

Microservices Migration Patterns



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Hands-on Software Architect / Published Author
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<http://www.wmrichards.com>

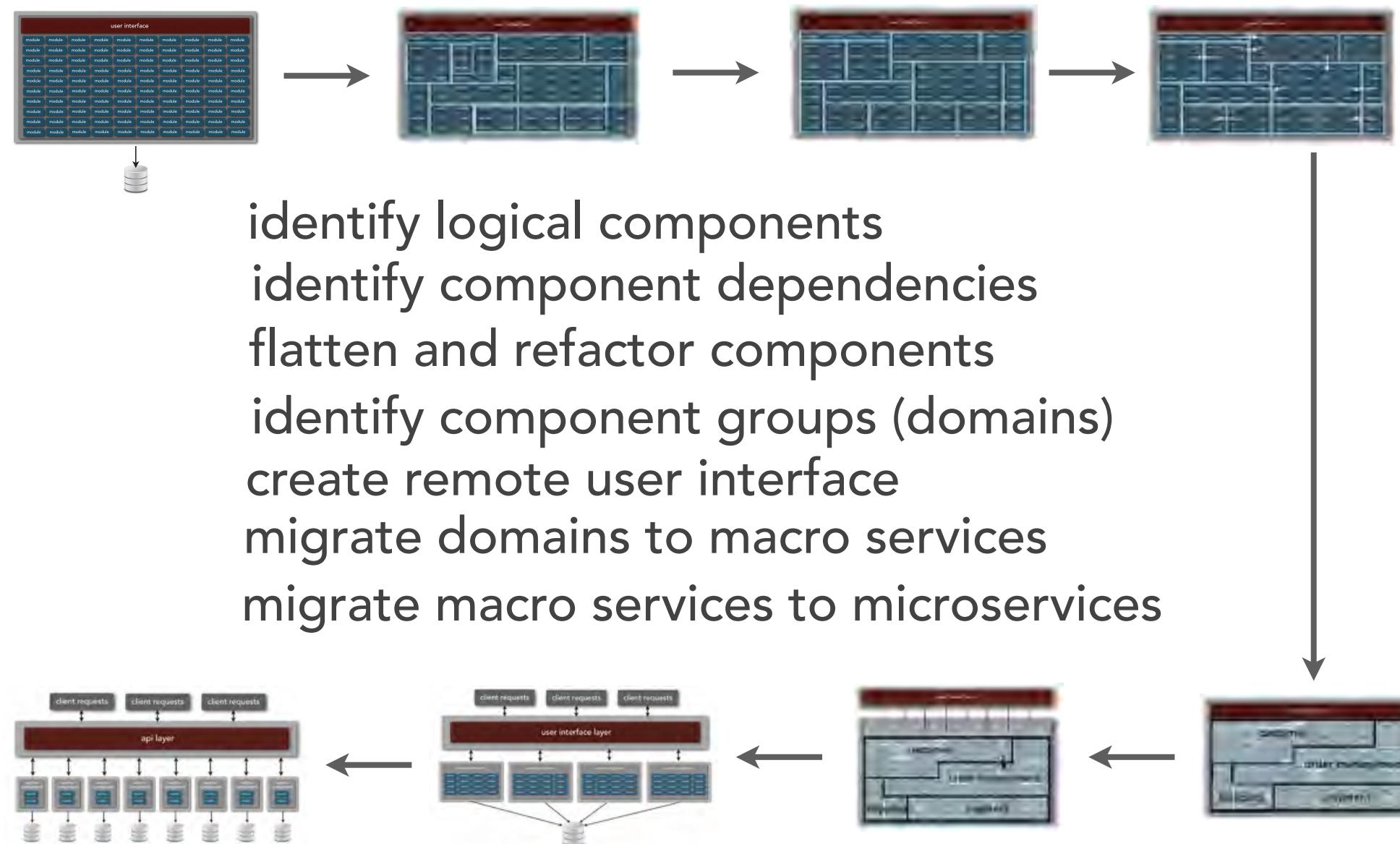
<https://www.linkedin.com/in/markrichards3>

@markrichardssa



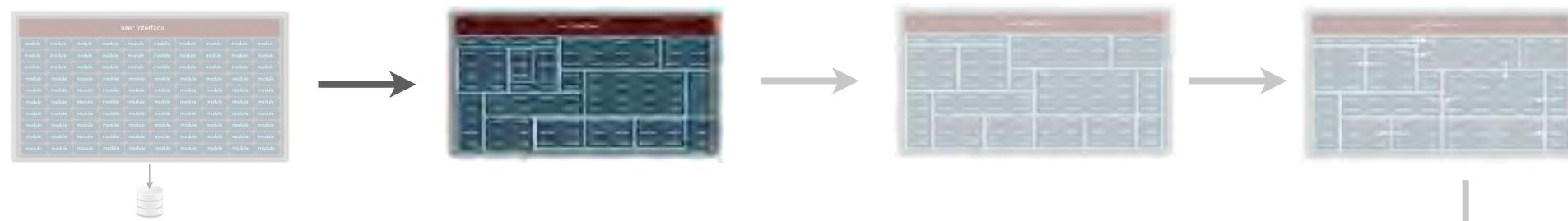
migration patterns

microservices roadmap

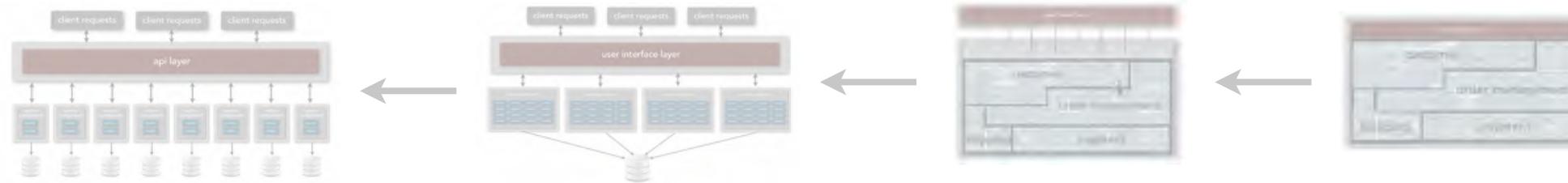


migration patterns

microservices roadmap

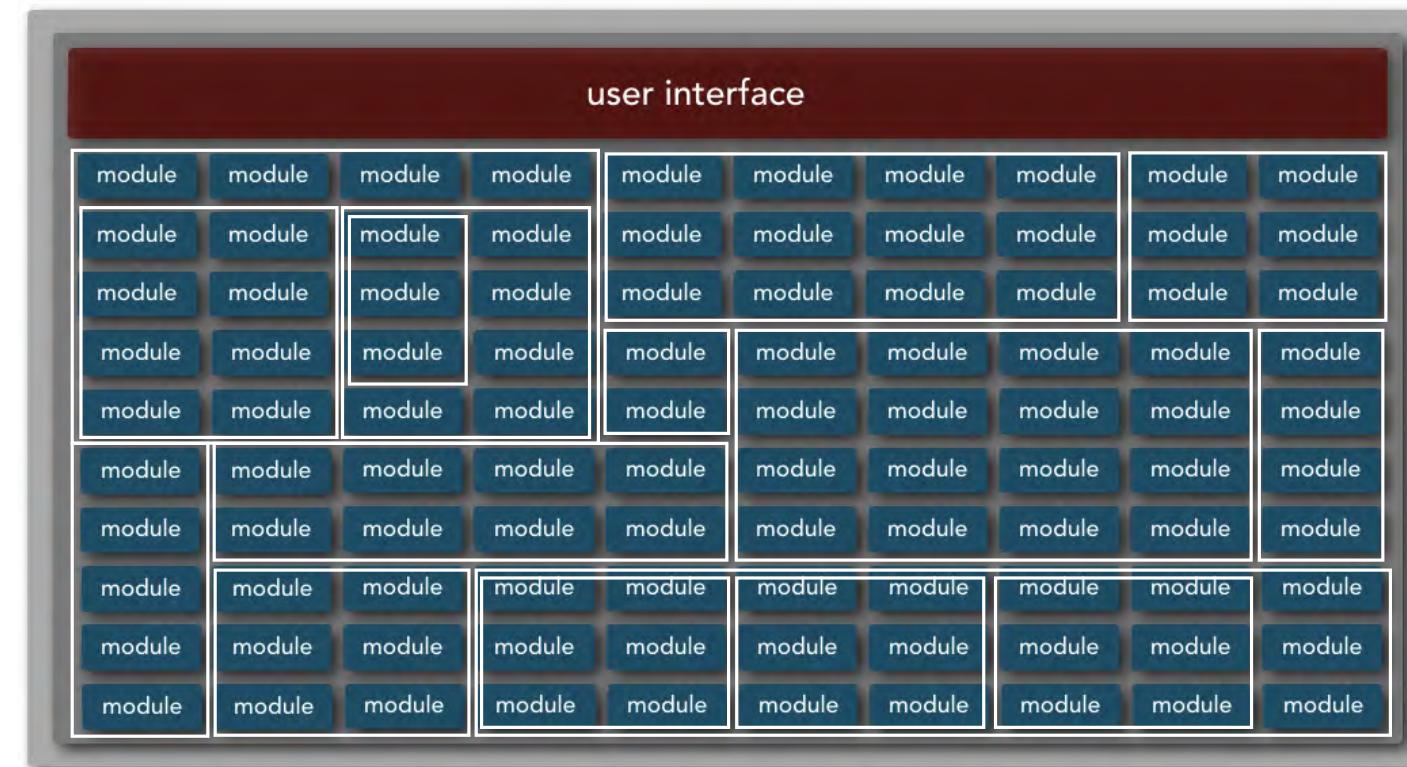


identify logical components



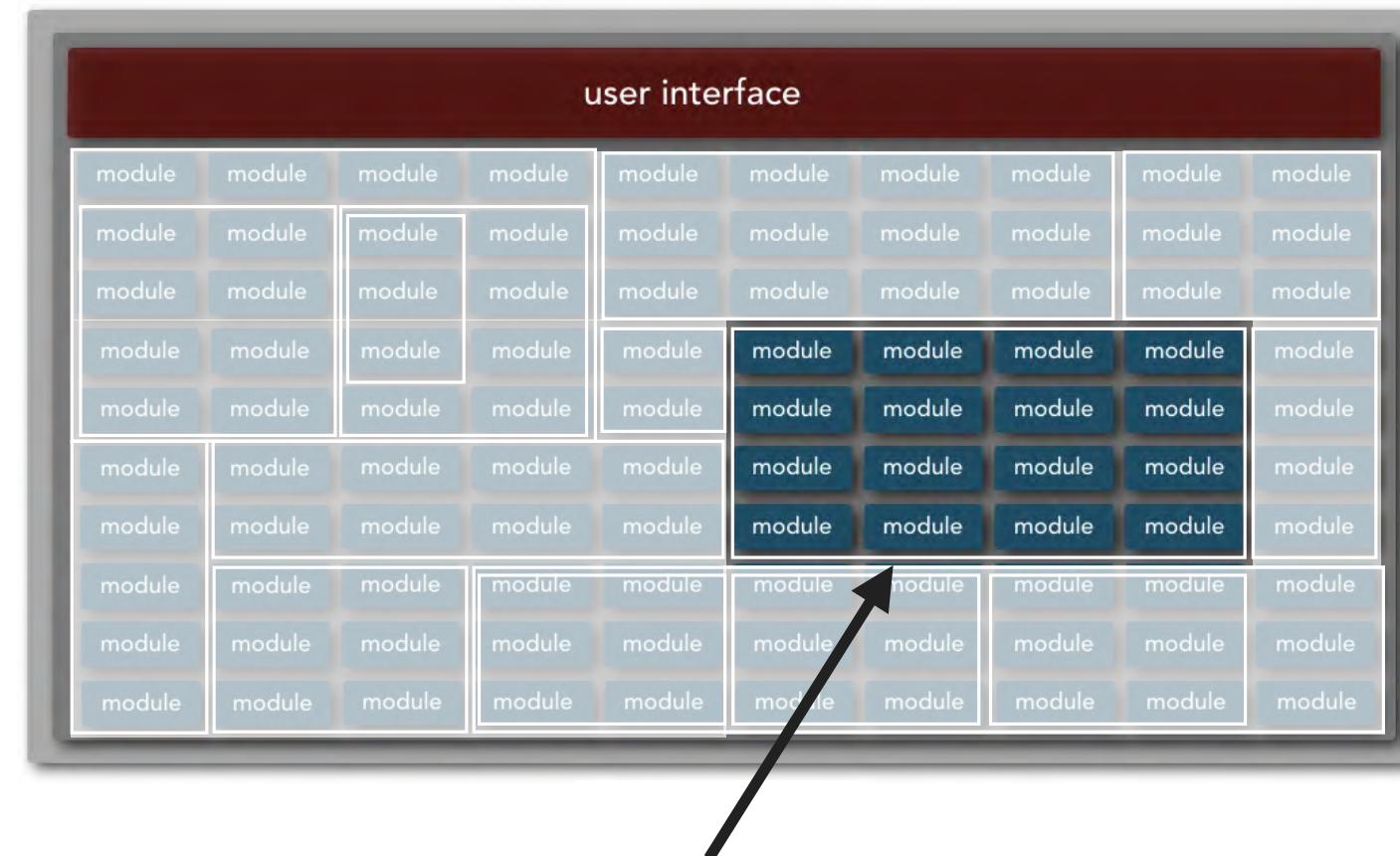
migration patterns

identify logical components



migration patterns

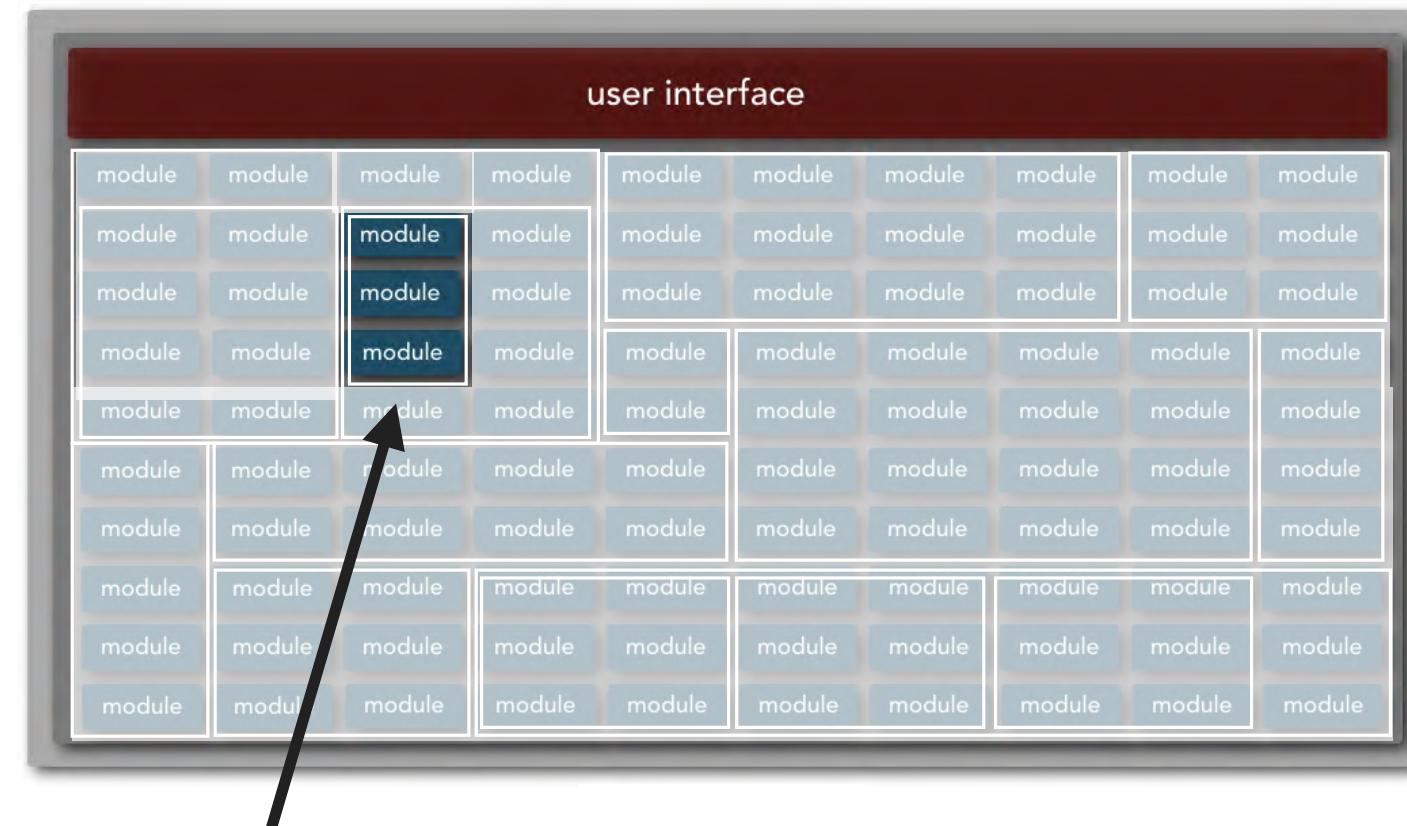
identify logical components



app.payment

migration patterns

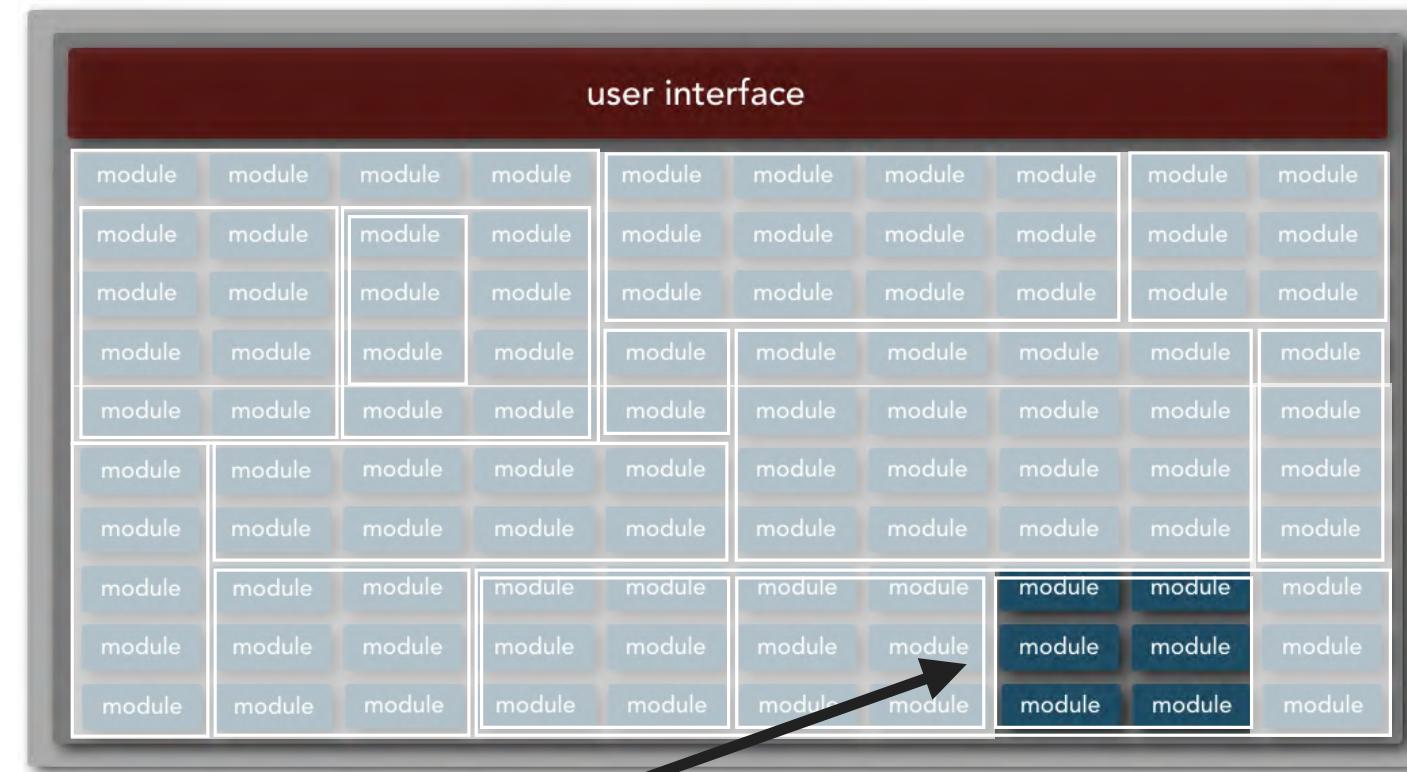
identify logical components



app.customer.notification.sms

migration patterns

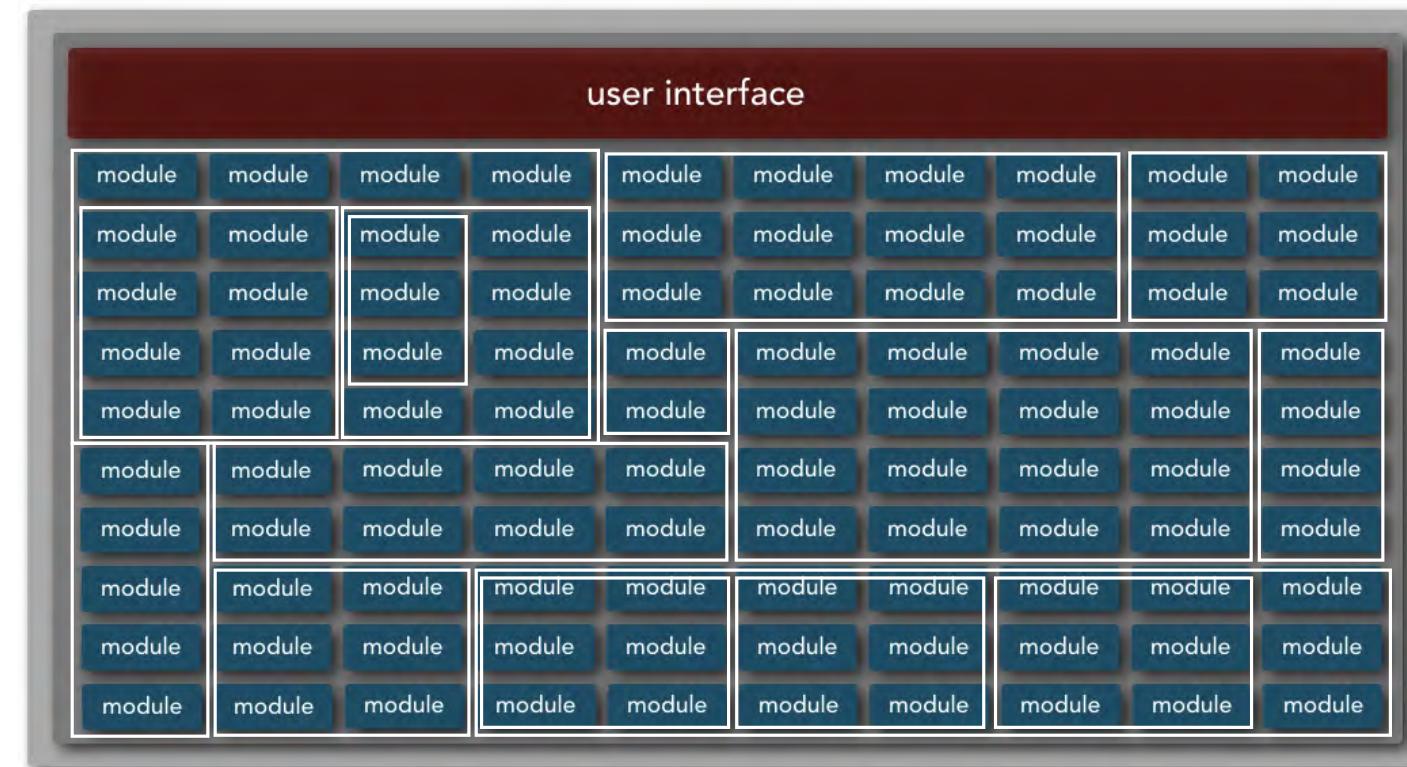
identify logical components



app.order.history

migration patterns

identify logical components



Component Size Analysis

Total Statements: 129304

Total Components: 27

Avg Statements Per Component: 4789

Standard Deviation: 10535

%	stmts	files	sdev	root	ca	ce	ct	component
1	53	3	1	*	24	2	26	business.framework.bos
41	54183	581	5		20	10	30	business.framework.bos.ae
3	4787	46	1		5	5	10	business.framework.bos.bi
7	9245	97	1		0	5	5	business.framework.bos.bv
3	5023	79	1		5	11	16	business.framework.bos.cm
2	2721	29	1		2	8	10	business.framework.bos.cn
6	8511	46	1		16	4	20	business.framework.bos.cr
3	4694	48	1		6	7	13	business.framework.bos.cs
4	5174	73	1		4	10	14	business.framework.bos.di
2	3387	71	1		2	7	9	business.framework.bos.dx
1	2234	83	1		3	5	8	business.framework.bos.ed
5	7002	77	1		2	9	11	business.framework.bos.es
1	1015	41	1		7	6	13	business.framework.bos.fw
1	421	13	1		0	5	5	business.framework.bos.hm
1	385	6	1		0	7	7	business.framework.bos.mi
1	163	7	1		0	3	3	business.framework.bos.pr

