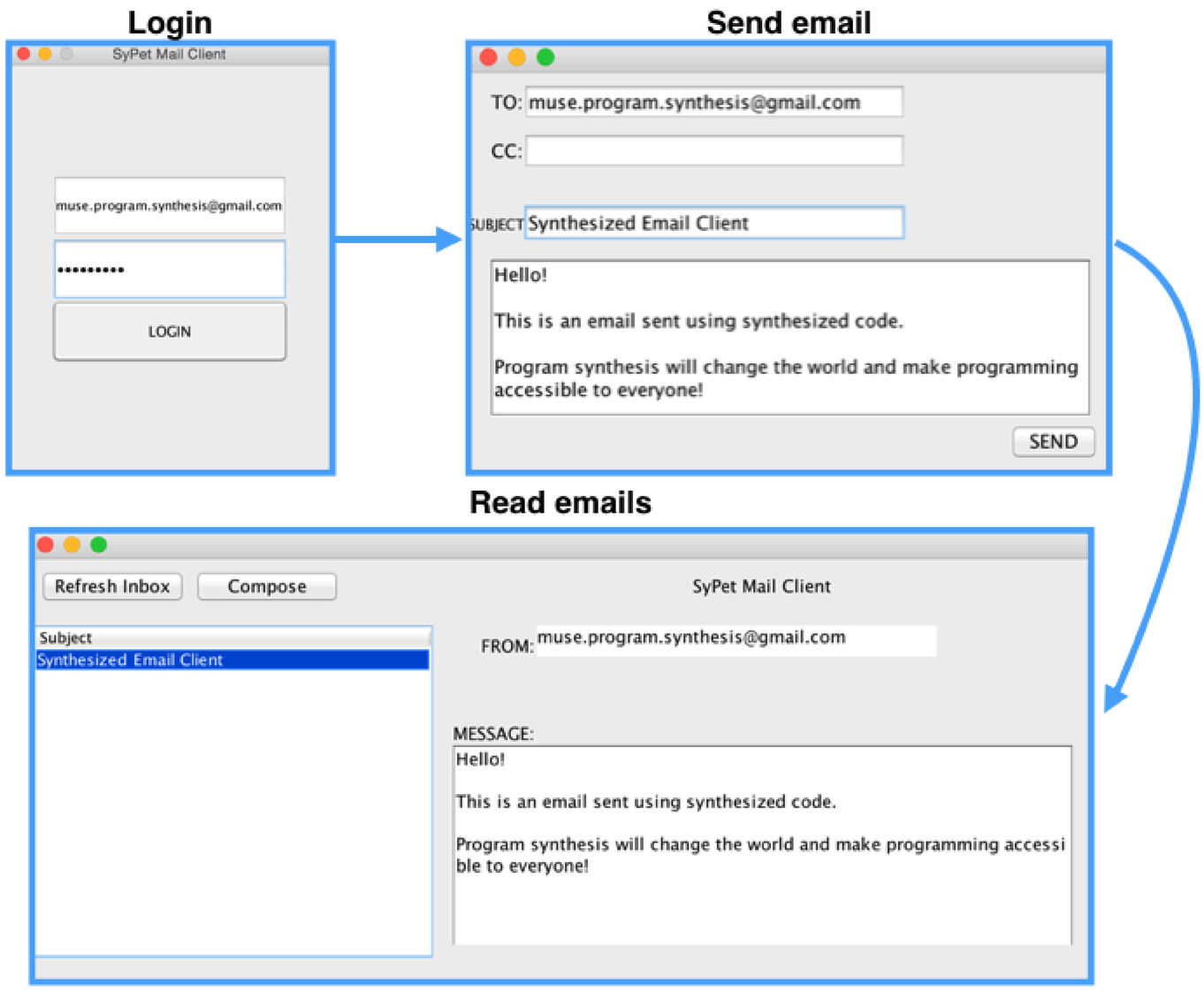
SyPet is a component-based synthesizer for *large* libraries that automatically synthesizes programs by composing API calls.

Overview



Synthesized Mail Client

Mail client using the synthesized code by SyPet for "login", "send email" and "read emails":



Acknowledgments

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SyPet at POPL'17

SyPet has been published at POPL 2017: "Component-Based Synthesis for Complex APIs". Yu Feng, Ruben Martins, Yuepeng Wang, Isil Dillig, and Thomas W. Reps.

New Features

- Support for simple conditionals and loops
- Simple specifications that over-approximate the behavior of APIs
- User can provide "hints" to the tool (keywords, APIs)
- Using machine learning to guide the search
- Graphical interface
- Application: Mail clients

Example

Synthesize "send email" functionality with SyPet:

```
import import javax.mail.*;

void sendEmail(String user, String pwd,
String host, String to, String cc,
String subject, String body, Transport
tp,Properties prop)
{

Session v1 =
   Session.getDefaultInstance(prop);
Message v2 = new MimeMessage(v1);
InternetAddress v3 =
   new InternetAddress(to);
InternetAdress v4 =
   new InternetAdress(cc);
v2.setRecipient(RecipientType.TO, v3);
v2.addRecipient(RecipientType.CC, v4);
v2.setSubject(subject);
v2.setContent(body, "text/html");
Address[] v5 = v2.getAllRecipients();
tp.connect(host, user, pwd);
tp.sendMessage(v2, v5);
}
```