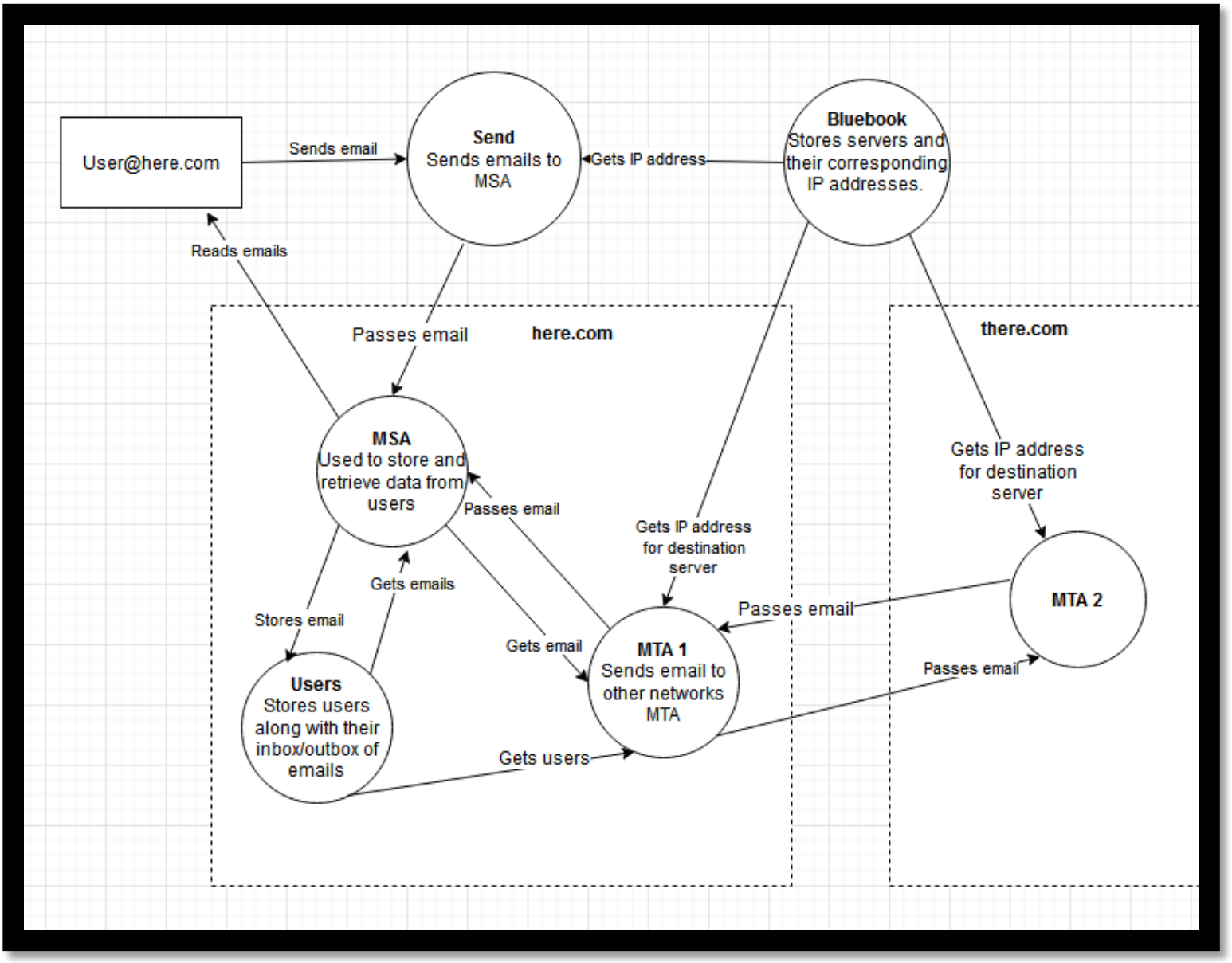
Email Service Built from Microservices

Microservice Identification



In this graph, nodes (circles) represent microservices and arcs (arrows) represent communication channels between said microservices. An email server is made up of three microservices; a Mail Submission Agent (MSA), a Message Transfer Agent (MTA), and a User storage system. This set of email service microservices can be deployed over multiple networks with different server names (e.g. here.com, there.com). There is a separate Bluebook microservice which stores a list of email services operating and their respective IP address. Emails are encoded in JSON with three fields; To, From and Body.

An email is sent via the Send microservice, this microservice looks up the e-mail server name in the 'From' field in the Bluebook microservice, so the email can be forwarded to the correct MSA microservice. The MSA puts any emails received into the correct user's outbox. At regular intervals, the MTA uses the MSA to read and delete messages from a user's outbox, and sends

this message across to another e-mail server, whose MTA uses its MSA to add the message to another user's inbox. At any time, a user may ask the MSA to list the messages in their inbox, or to read and delete messages from their inbox.