Component Size Analysis

Total Statements: 129304

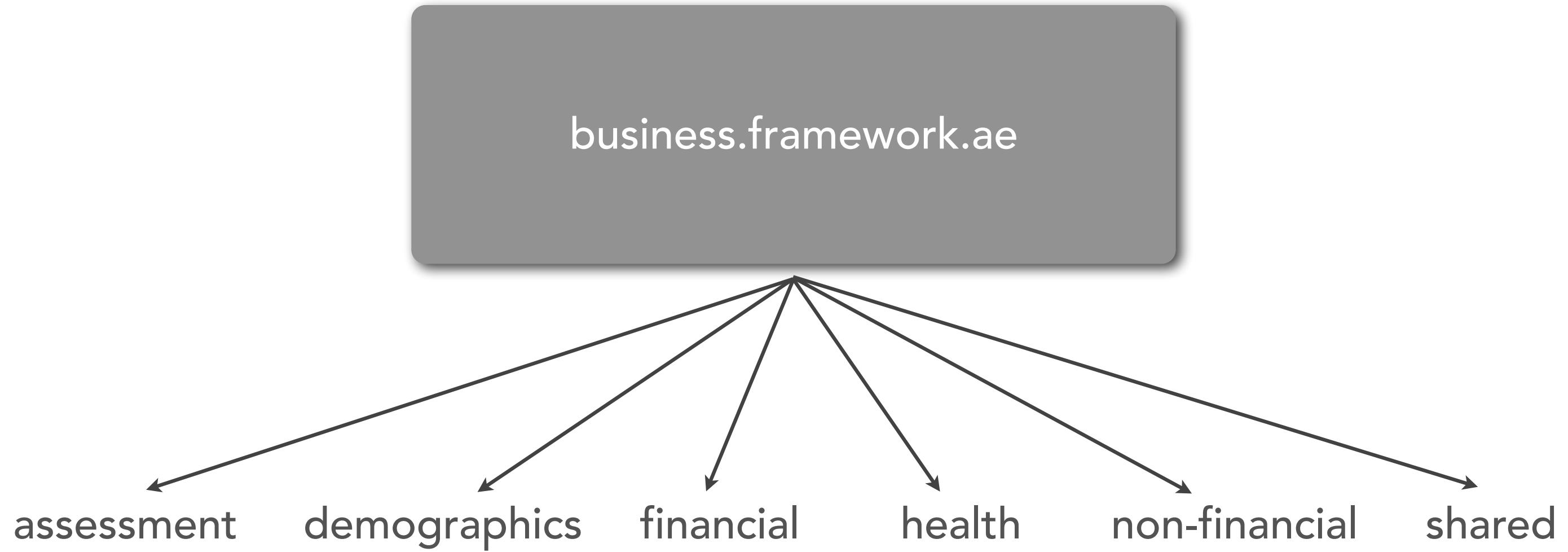
Total Components: 27

Avg Statements Per Component: 4789

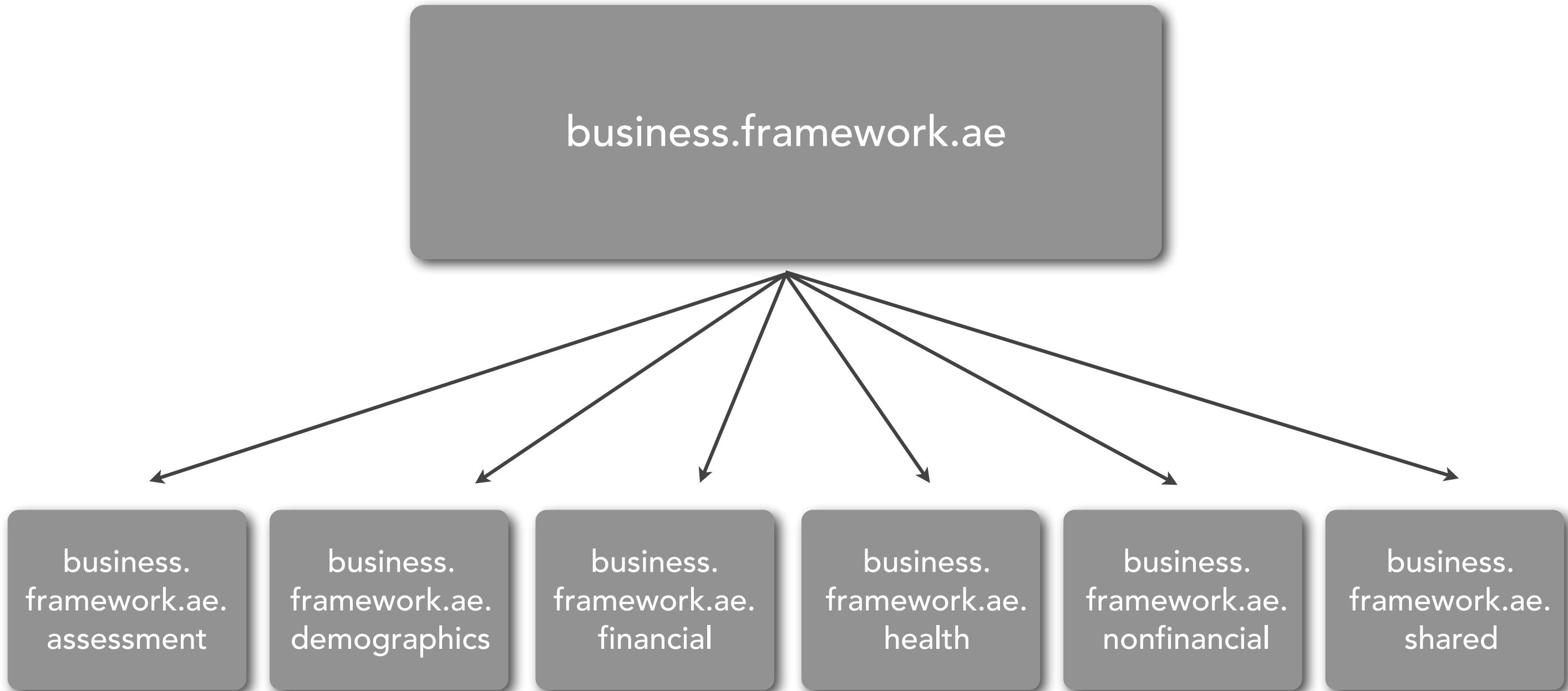
Standard Deviation: 10535

%	stmts	files	sdev	root	ca	ce	ct	component
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41	54183	581	5	*	20	10	30	business.framework.bos.ae
3	4787	46	1	*	5	5	10	business.framework.bos.bi
7	9245	97	1	*	0	5	5	business.framework.bos.bv
3	5023	79	1	*	5	11	16	business.framework.bos.cm
2	2721	29	1	*	2	8	10	business.framework.bos.cn
6	8511	46	1	*	16	4	20	business.framework.bos.cr
3	4694	48	1	*	6	7	13	business.framework.bos.cs
4	5174	73	1	*	4	10	14	business.framework.bos.di
2	3387	71	1	*	2	7	9	business.framework.bos.dx
1	2234	83	1	*	3	5	8	business.framework.bos.ed
5	7002	77	1	*	2	9	11	business.framework.bos.es
1	1015	41	1	*	7	6	13	business.framework.bos.fw
1	421	13	1	*	0	5	5	business.framework.bos.hm
1	385	6	1	*	0	7	7	business.framework.bos.mi
1	163	7	1	*	0	3	3	business.framework.bos.pr

component size refactoring



component size refactoring



Component Size Analysis

Total Statements: 129304

Total Components: 27

Avg Statements Per Component: 4789

Standard Deviation: 10535

%	stmts	files	sdev	root	ca	ce	ct	component
1	53	3	1	*	24	2	26	business.framework.bos
41	54183	581	5		20	10	30	business.framework.bos.ae
3	4787	46	1		5	5	10	business.framework.bos.bi
7	9245	97	1		0	5	5	business.framework.bos.bv
3	5023	79	1		5	11	16	business.framework.bos.cm
2	2721	29	1		2	8	10	business.framework.bos.cn
6	8511	46	1		16	4	20	business.framework.bos.cr
3	4694	48	1		6	7	13	business.framework.bos.cs
4	5174	73	1		4	10	14	business.framework.bos.di
2	3387	71	1		2	7	9	business.framework.bos.dx
1	2234	83	1		3	5	8	business.framework.bos.ed
5	7002	77	1		2	9	11	business.framework.bos.es
1	1015	41	1		7	6	13	business.framework.bos.fw
1	421	13	1		0	5	5	business.framework.bos.hm
1	385	6	1		0	7	7	business.framework.bos.mi
1	163	7	1		0	3	3	business.framework.bos.pr

Component Size Analysis

Total Statements: 129304

Total Components: 32

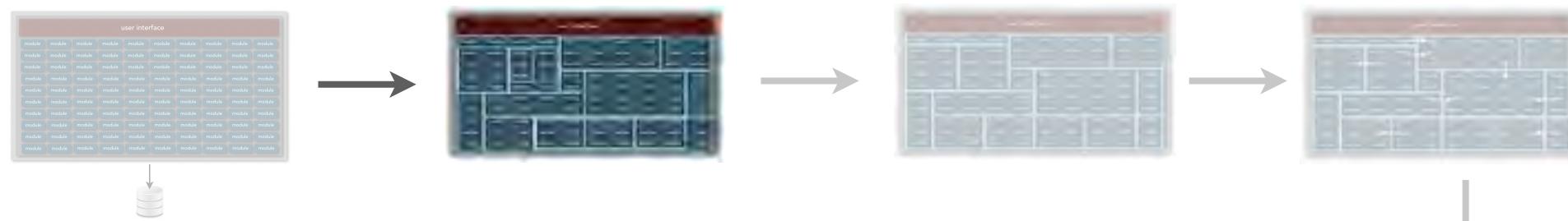
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Standard Deviation: 4534

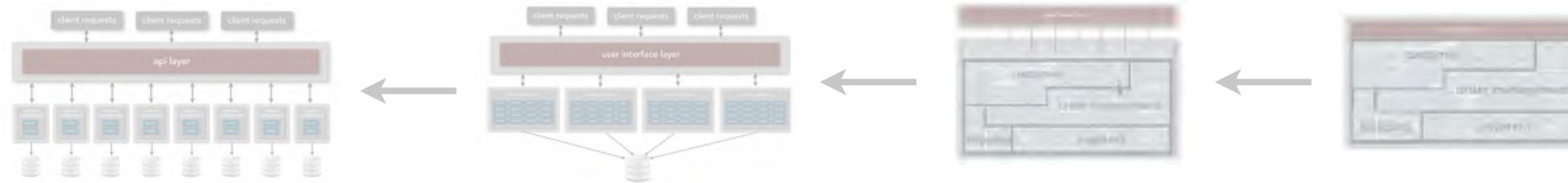
%	stmts	files	sdev	root	ca	ce	ct	component
1	53	3	1	*	29	2	31	business.framework.bos
6	8350	119	1		10	7	17	business.framework.bos.ae.assessment
8	11486	102	2		4	10	14	business.framework.bos.ae.demographics
10	13641	158	3		2	7	9	business.framework.bos.ae.financial
6	8872	72	2		5	5	10	business.framework.bos.ae.health
8	11127	120	2		2	9	11	business.framework.bos.ae.nonfinancial
1	707	10	1		9	6	15	business.framework.bos.ae.shared
3	4787	40	1		5	5	10	business.framework.bos.bi
7	9245	97	2		0	5	5	business.framework.bos.bv
3	5023	79	1		5	11	16	business.framework.bos.cm
2	2721	29	1		2	8	10	business.framework.bos.cn
6	8511	46	1		21	4	25	business.framework.bos.cr
3	4694	48	1		10	7	17	business.framework.bos.cs
4	5174	73	1		4	10	14	business.framework.bos.di
2	3387	71	1		2	7	9	business.framework.bos.dx
1	2234	83	1		5	5	10	business.framework.bos.ed
5	7002	77	1		2	9	11	business.framework.bos.es
1	1015	41	1		9	6	15	business.framework.bos.fw
1	421	13	1		0	5	5	business.framework.bos.hm

migration patterns

microservices roadmap

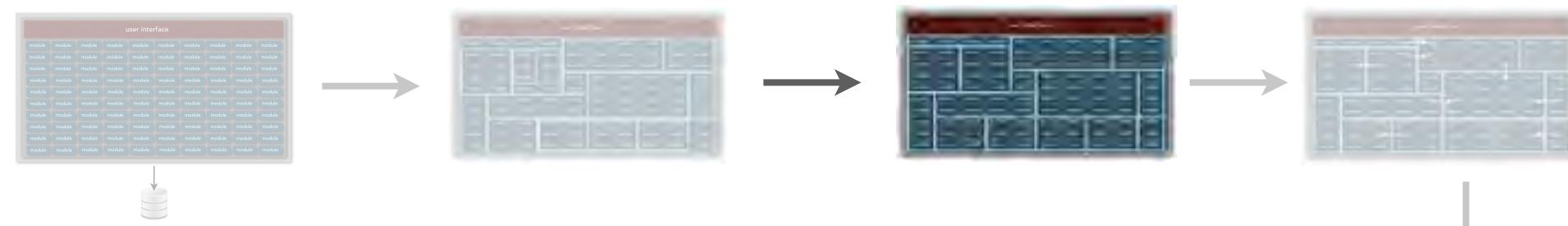


identify logical components

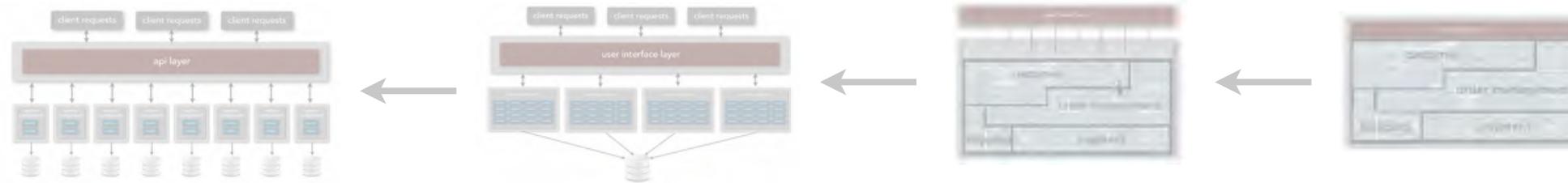


migration patterns

microservices roadmap

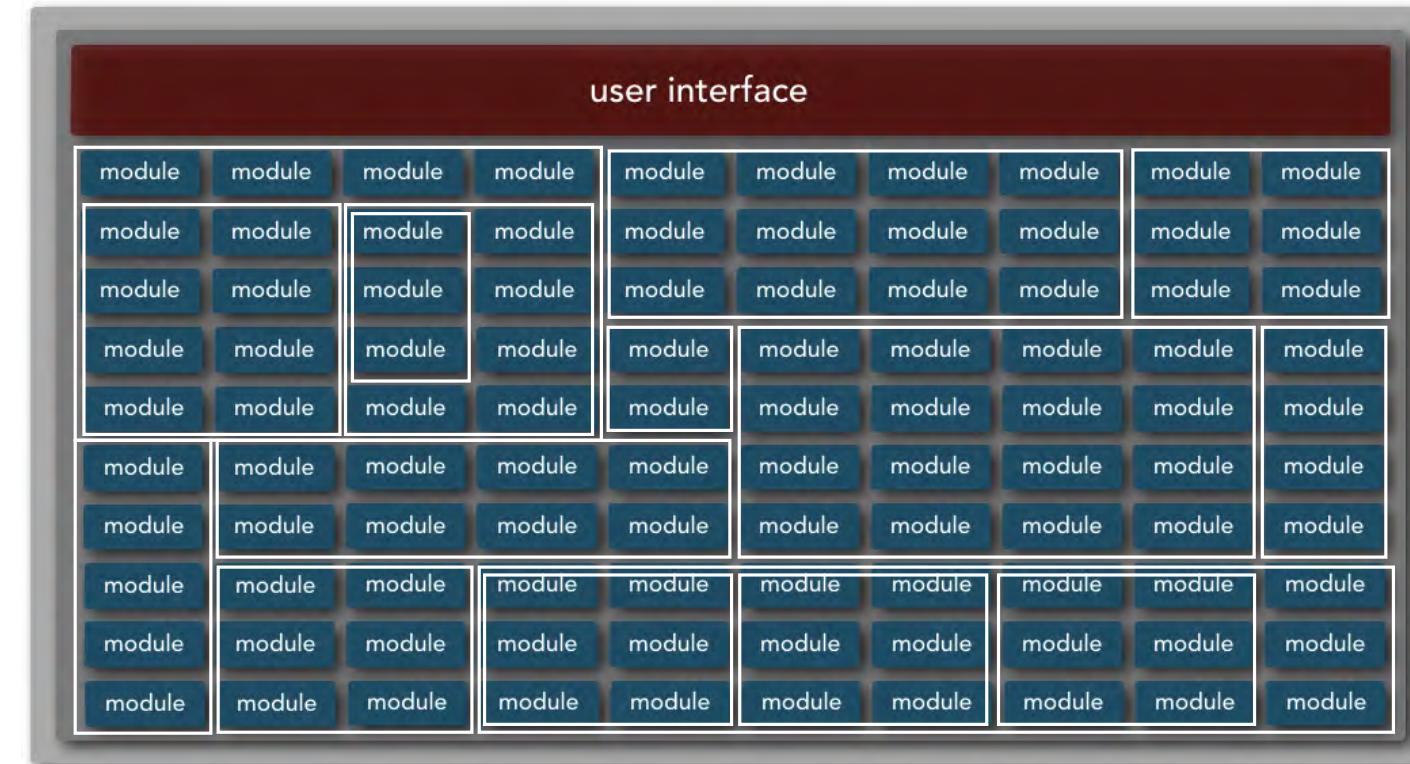


flatten and refactor components



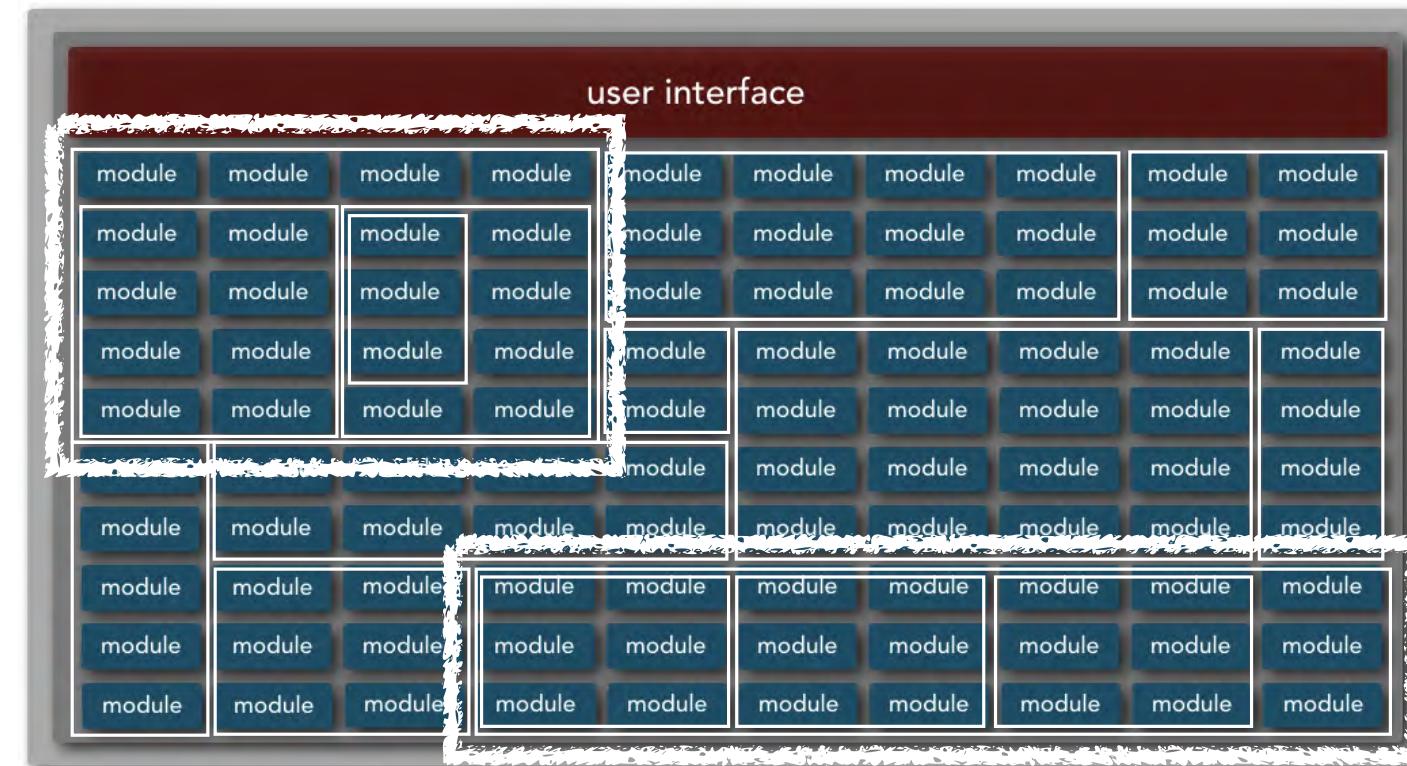
migration patterns

flatten and refactor components



migration patterns

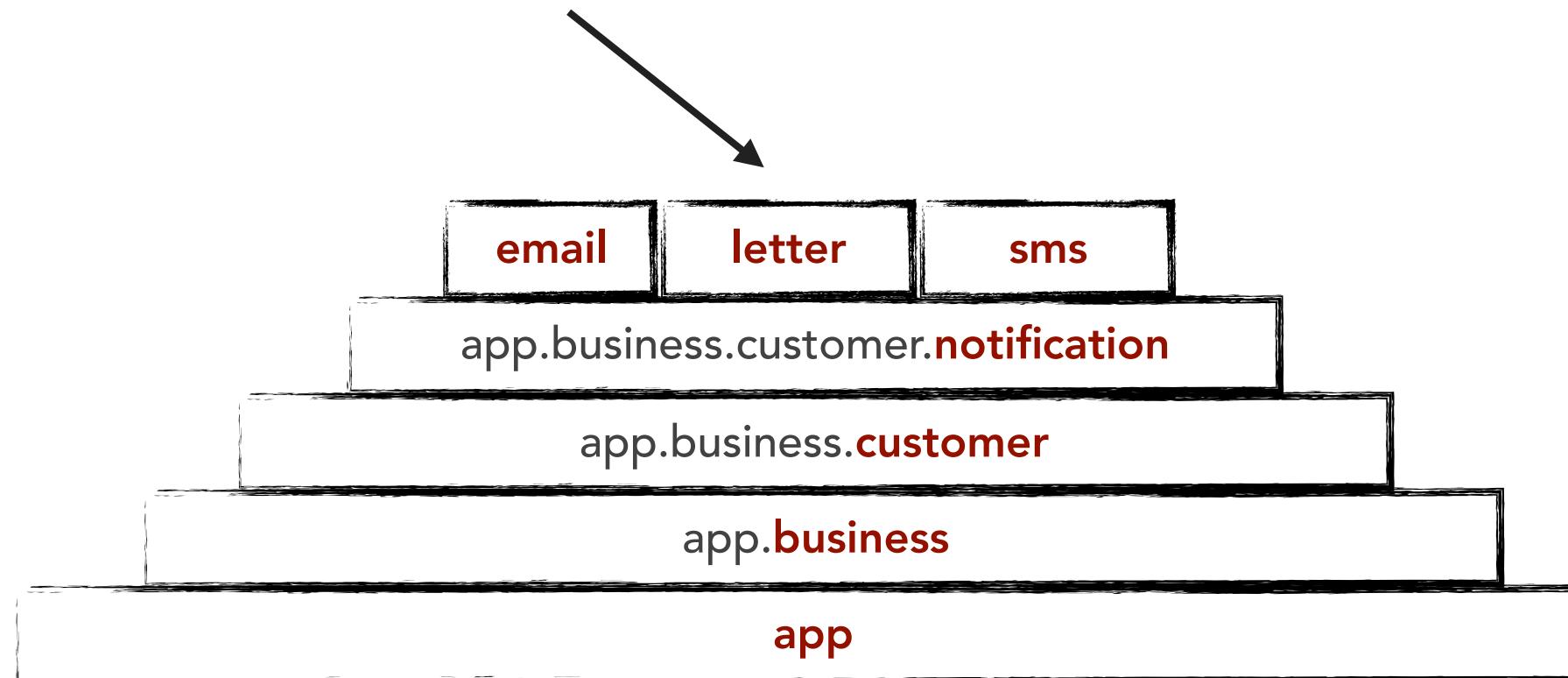
flatten and refactor components



migration patterns

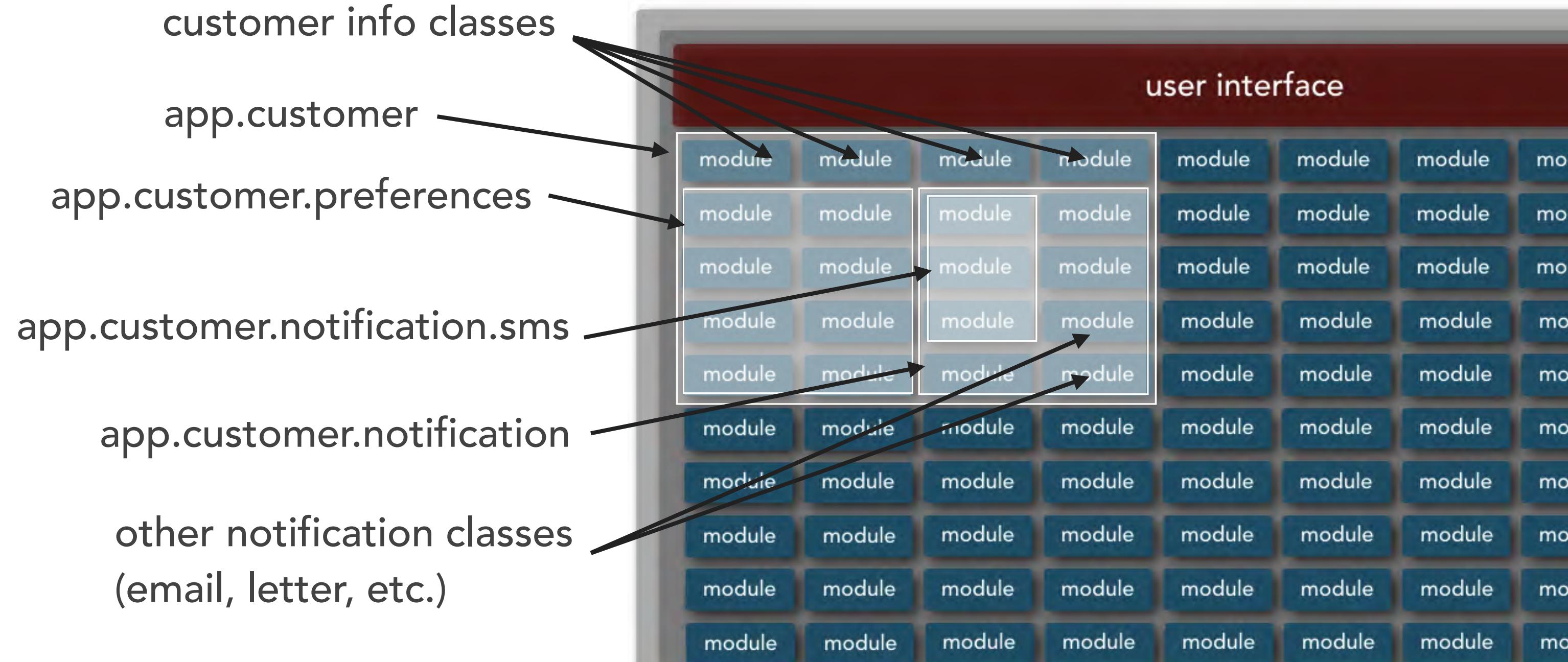
flatten and refactor components

app.business.customer.notification.letter



migration patterns

flatten and refactor components



migration patterns

flatten and refactor components

app.customer



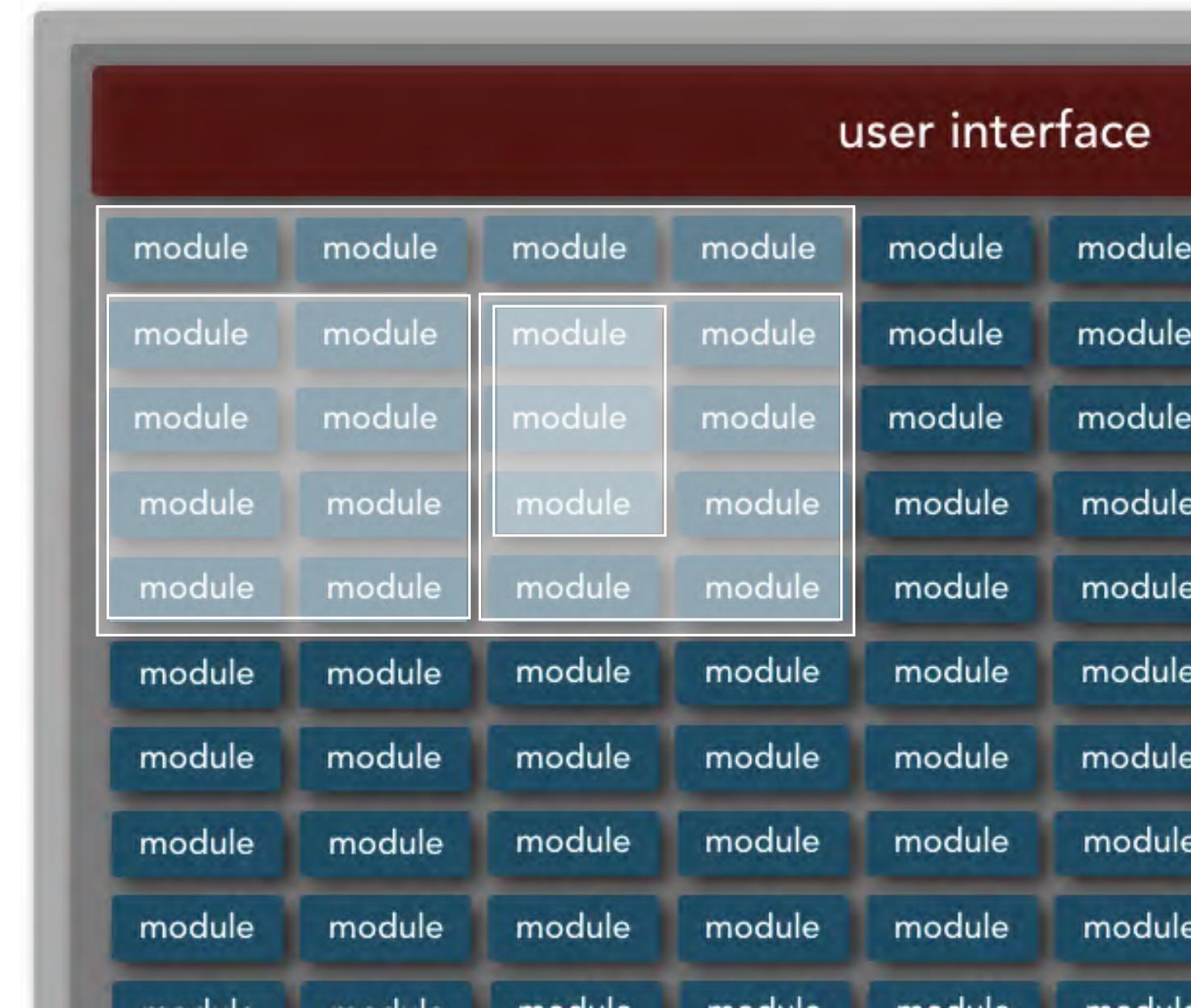
app.customer.notification



app.customer.notification.sms



app.customer.preferences



migration patterns

flatten and refactor components

app.customer

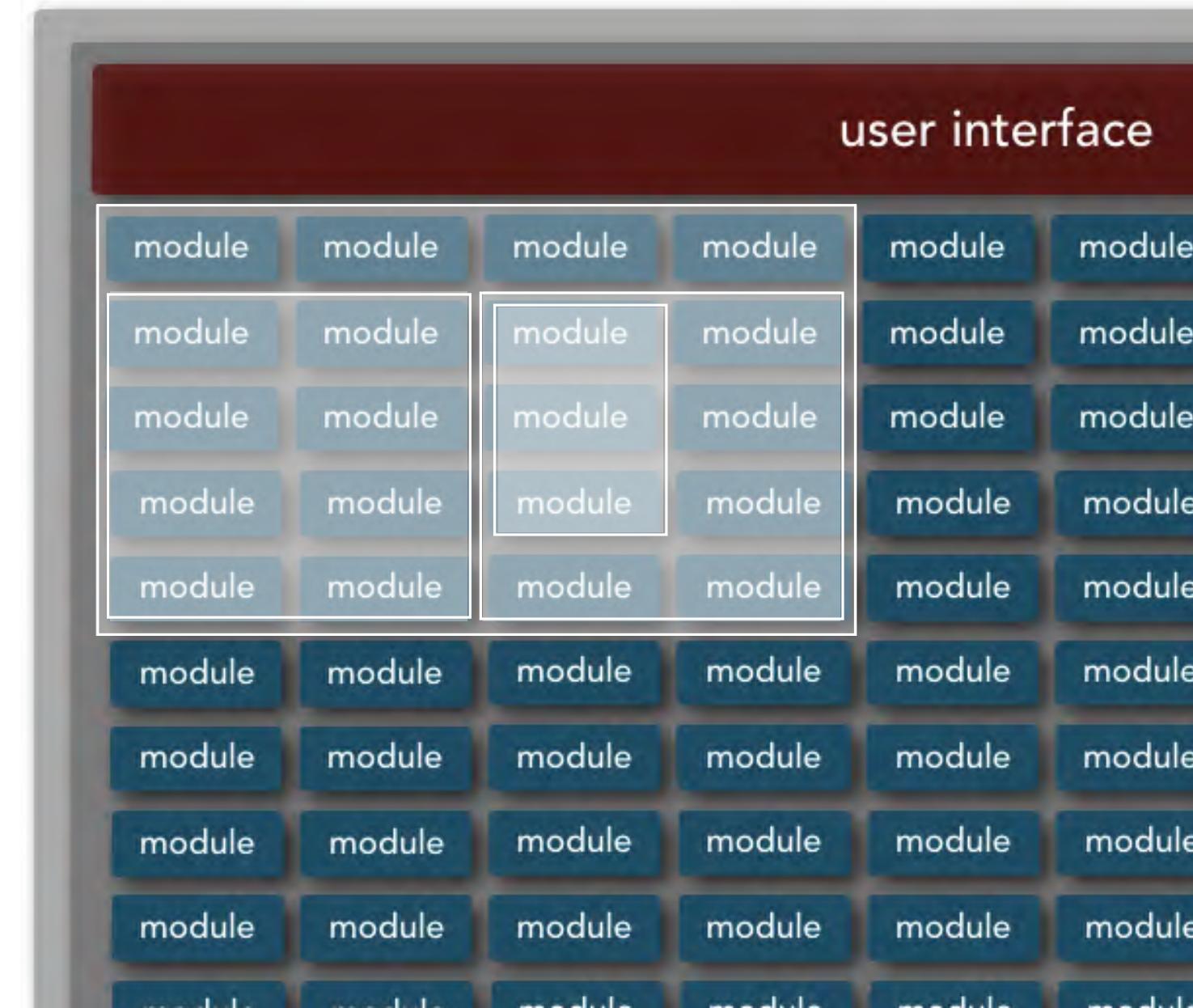


app.customer.notification



app.customer.notification.sms

app.customer.preferences