Microservice Usages

Bluebook

Operation	Method	Route
Create	POST	/bluebook/{server}
Read	GET	/bluebook/{server}
Update	PUT	/bluebook/{server}
Delete	DELETE	/bluebook/{server}

> curl -v -X POST -d "192.168.1.4" https://192.168.1.2:8888/here.com
- Creates an entry in the bluebook server with server name as here.com and ip as 192.168.1.4

> curl -v -X GET https://192.168.1.2:8888/here.com
- Returns the IP address of here.com

>curl -v -X PUT -d "192.168.1.5" https://192.168.1.2:8888/here.com
- Updates the entry in the bluebook server for here.com, changes from to 192.168.1.5

>curl -v -X DELETE https://192.168.1.2:8888/here.com
- Deletes the entry for here.com

User

Operation	Method	Route
Create	POST	/users
Store	PUT	/users/{user}/{box}/{subject}
Delete	DELETE	/users/{user}/{box}/{subject}
ReadEmail	GET	/users/{user}/{box}/{subject}
List	GET	/users/{user}/{box}
ReadUsers	GET	/users

> curl -v -X POST -d "me" https://192.168.1.51:8888/users
- Creates a user with the name of "me", along with an inbox and outbox

> curl -v -X PUT -d "{\"To\":\"someone@there.com\",\"From\":\"me@here.com\",\"Body\":\"Hello World\"}" https://192.168.1.51:8888/users/me/outbox/anEmailSubject
- Puts an email into the user's outbox

> curl -v -X GET https://192.168.1.51:8888/users/me/inbox/aDifferentEmailSubject
- Returns the email with "aDifferentEmailSubject" as the subject in JSON format from the user's inbox

> curl -v -X DELETE https://192.168.1.51:8888/users/me/inbox/aDifferentEmailSubject
- Deletes the email with “aDifferentEmailSubject” as the subject from the user’s outbox

> curl -v -X GET https://192.168.1.51:8888/users/me/inbox
- Returns a list of all email subjects that are in the user’s inbox

> curl -v -X GET https://192.168.1.51:8888/users
- Returns a list of all user names that are on this server

Send

Operation	Method	Route
Send	POST	/emailserver/{subject}/send

> curl -v -X POST -d “{\”To\”:\”someone@there.com\”,\”From\”:\”me@here.com\”,\”Body\”:\”Hello World\”}” https://192.168.1.3:8888/emailserver/anEmailSubject/send
- Sends an email to someone@there.com from me@here.com with the body “Hello World” and subject “anEmailSubject”

MSA

Operation	Method	Route
Receive	POST	/MSA/{subject}/toInbox
Send	POST	/MSA/{subject}/toOutbox
List	GET	/MSA/{user}/{box}
Read	GET	/MSA/{user}/{box}/{title}
Delete	DELETE	/MSA/{user}/{box}/{title}

> curl -v -X POST -d “{\”To\”:\”someone@there.com\”,\”From\”:\”me@here.com\”,\”Body\”:\”Hello World\”}” https://192.168.1.52:8888/MSA/anEmailSubject/toInbox
- Sends an email to a user’s inbox

> curl -v -X POST -d “{\”To\”:\”someone@there.com\”,\”From\”:\”me@here.com\”,\”Body\”:\”Hello World\”}” https://192.168.1.52:8888/MSA/anEmailSubject/toOutbox
- Sends an email to a user’s outbox

> curl -v -X GET https://192.168.1.52:8888/me/inbox
- Prints a list of emails in the inbox of user “me”, in a formatted way

> curl -v -X GET https://192.168.1.52:8888/me/inbox/anEmailSubject
- Prints the email with subject “anEmailSubject” in a formatted way

> curl -v -X DELETE https://192.168.1.52:8888/me/inbox/anEmailSubject
- Deletes the email with subject “anEmailSubject” from the user’s inbox

MTA

Operation	Method	Route
RecieveEmail	POST	/MTA/{subject}/recieveEmail

> curl -v -X POST -d "{\"To\":\"someone@there.com\",\"From\":\"me@here.com\",\"Body\":\"Hello World\"}" https://192.168.1.53:8888/MTA/anEmailSubject/receiveEmail

- Uses the server's MSA to move the email to the correct user's inbox

Deploying the Service

There are 4 shell files, two to setup and terminate the Bluebook/Send microservices, and two to setup and terminate the MSA/MTA/Users microservices.

There are no options when deploying Bluebook and Send, Send will always use the ip 192.168.1.2, and Bluebook will always use 192.168.1.3.

When deploying MSA/MTA/Users, you will have the option to choose the server name (here.com, there.com, etc.), the server ip, and a port for each of the microservices. When making requests to each of the microservices, add a 1 at the end for Users, 2 for MSA and 3 for MTA. For example if you chose the ip 192.168.1.5, address Users with 192.168.1.51, MSA with 192.168.1.52, and MTA with 192.168.1.53.

For all microservices the external port you use to make requests is :8888.