migration patterns

flatten and refactor components

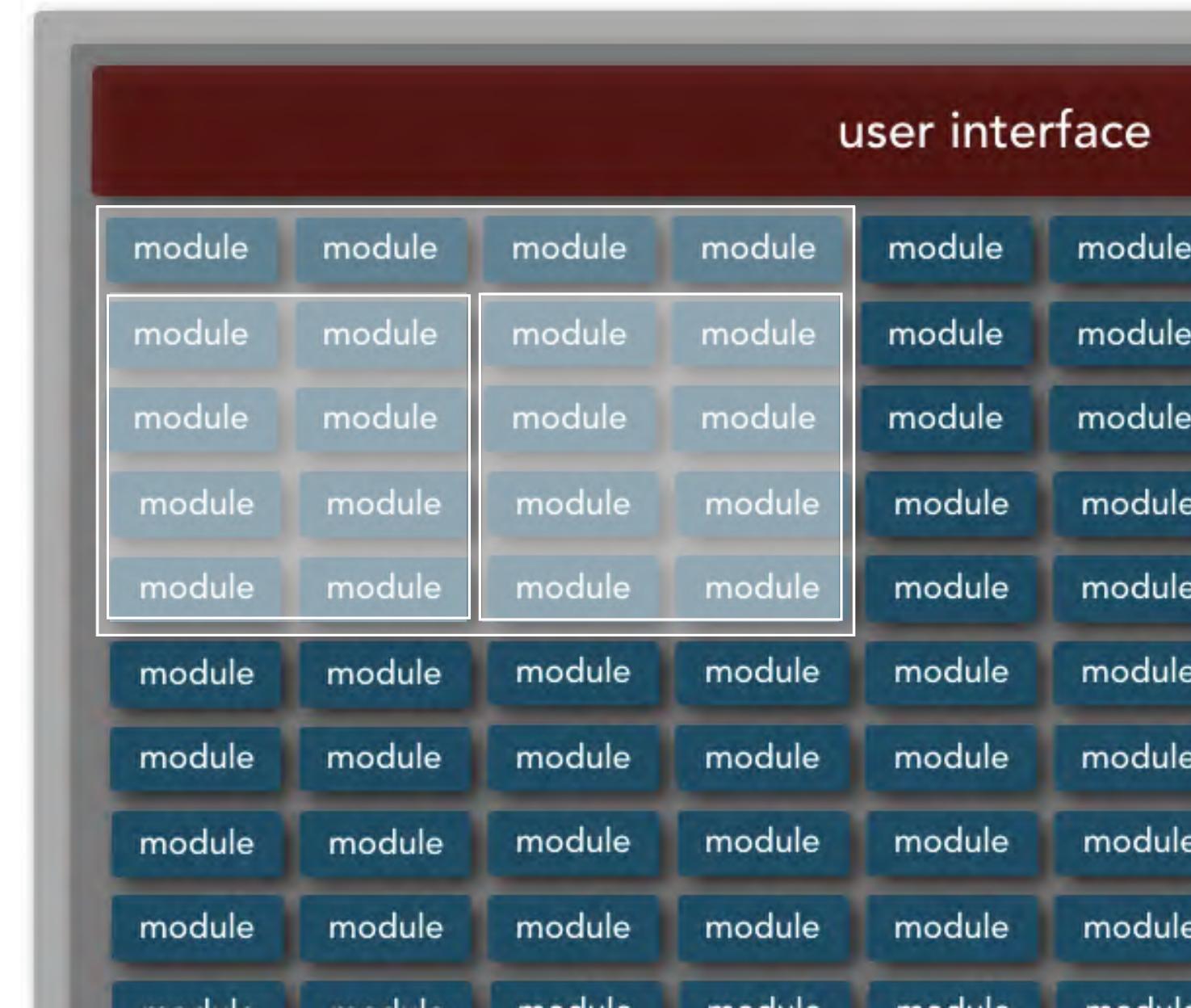
app.customer



app.customer.notification



app.customer.preferences



migration patterns

flatten and refactor components

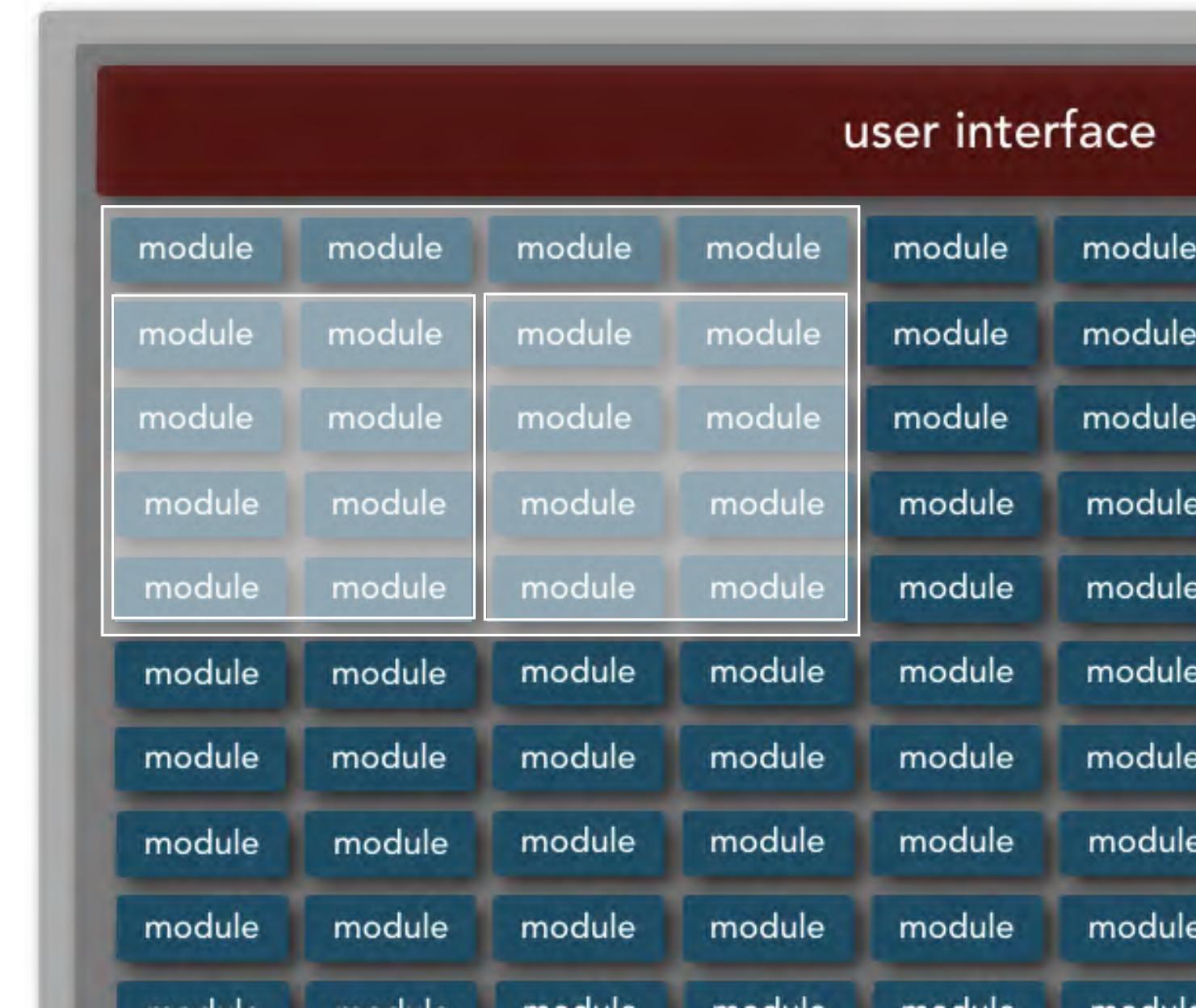
app.customer



app.customer.notification



app.customer.preferences



migration patterns

flatten and refactor components

app.customer



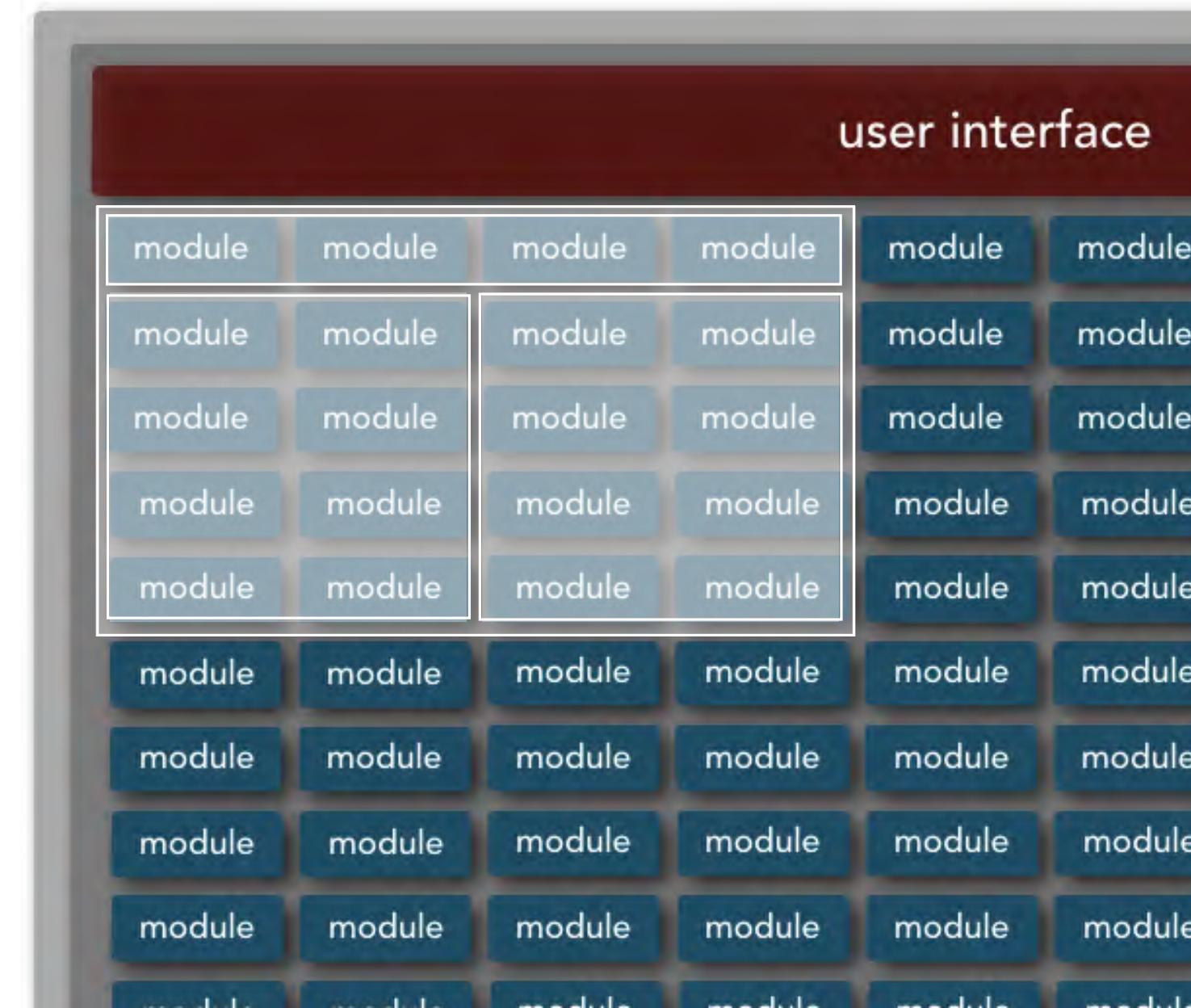
app.customer.notification



app.customer.preferences



app.customer.info



migration patterns

flatten and refactor components

app.customer

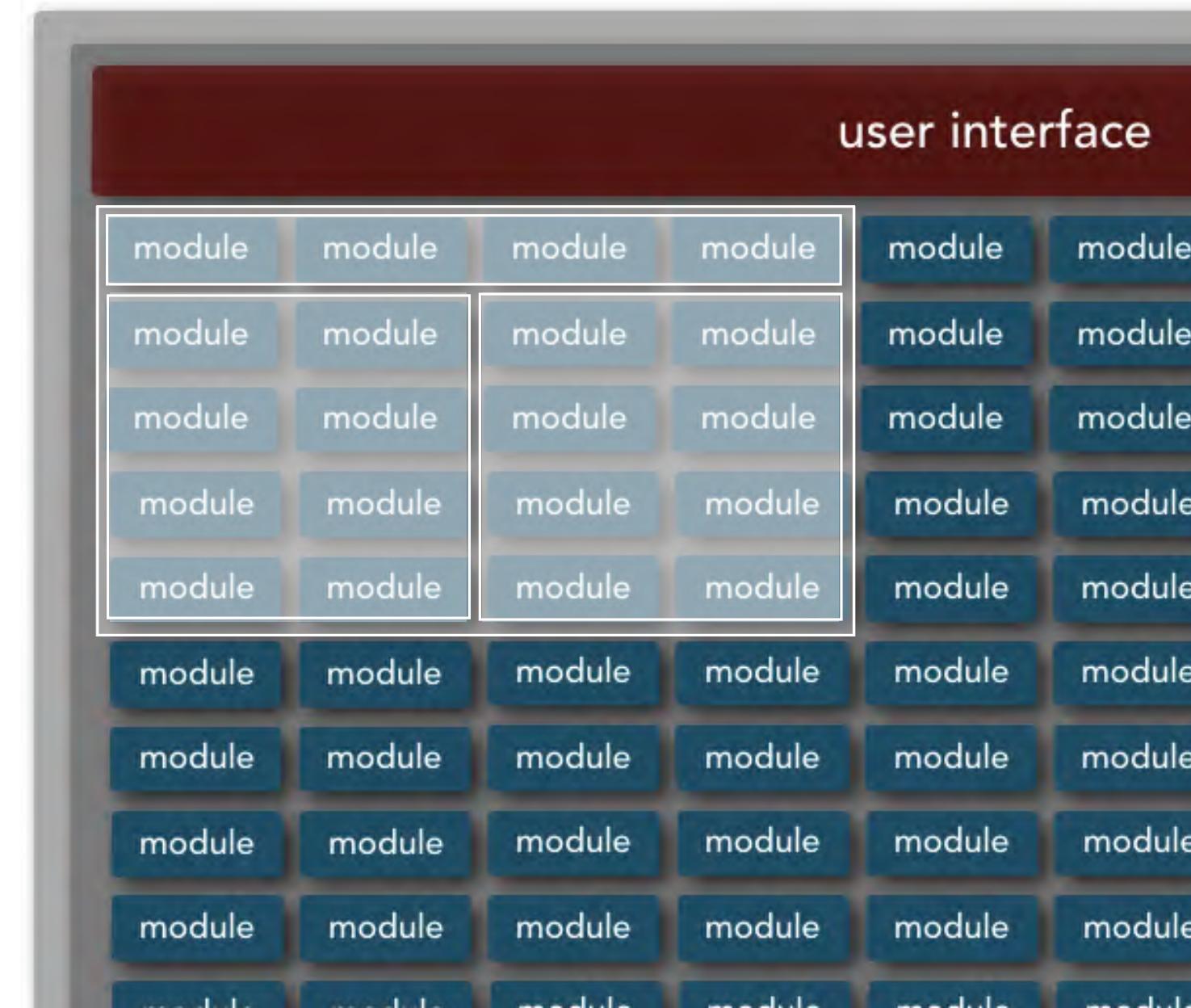
app.customer.notification



app.customer.preferences



app.customer.info



migration patterns

flatten and refactor components

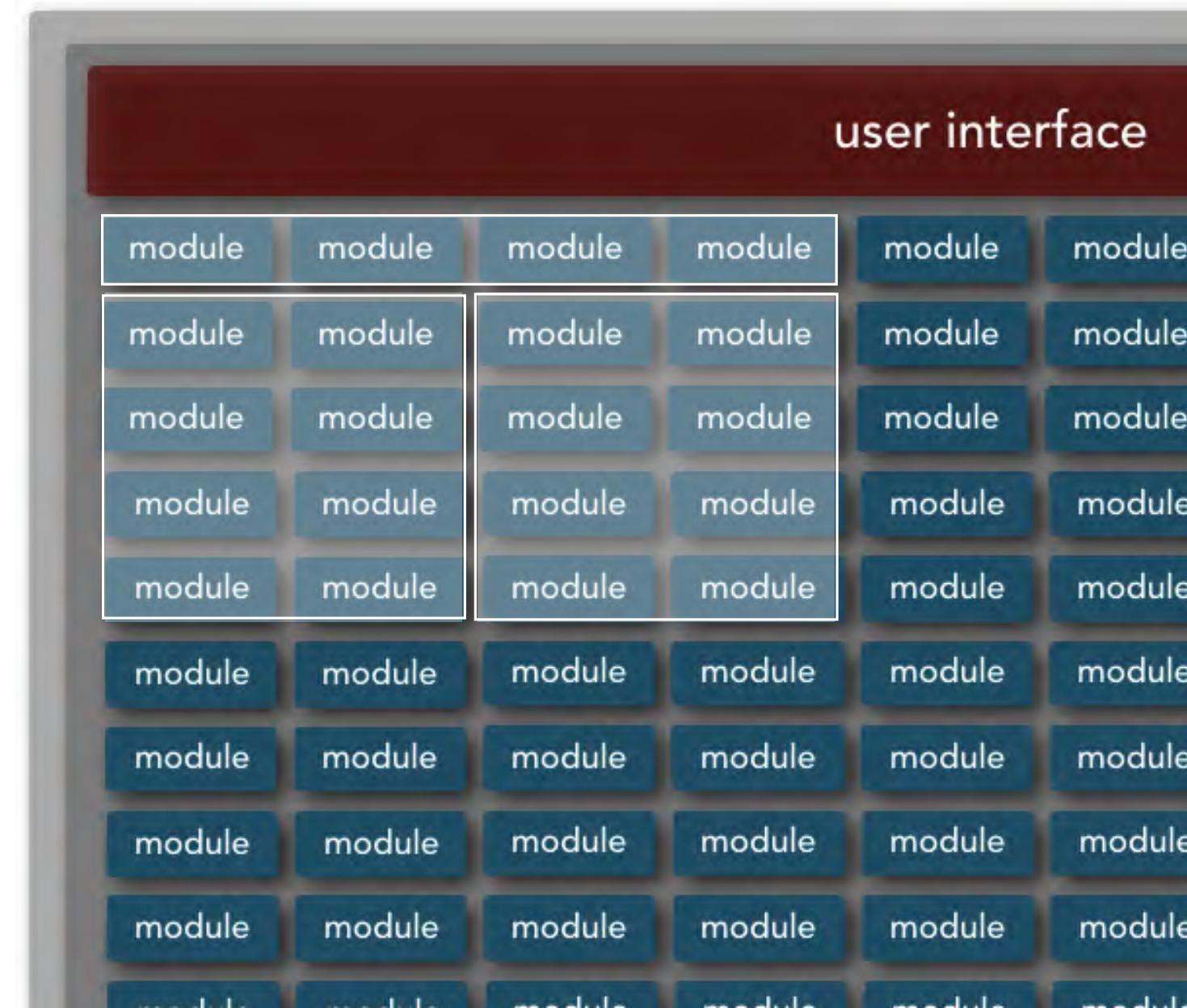
app.customer.notification



app.customer.preferences



app.customer.info



migration patterns

flatten and refactor components

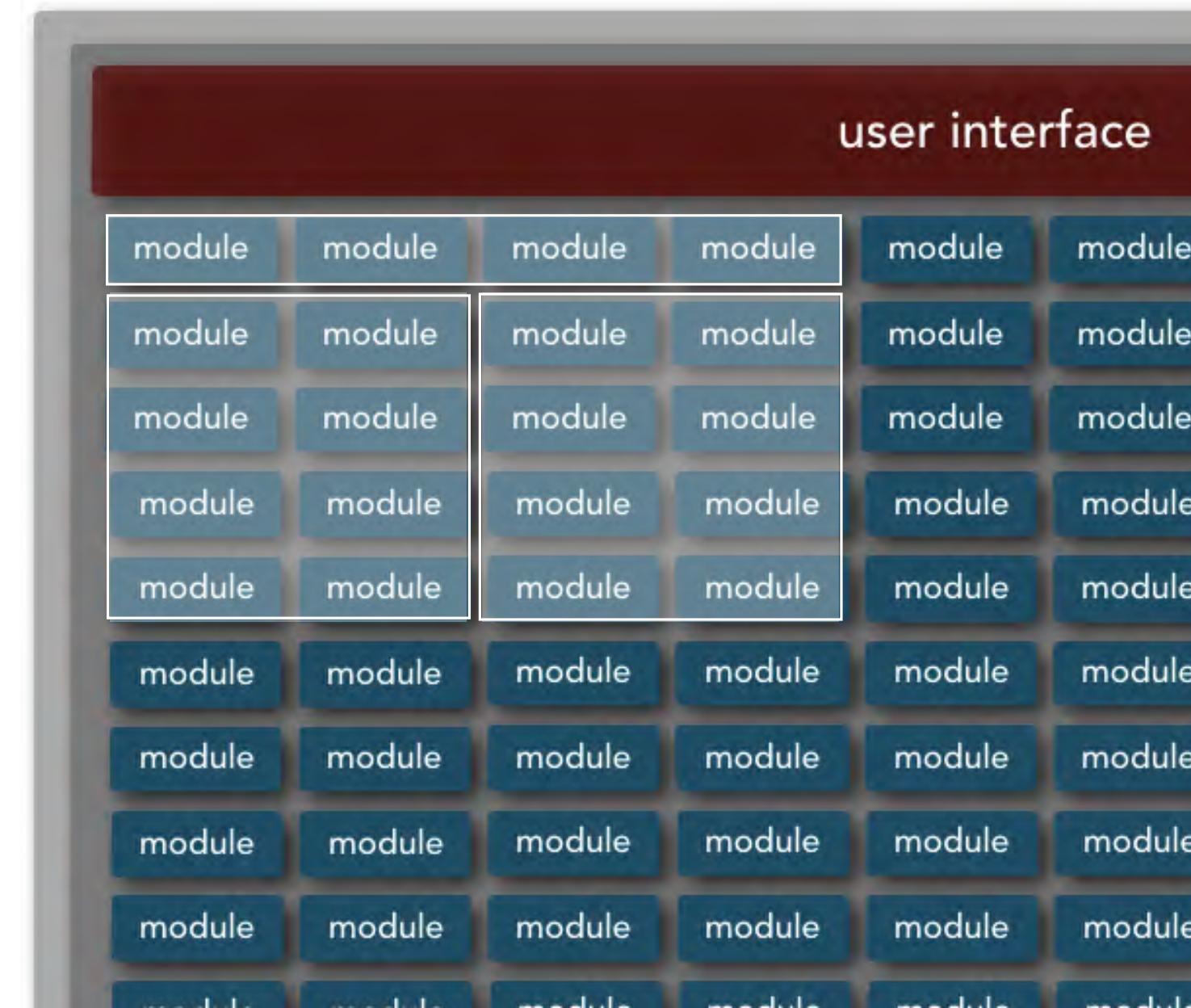
app.customer.notification



app.customer.preferences



app.customer.info



migration patterns

flatten and refactor components

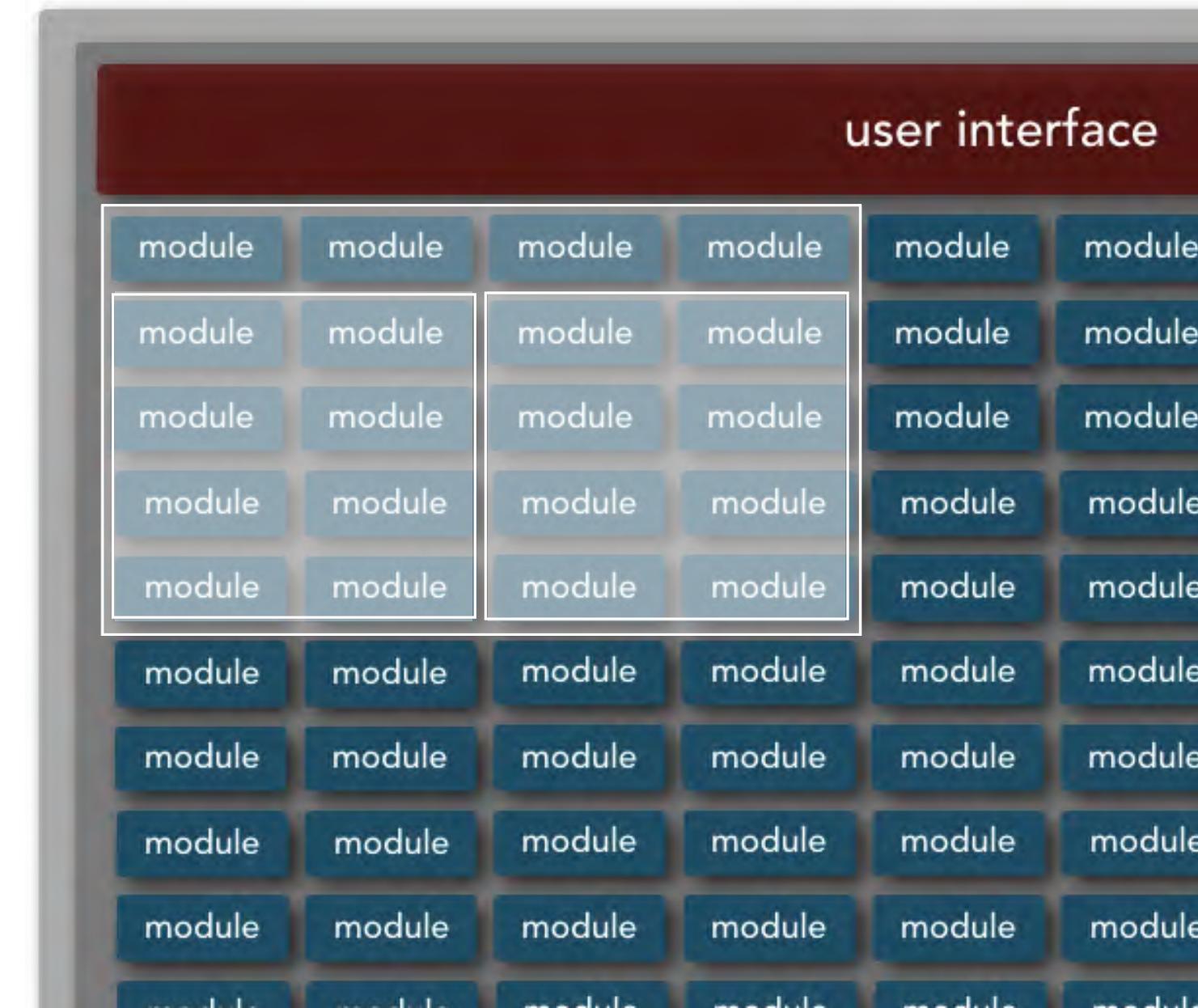
app.customer



app.customer.notification



app.customer.preferences



migration patterns

flatten and refactor components

app.customer



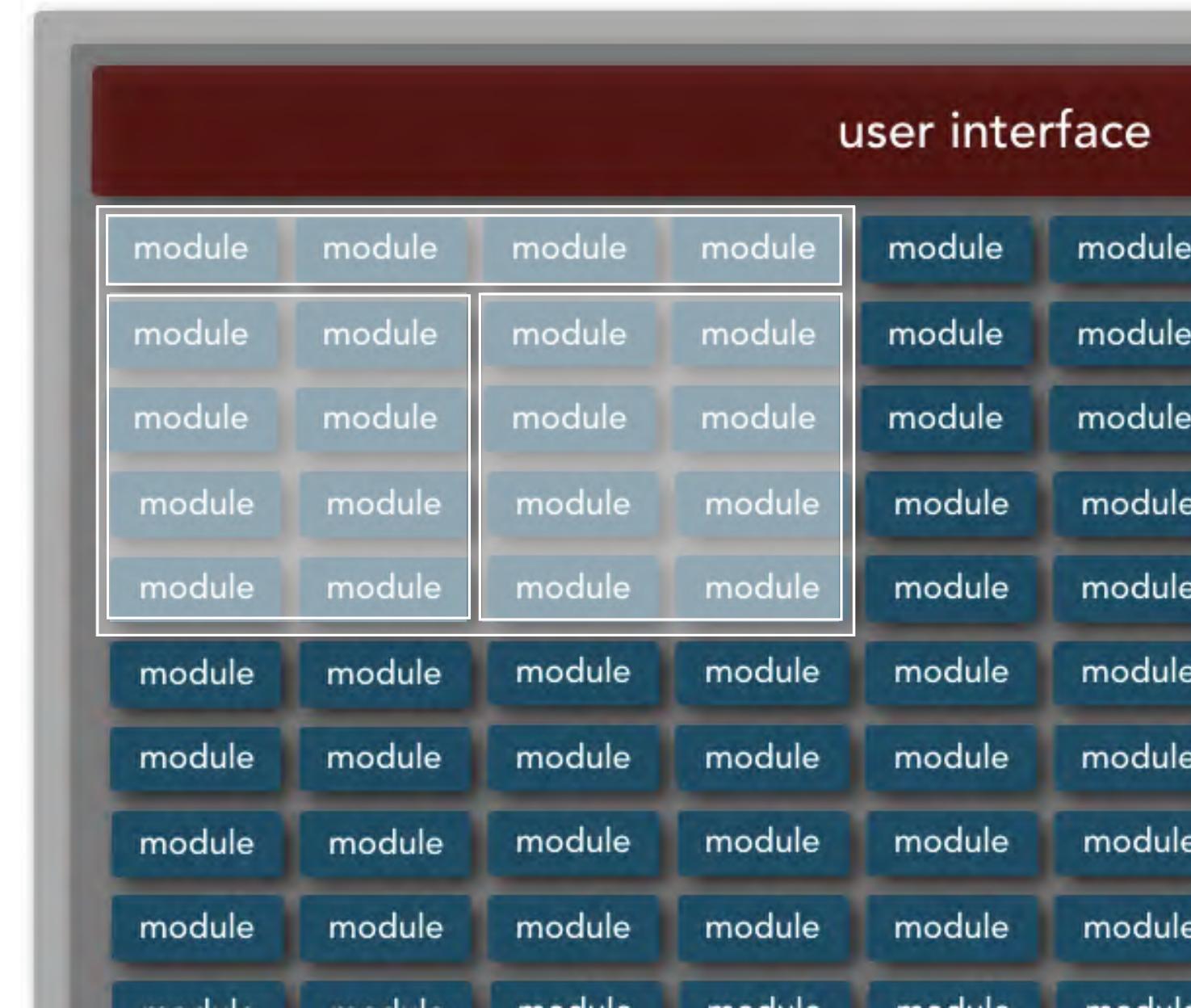
app.customer.notification



app.customer.preferences



app.customer.shared



migration patterns

flatten and refactor components

app.customer

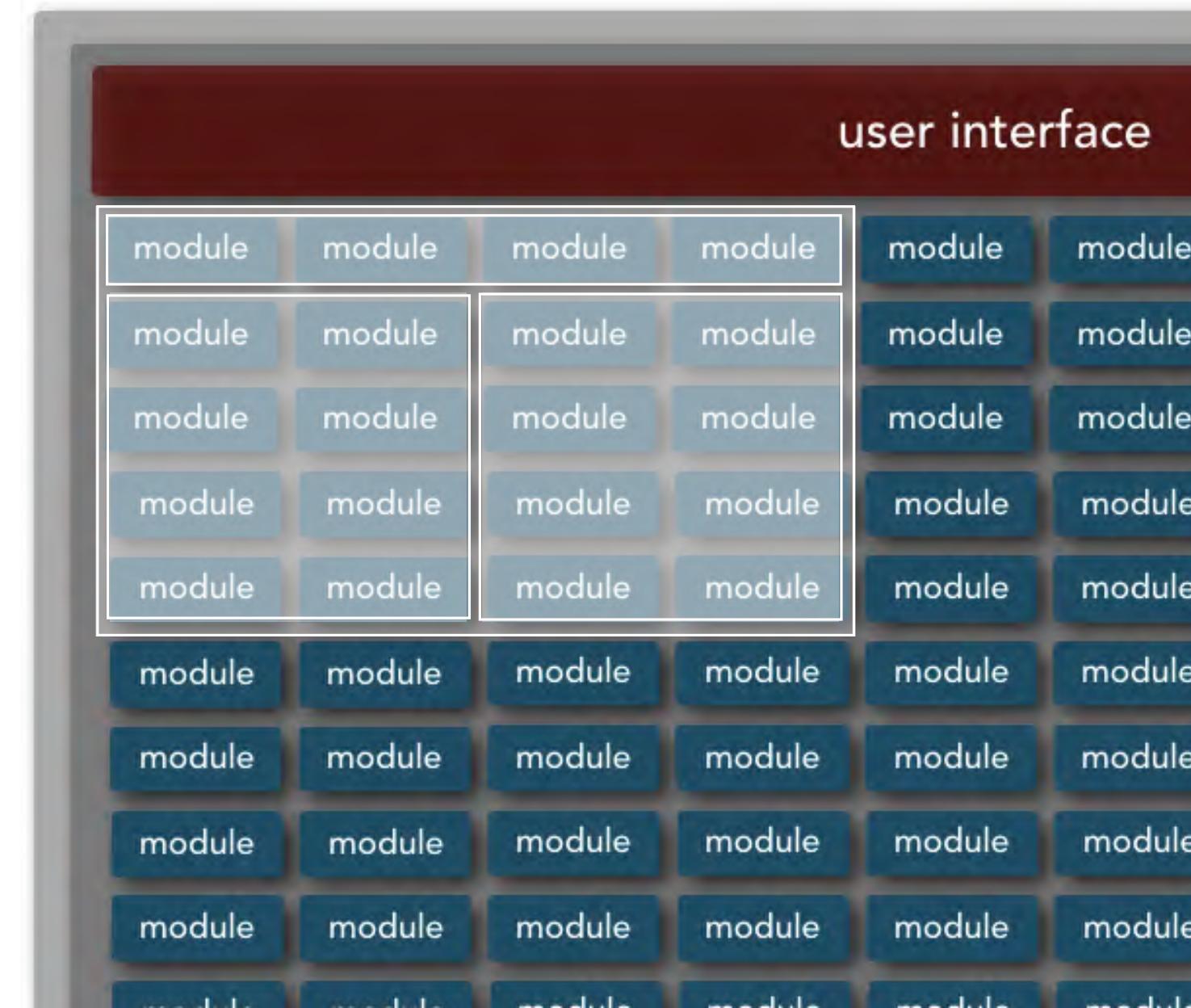
app.customer.notification



app.customer.preferences



app.customer.shared



migration patterns

flatten and refactor components

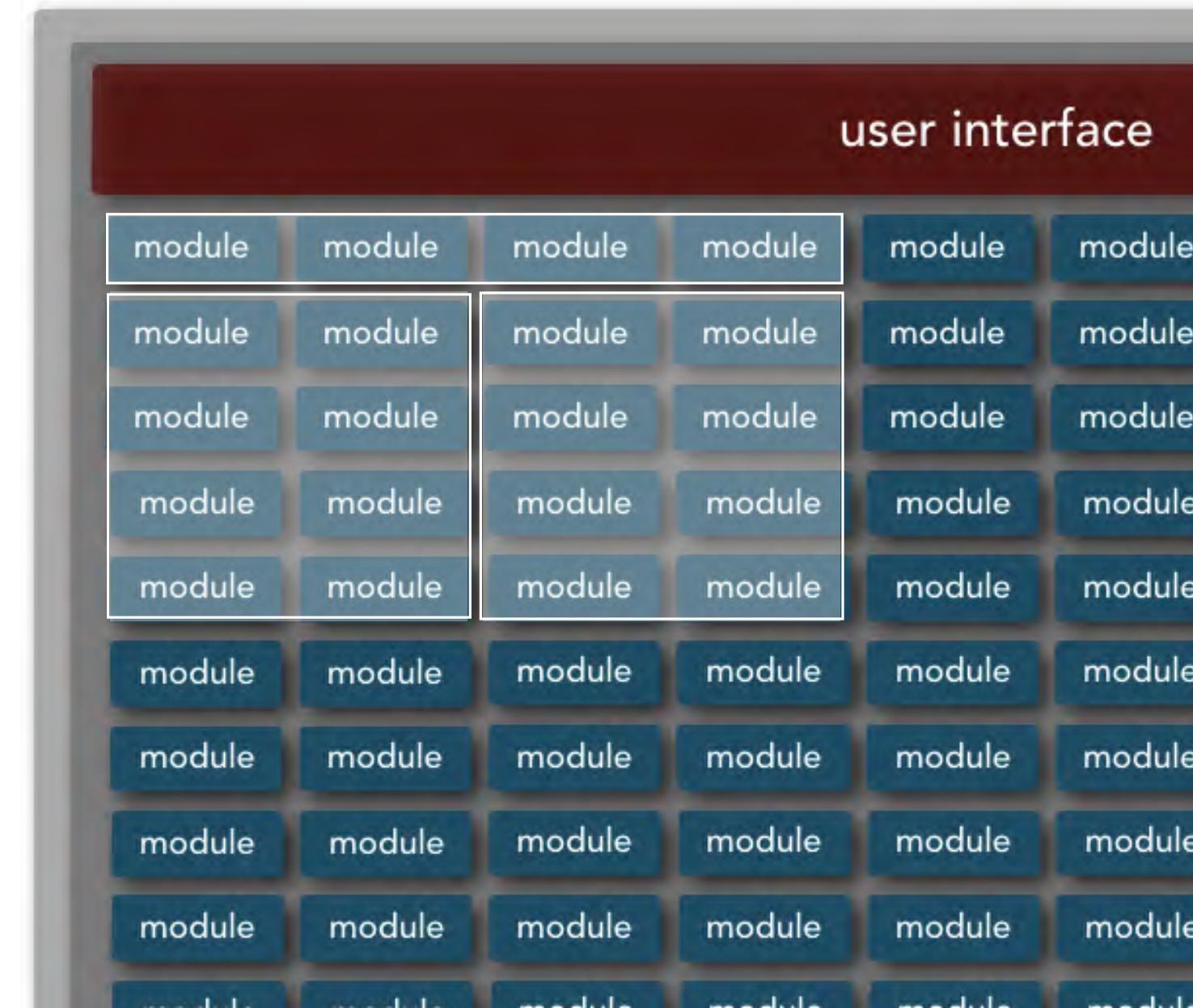
app.customer.notification



app.customer.preferences



app.customer.shared



migration patterns

flatten and refactor components

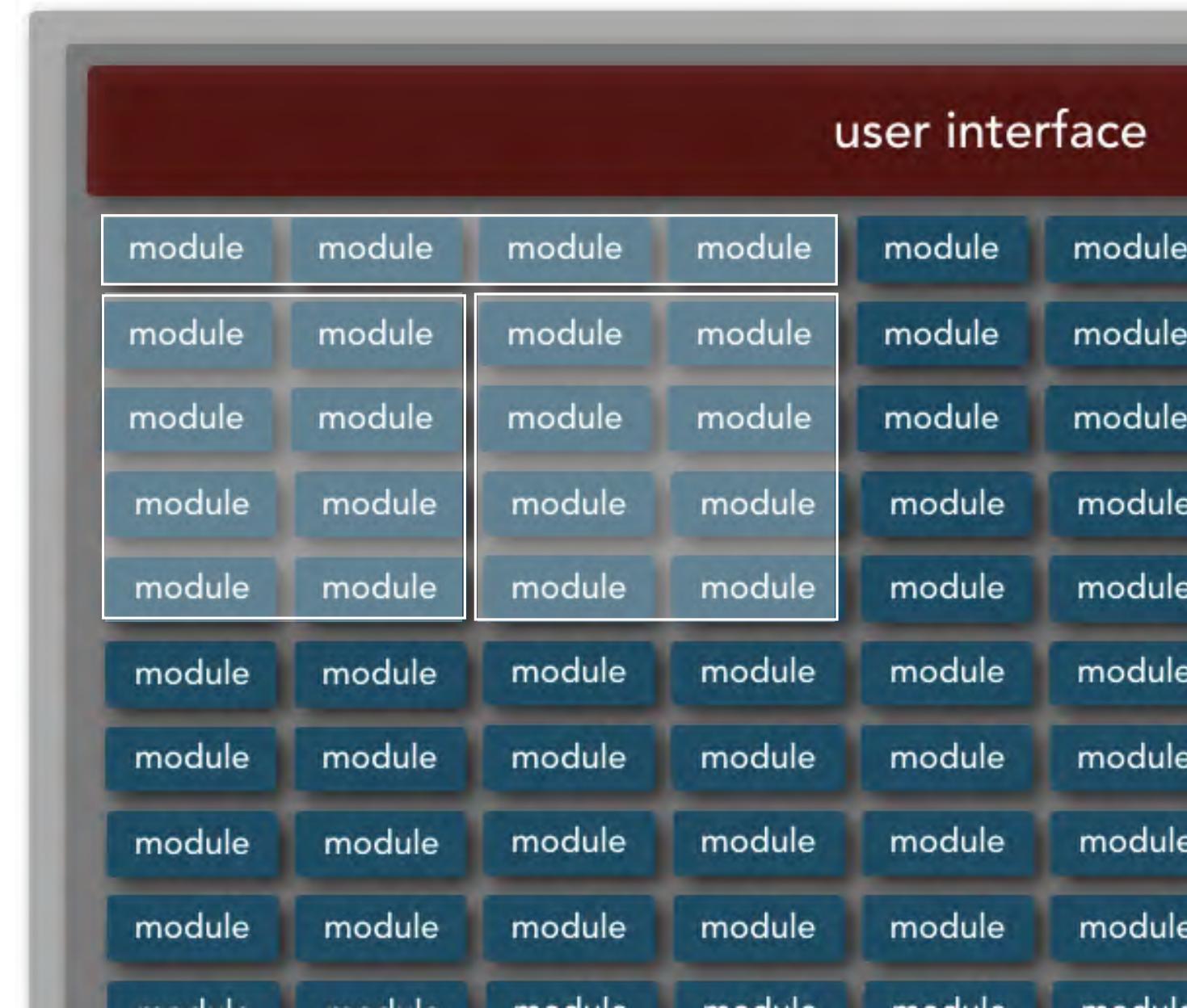
app.customer.notification



app.customer.preferences



app.customer.shared



migration patterns

flatten and refactor components

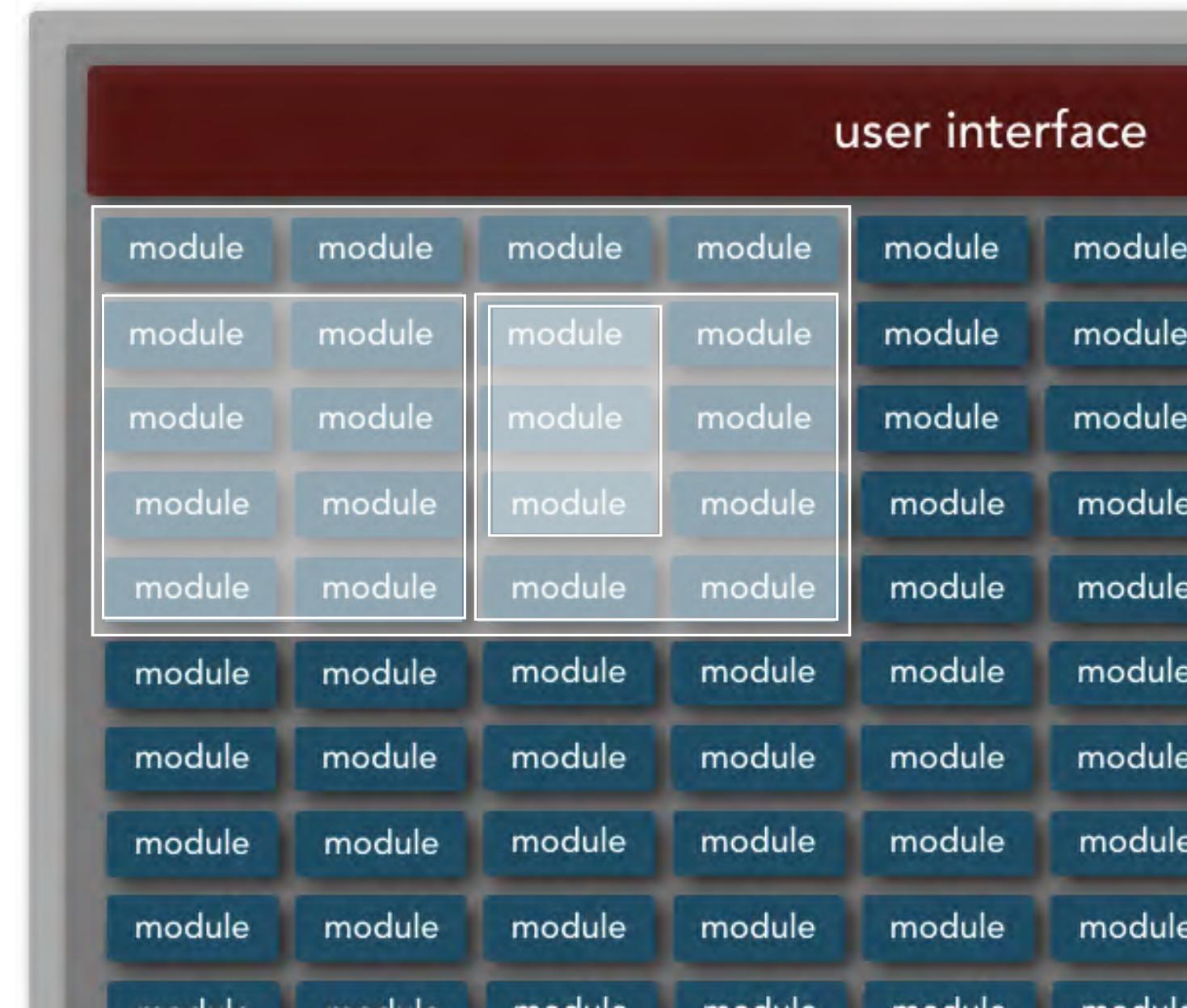
app.customer



app.customer.notification



app.customer.notification.sms



migration patterns

flatten and refactor components

app.customer



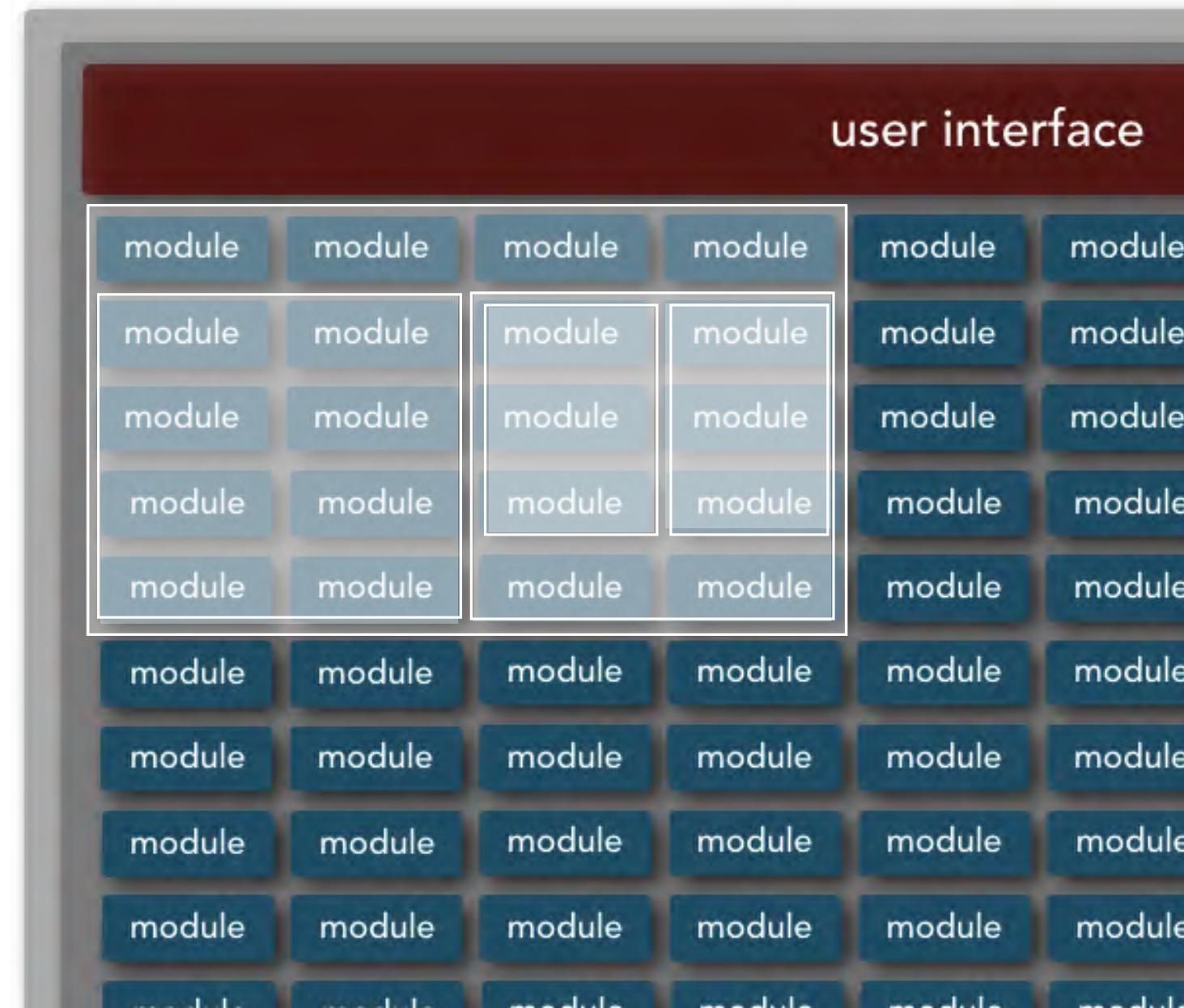
app.customer.notification



app.customer.notification.sms



app.customer.notification.letter



migration patterns

flatten and refactor components

app.customer



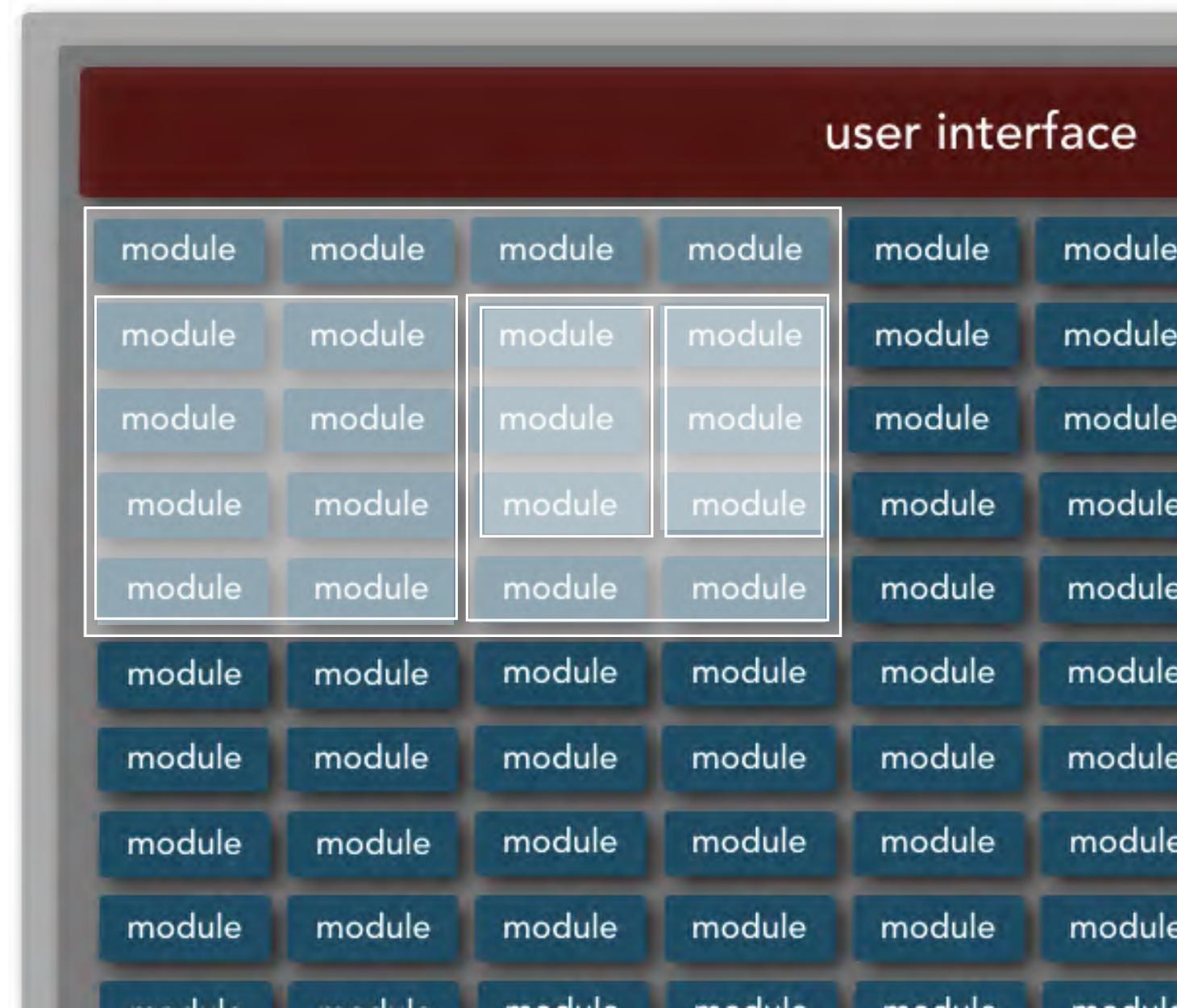
app.customer.notification



app.customer.notification.sms



app.customer.notification.letter



migration patterns

flatten and refactor components

app.customer



app.customer.notification



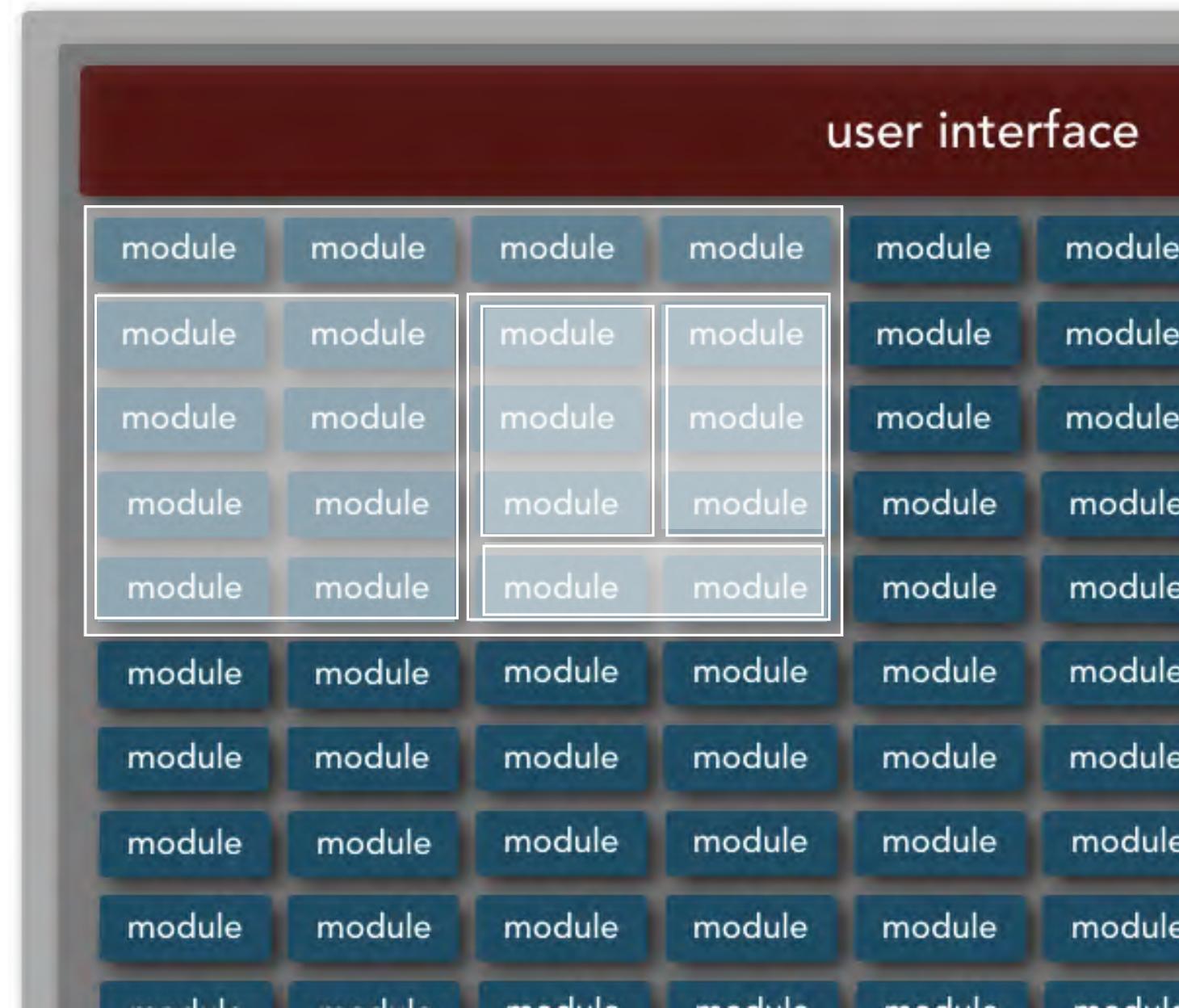
app.customer.notification.sms



app.customer.notification.letter



app.customer.notification.email



migration patterns

flatten and refactor components

app.customer



app.customer.notification

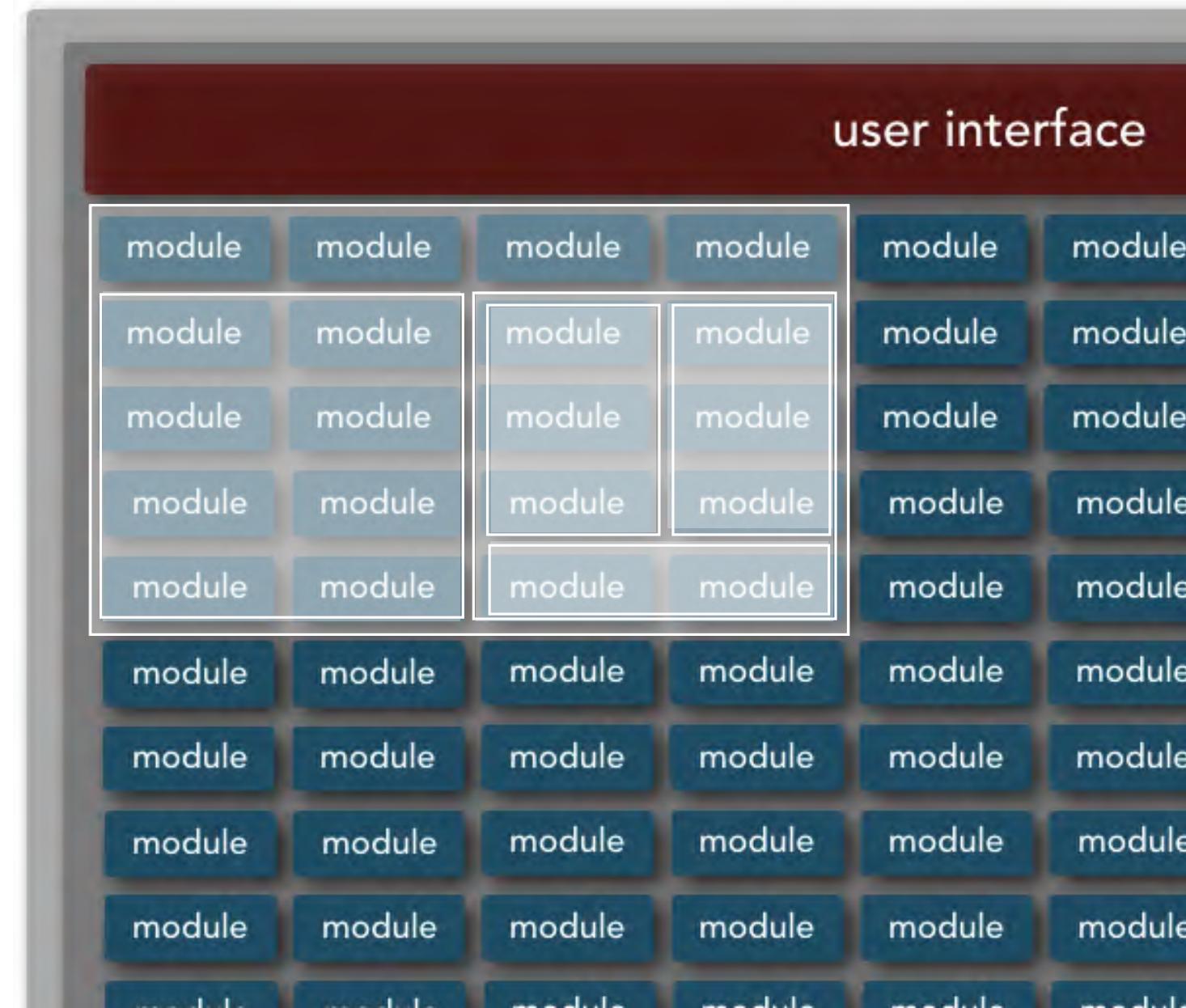
app.customer.notification.sms



app.customer.notification.letter



app.customer.notification.email



migration patterns

flatten and refactor components

app.customer



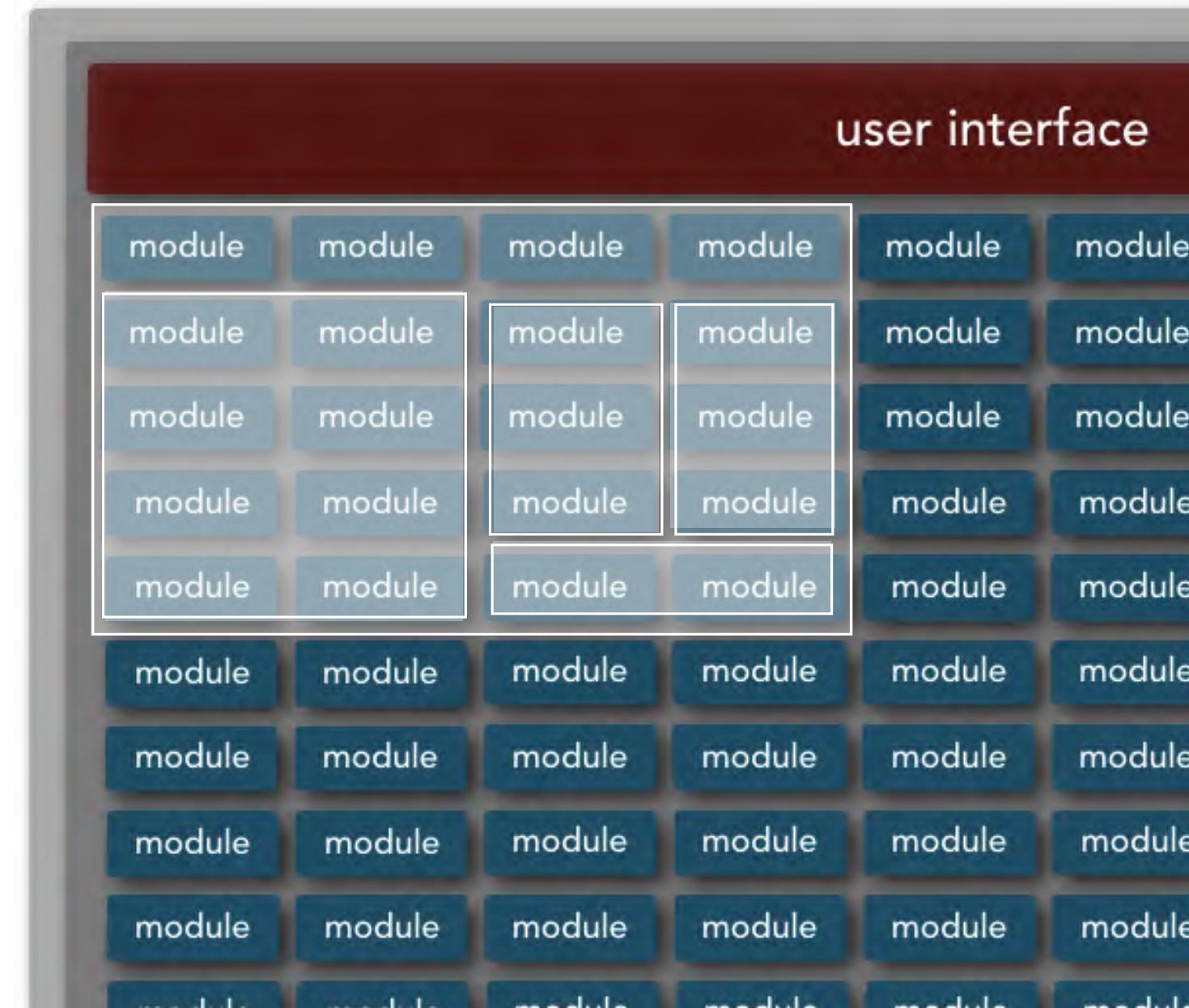
app.customer.notification.sms



app.customer.notification.letter



app.customer.notification.email



migration patterns

flatten and refactor components

app.customer



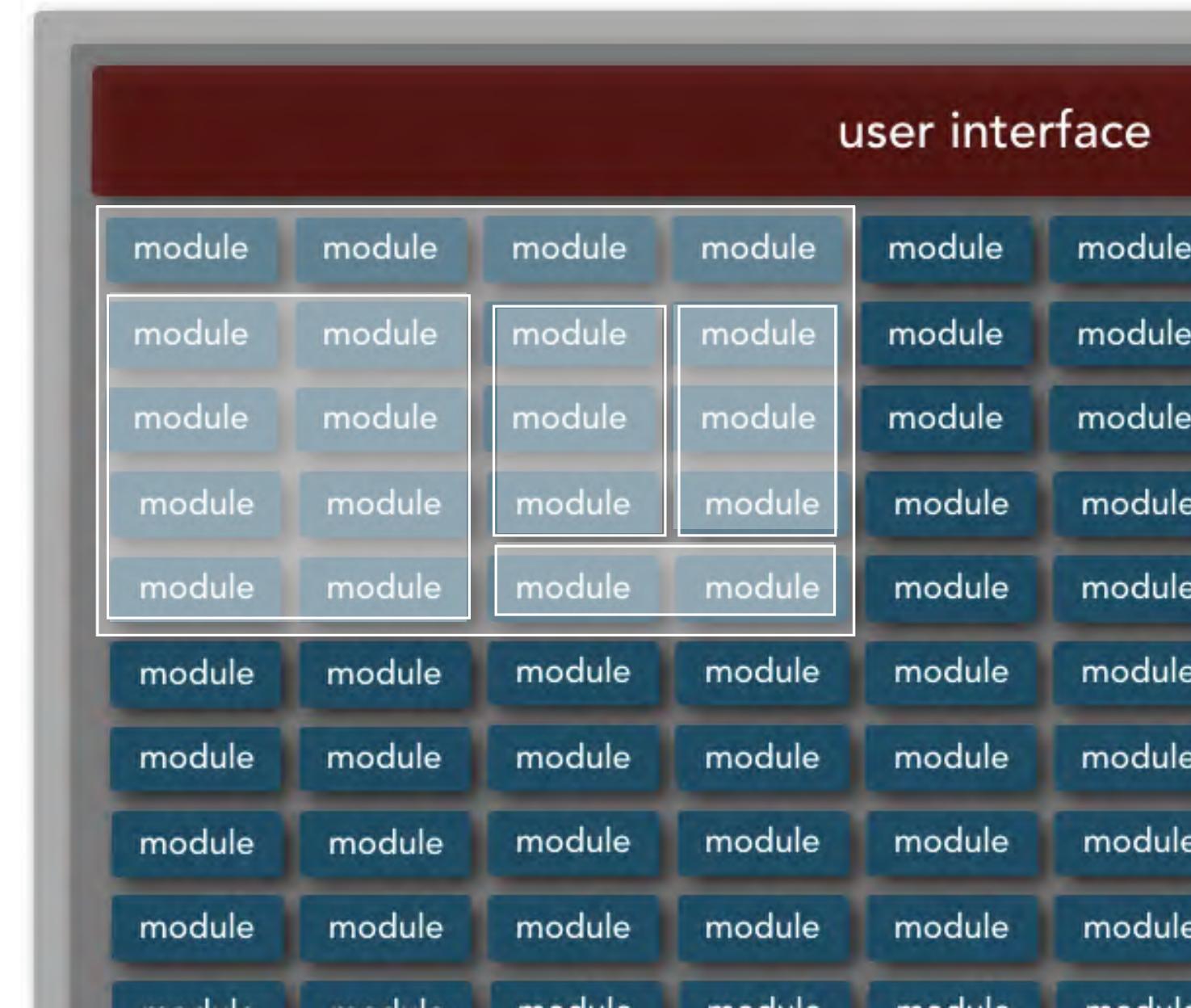
app.customer.notification.sms



app.customer.notification.letter

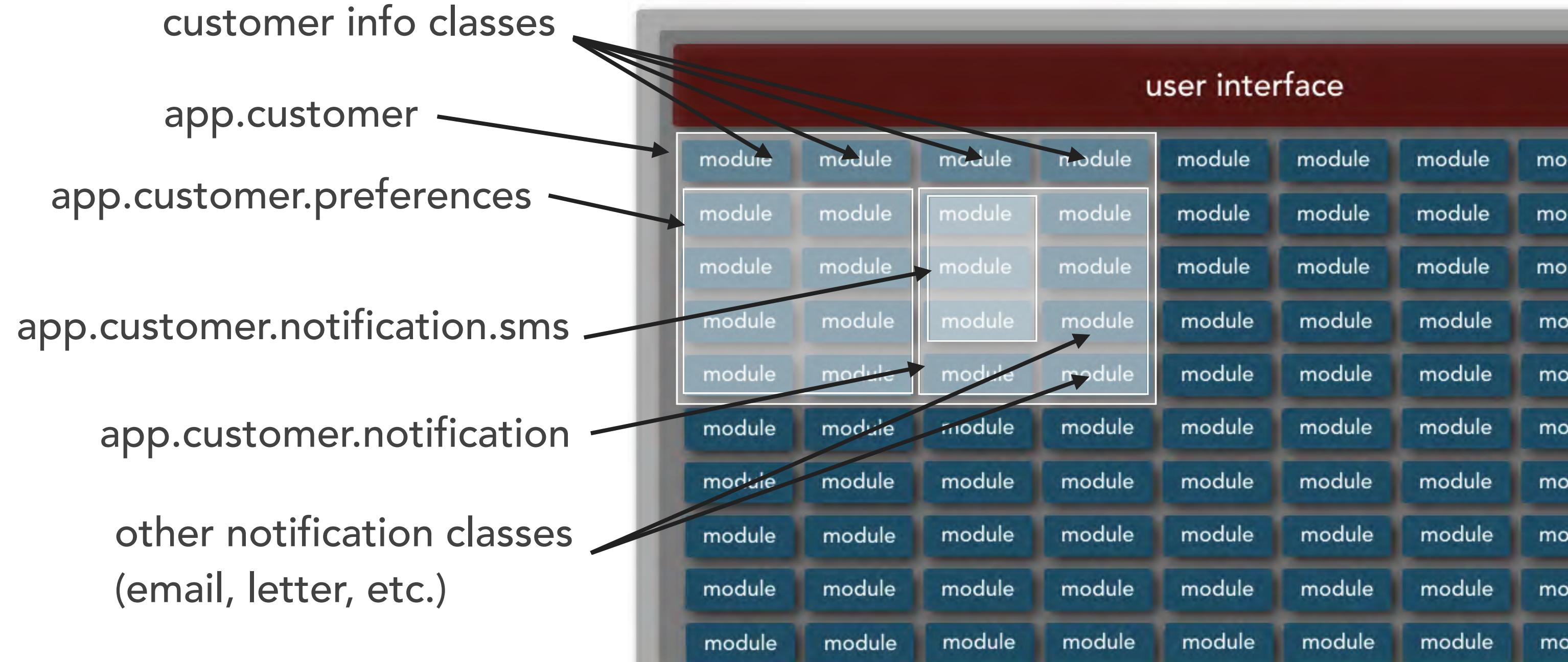


app.customer.notification.email



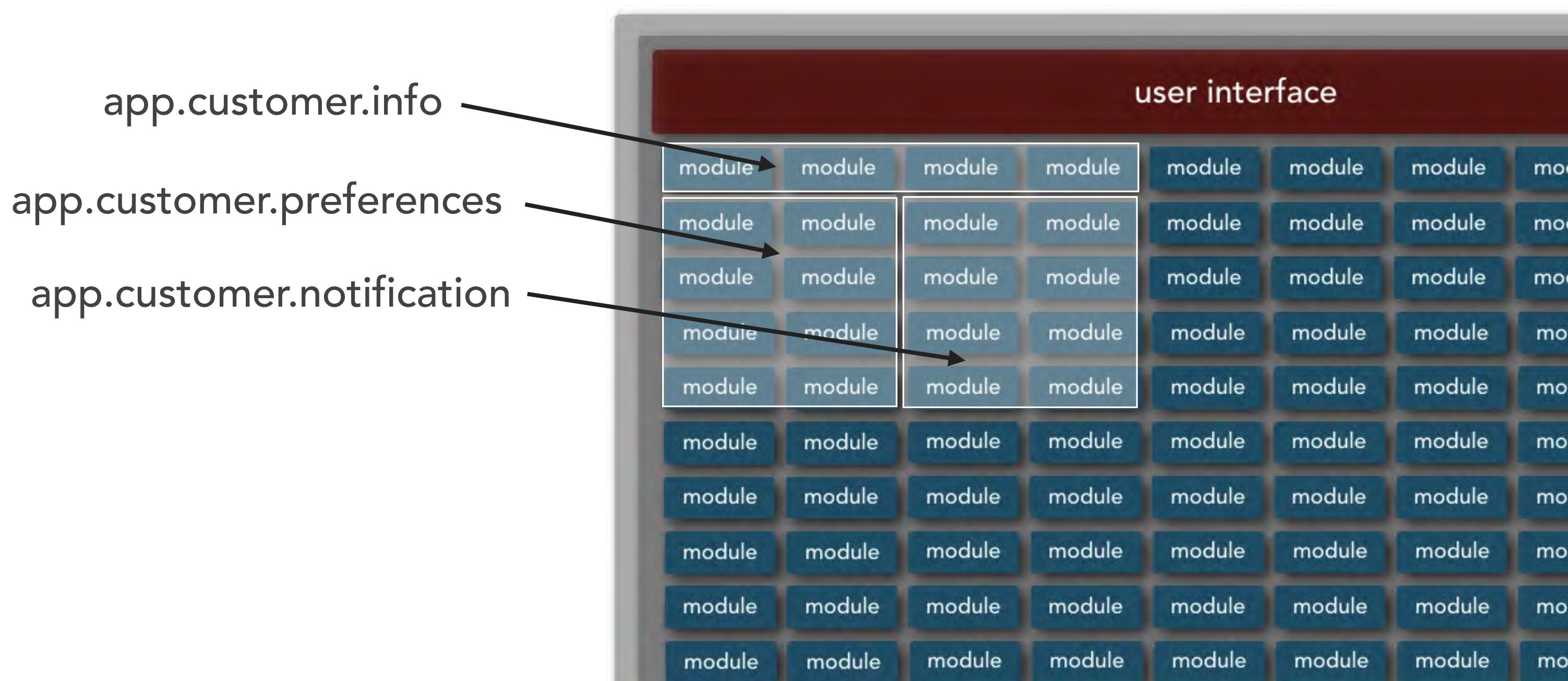
migration patterns

flatten and refactor components



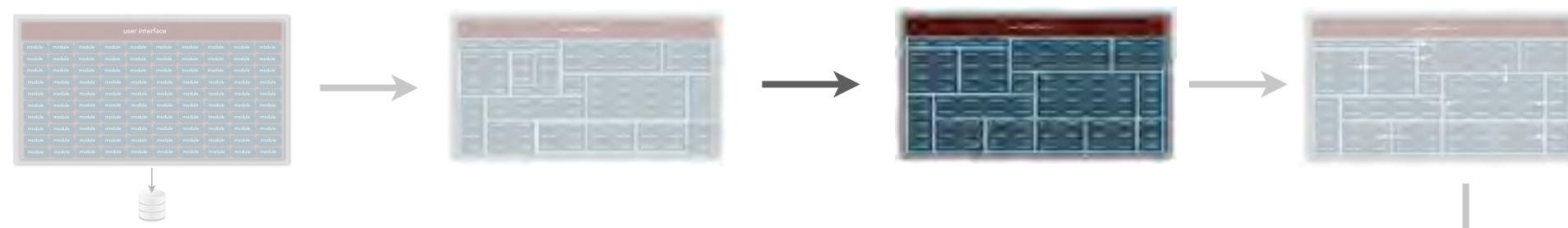
migration patterns

flatten and refactor components

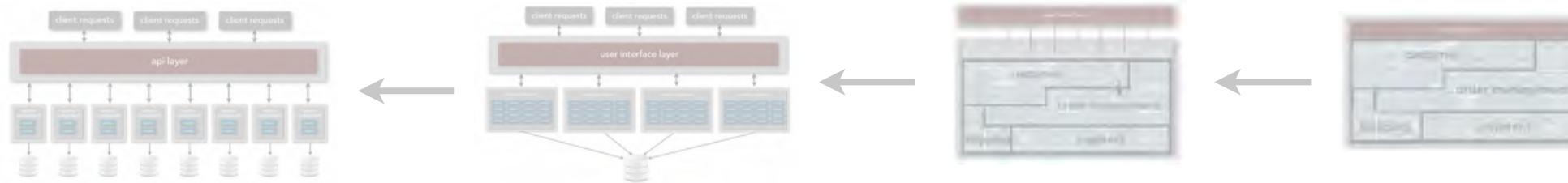


migration patterns

microservices roadmap

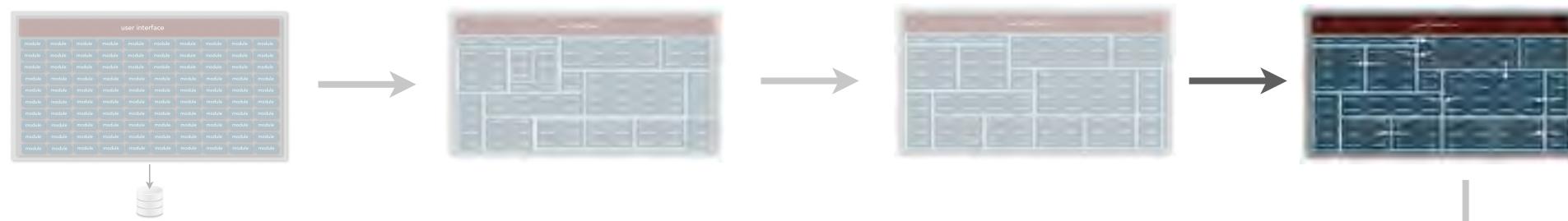


flatten and refactor components

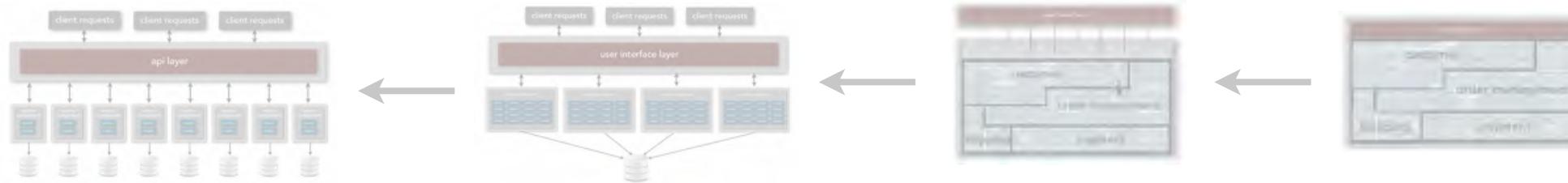


migration patterns

microservices roadmap

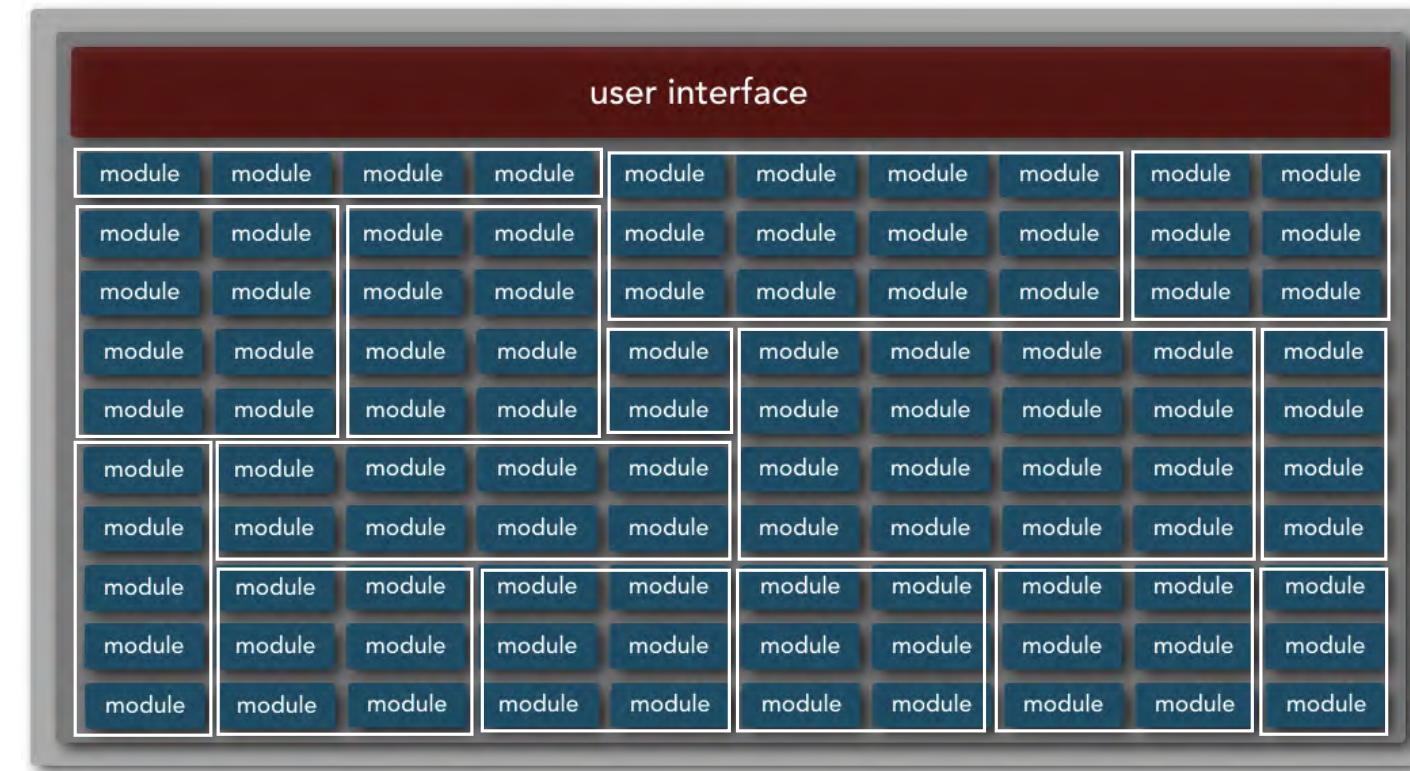


identify component dependencies



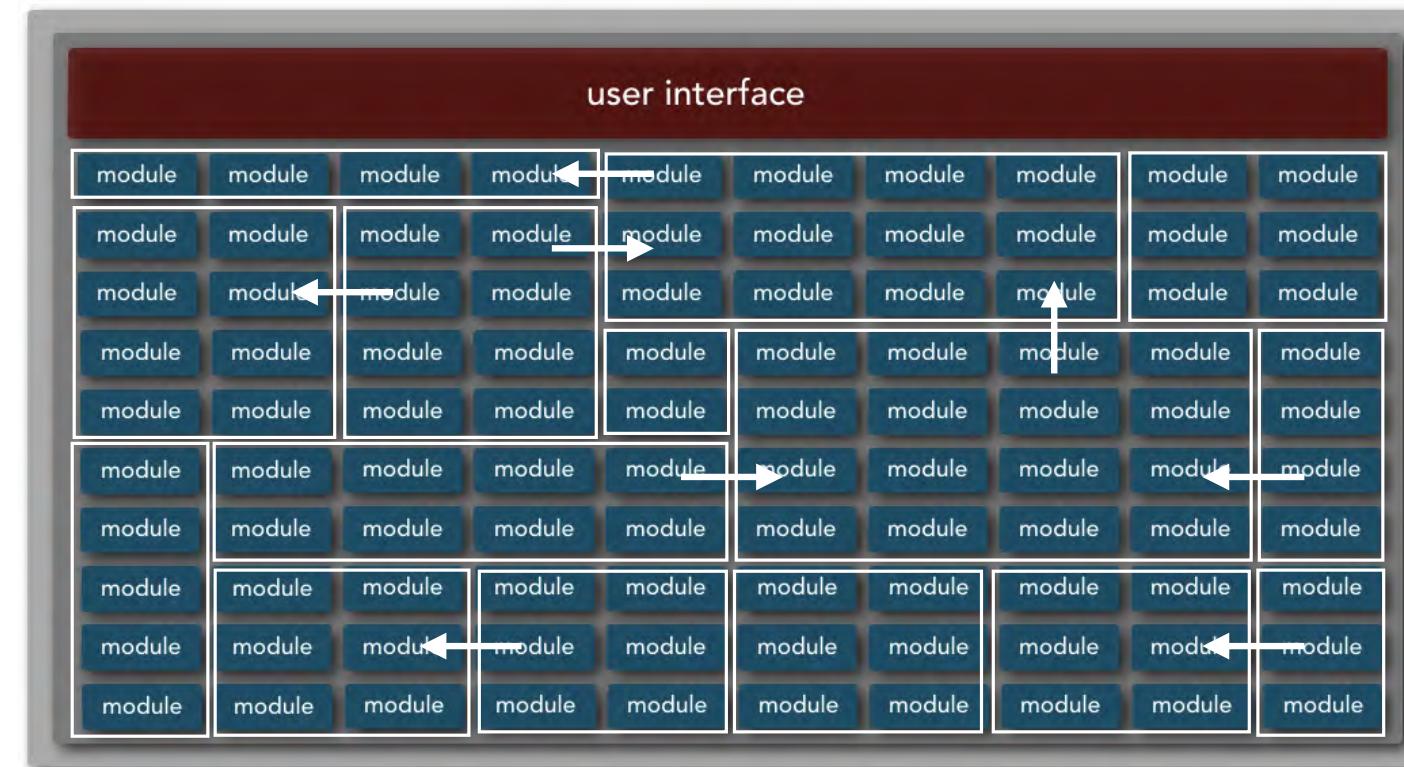
migration patterns

identify components dependencies



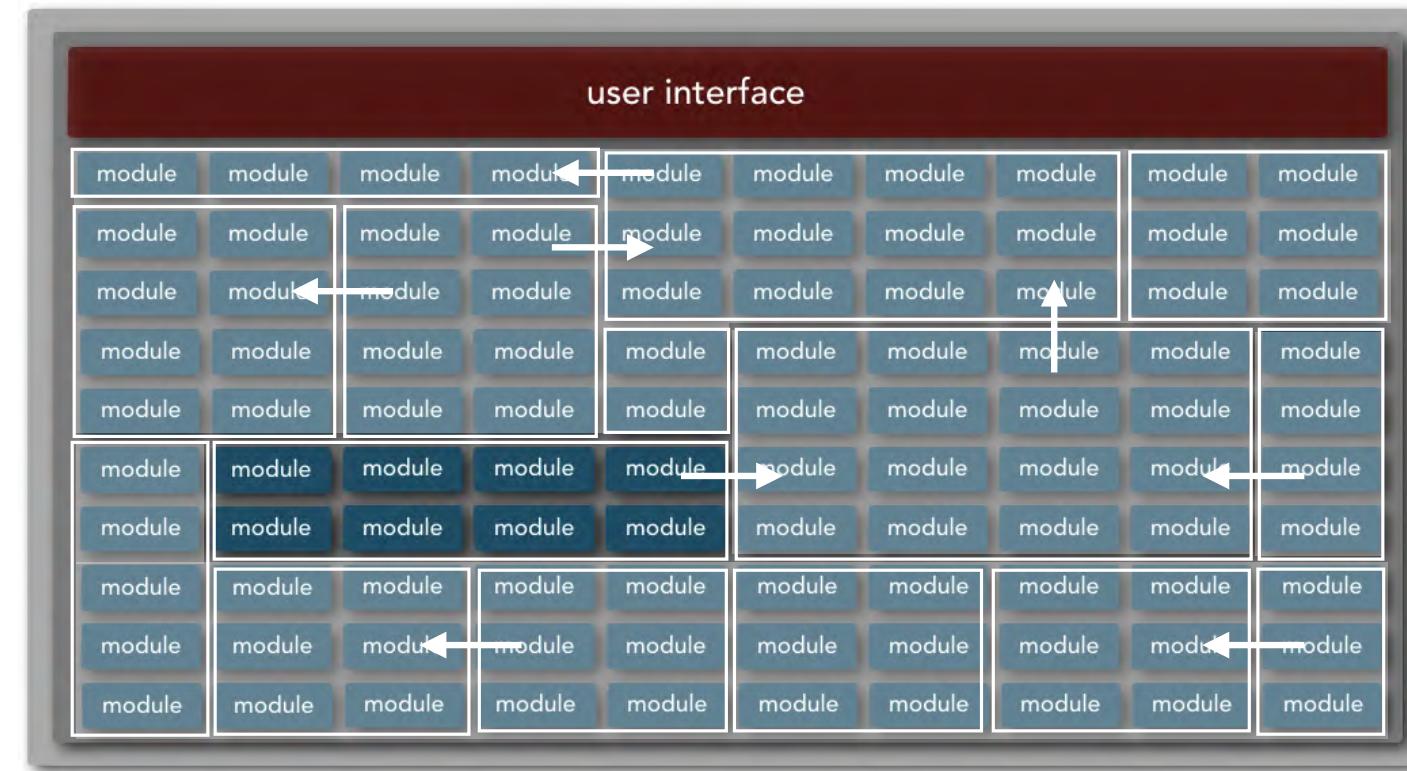
migration patterns

identify components dependencies



migration patterns

identify components dependencies



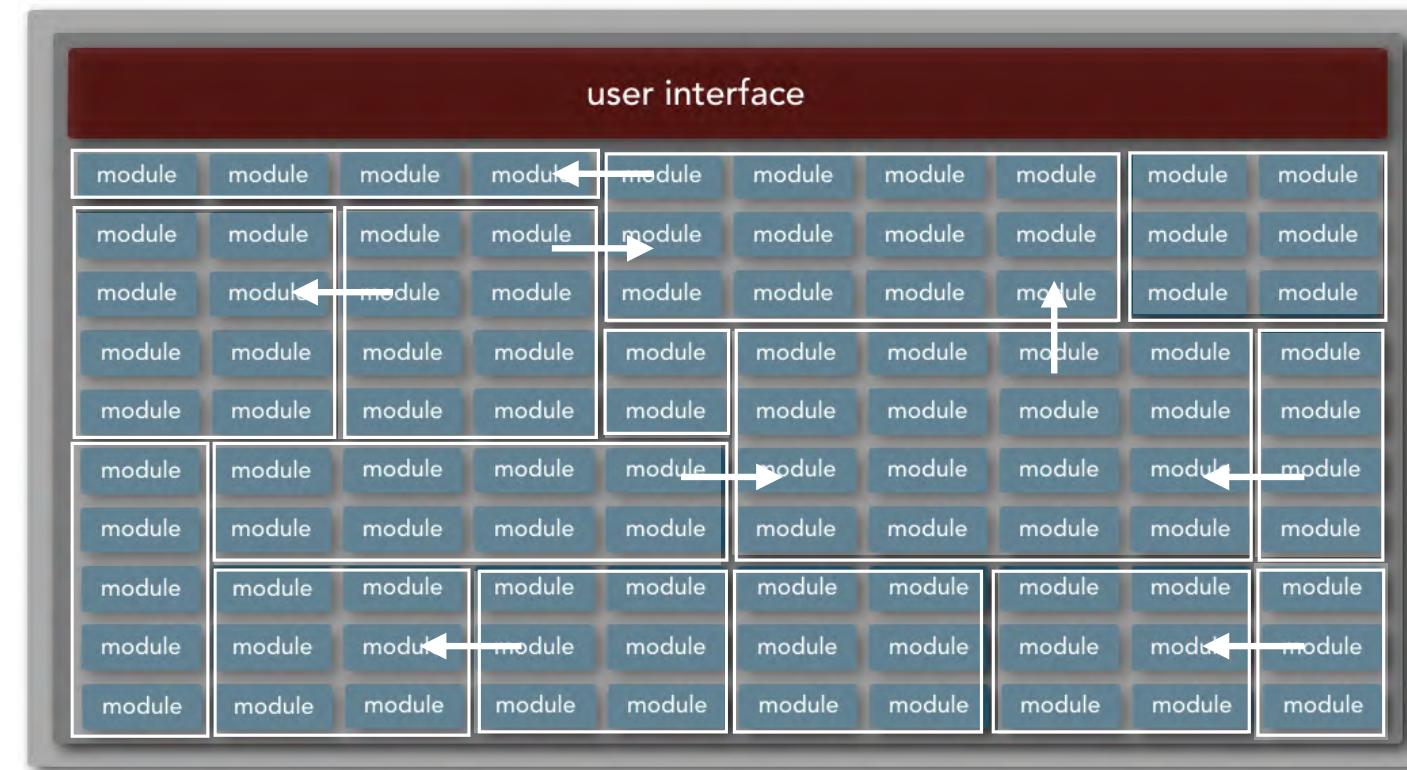
app.shipping.fulfillment.OrderShipment

app.payment.invoicing.CustomerInvoice



migration patterns

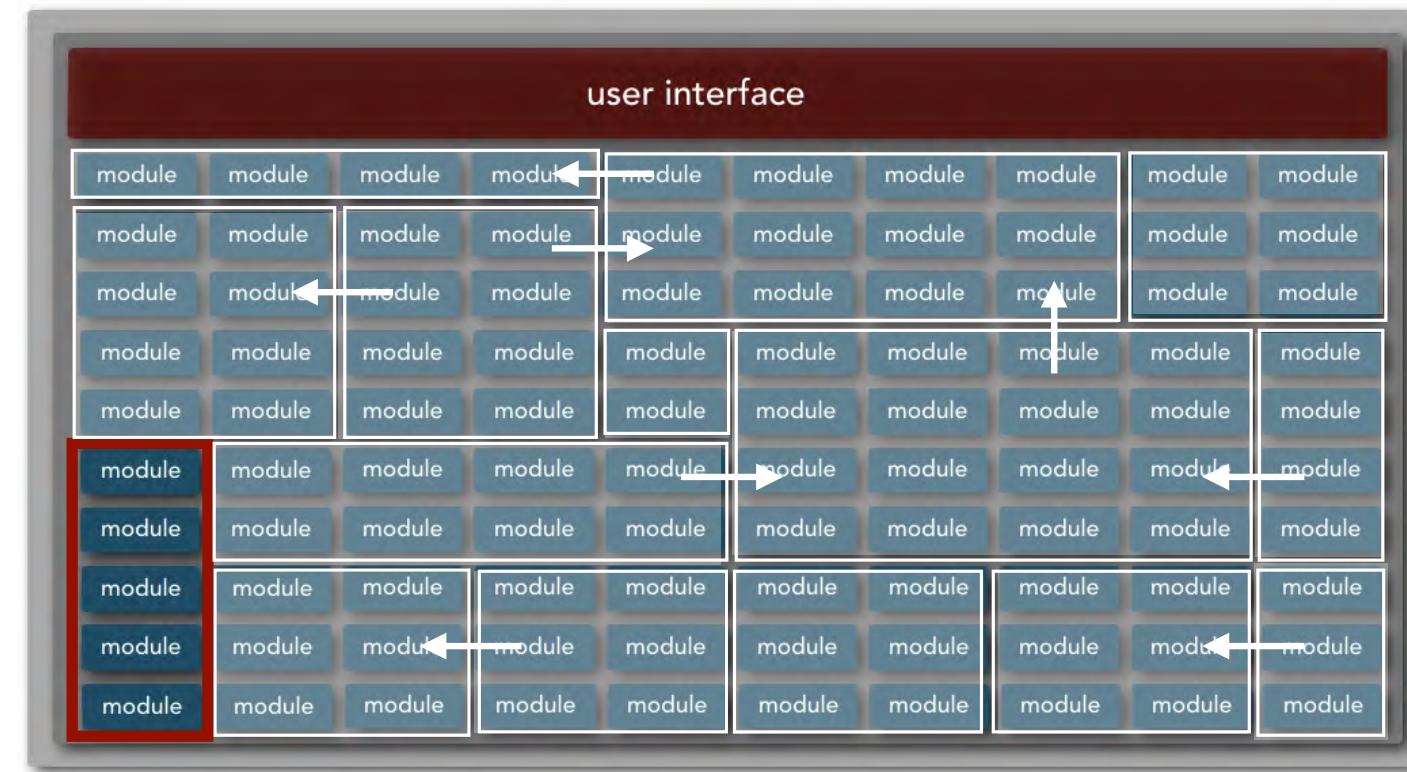
identify components dependencies



component coupling analysis

migration patterns

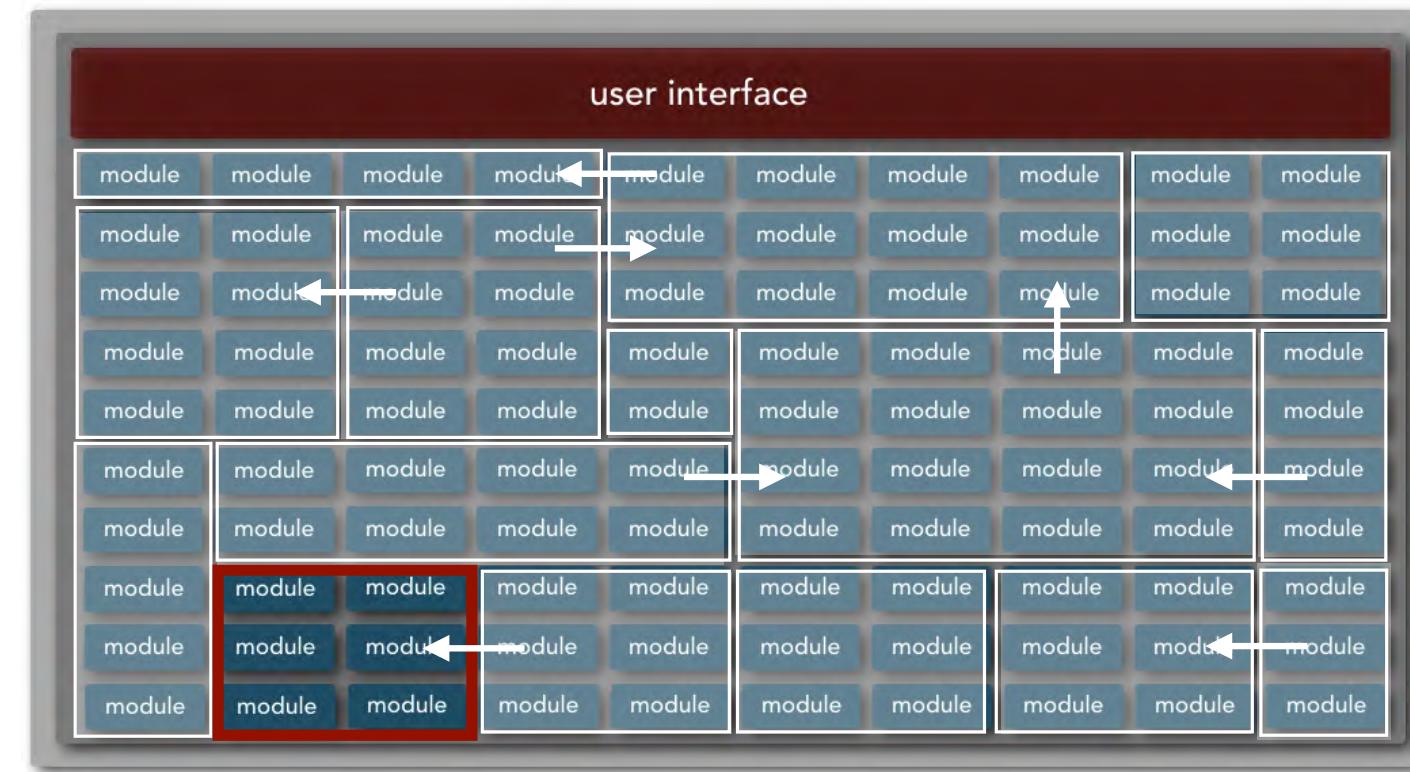
identify components dependencies



component coupling analysis

migration patterns

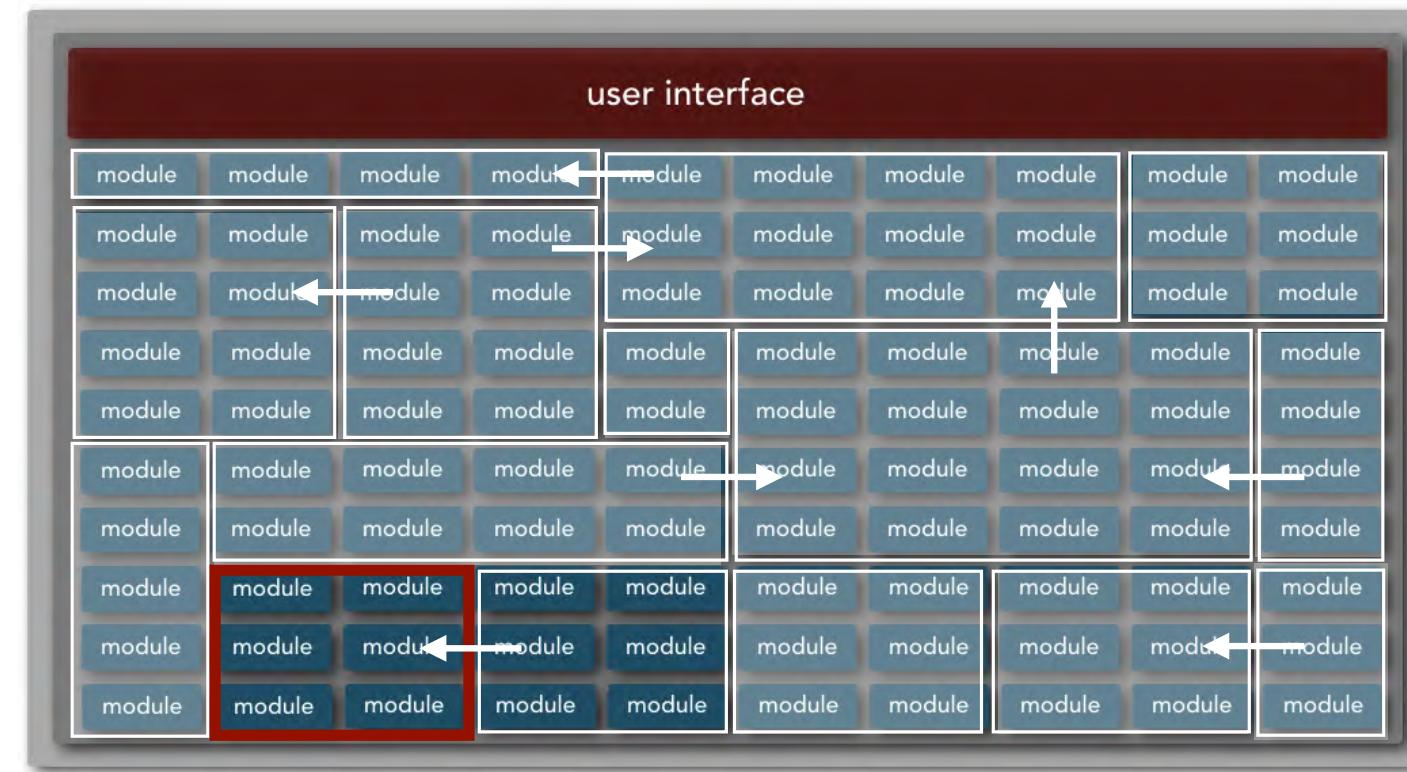
identify components dependencies



component coupling analysis

migration patterns

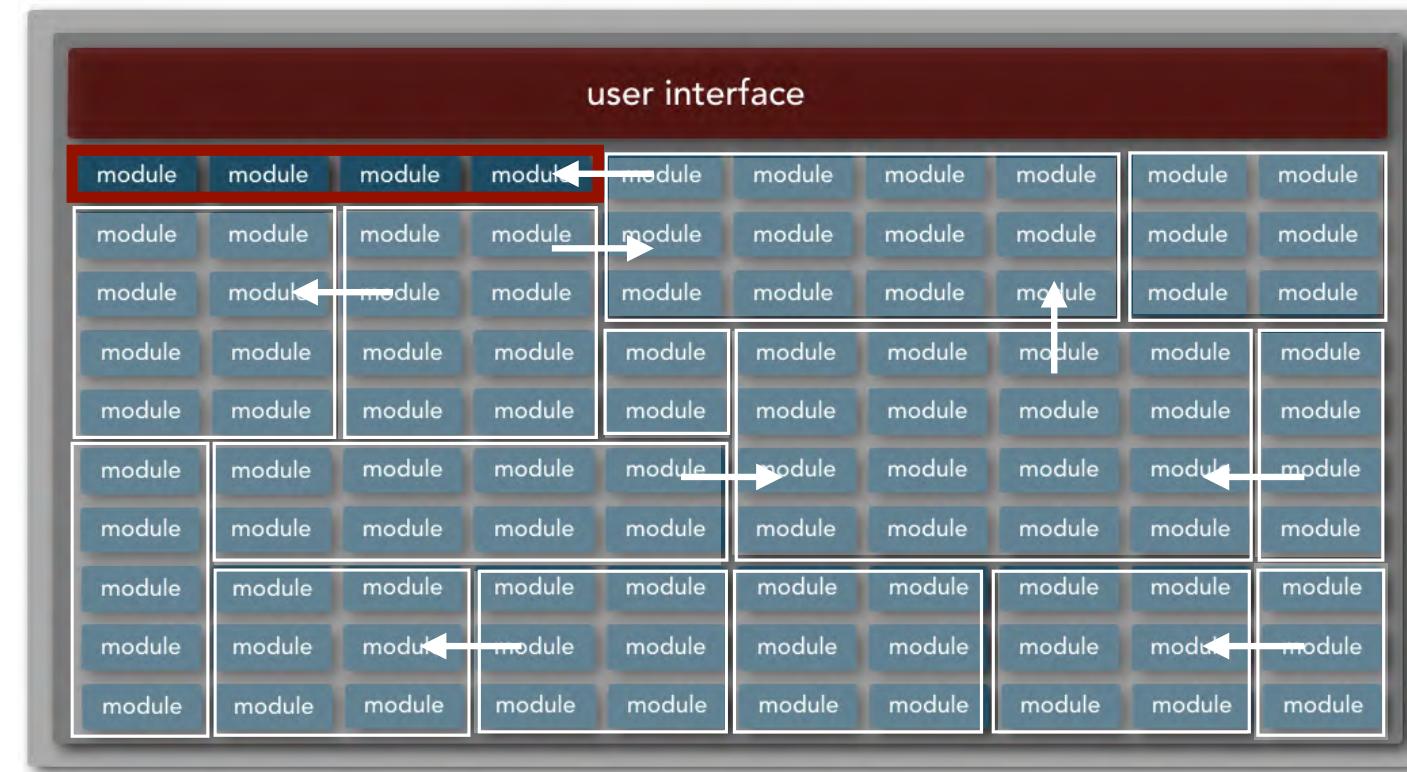
identify components dependencies



component coupling analysis

migration patterns

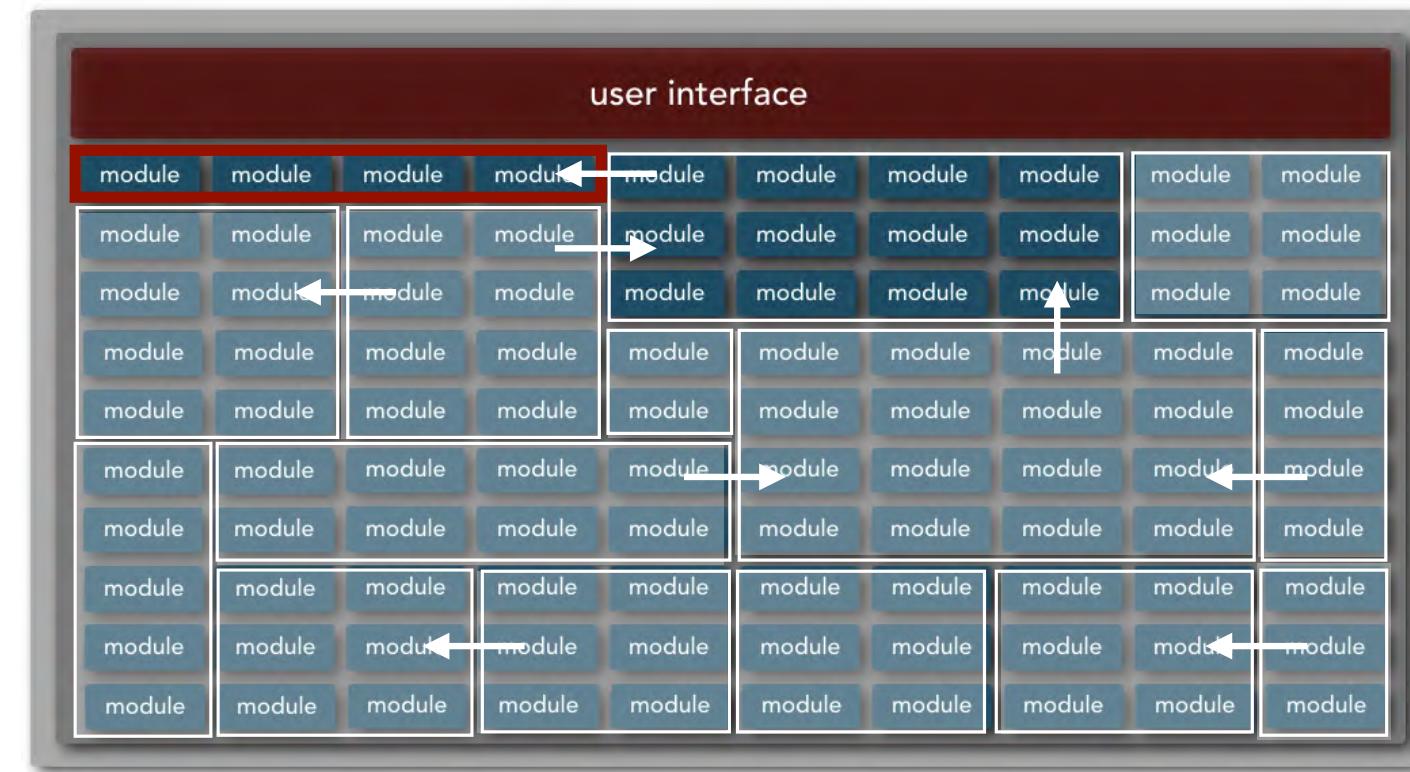
identify components dependencies



component coupling analysis

migration patterns

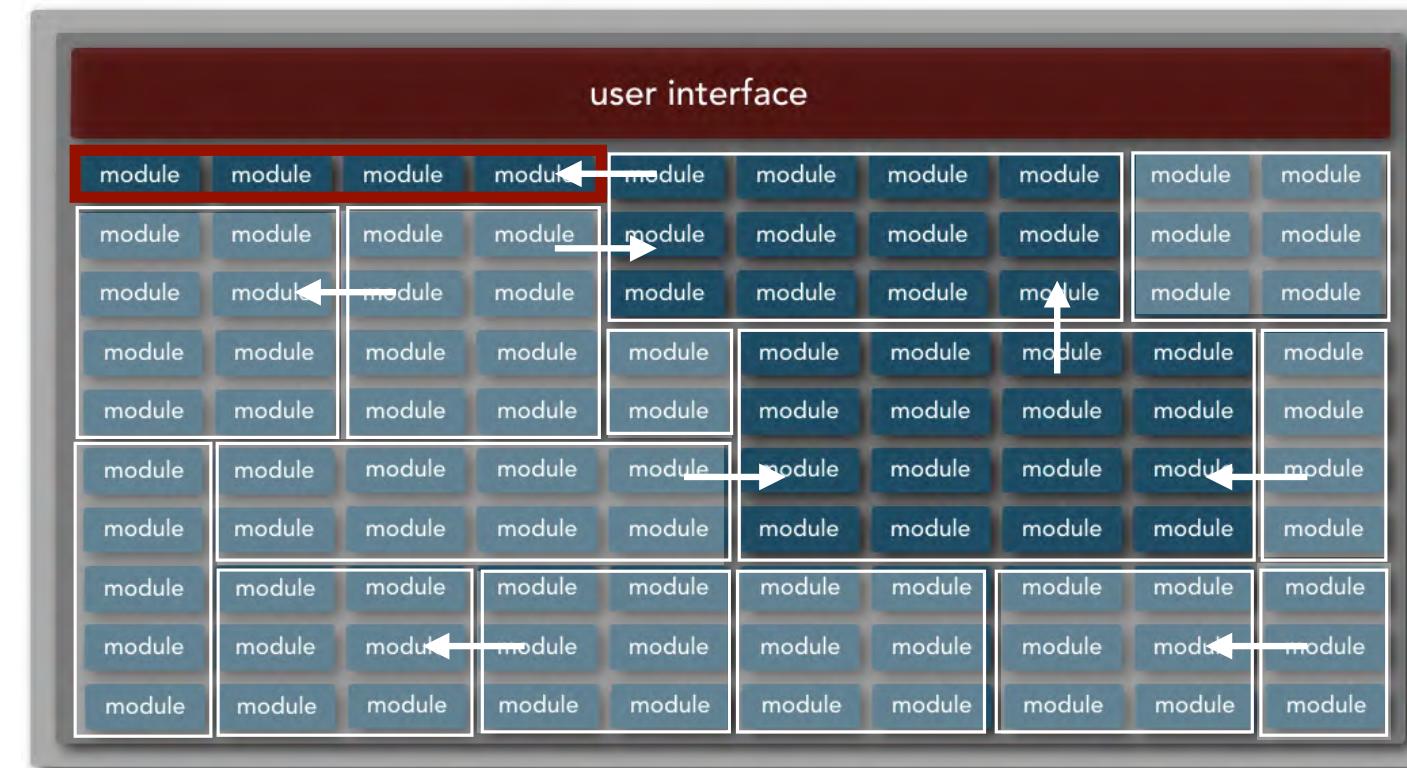
identify components dependencies



component coupling analysis

migration patterns

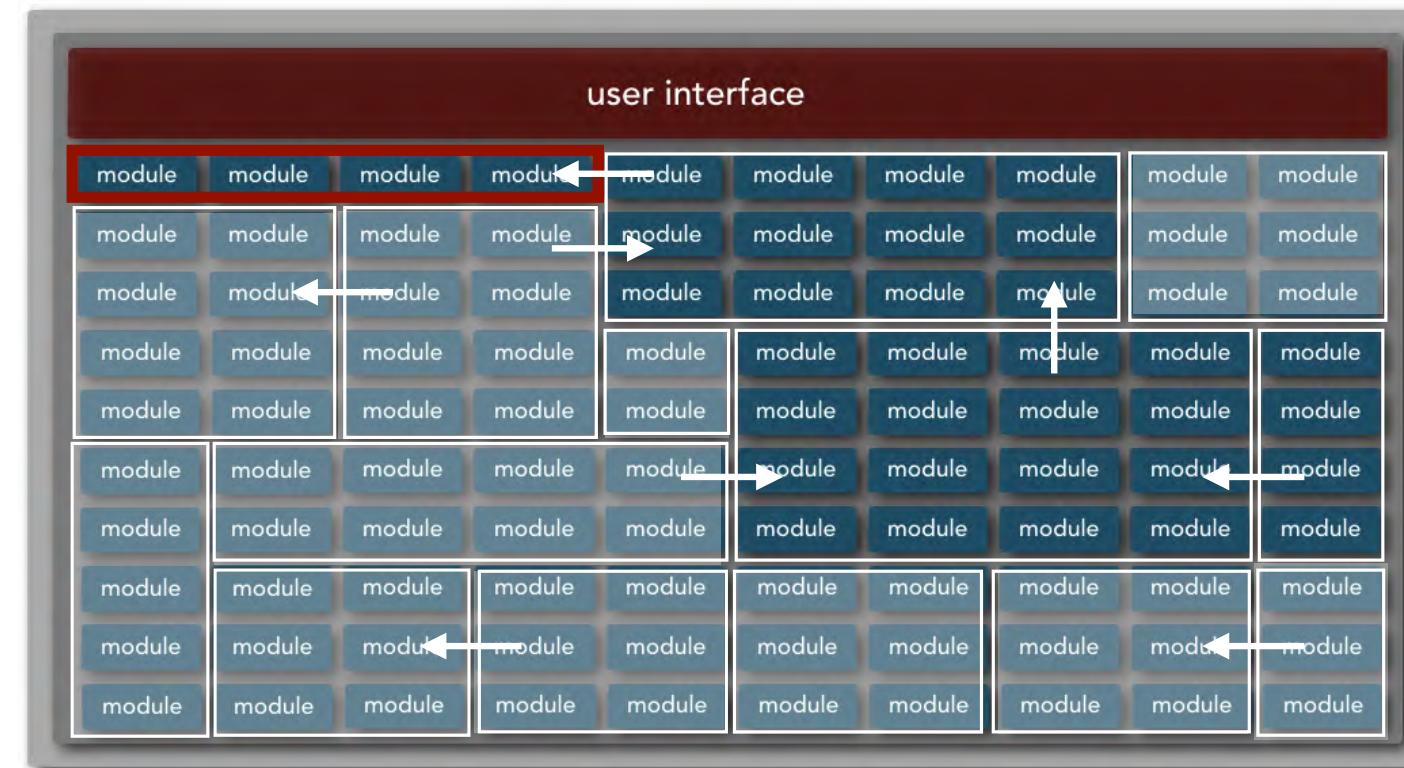
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component coupling analysis

migration patterns

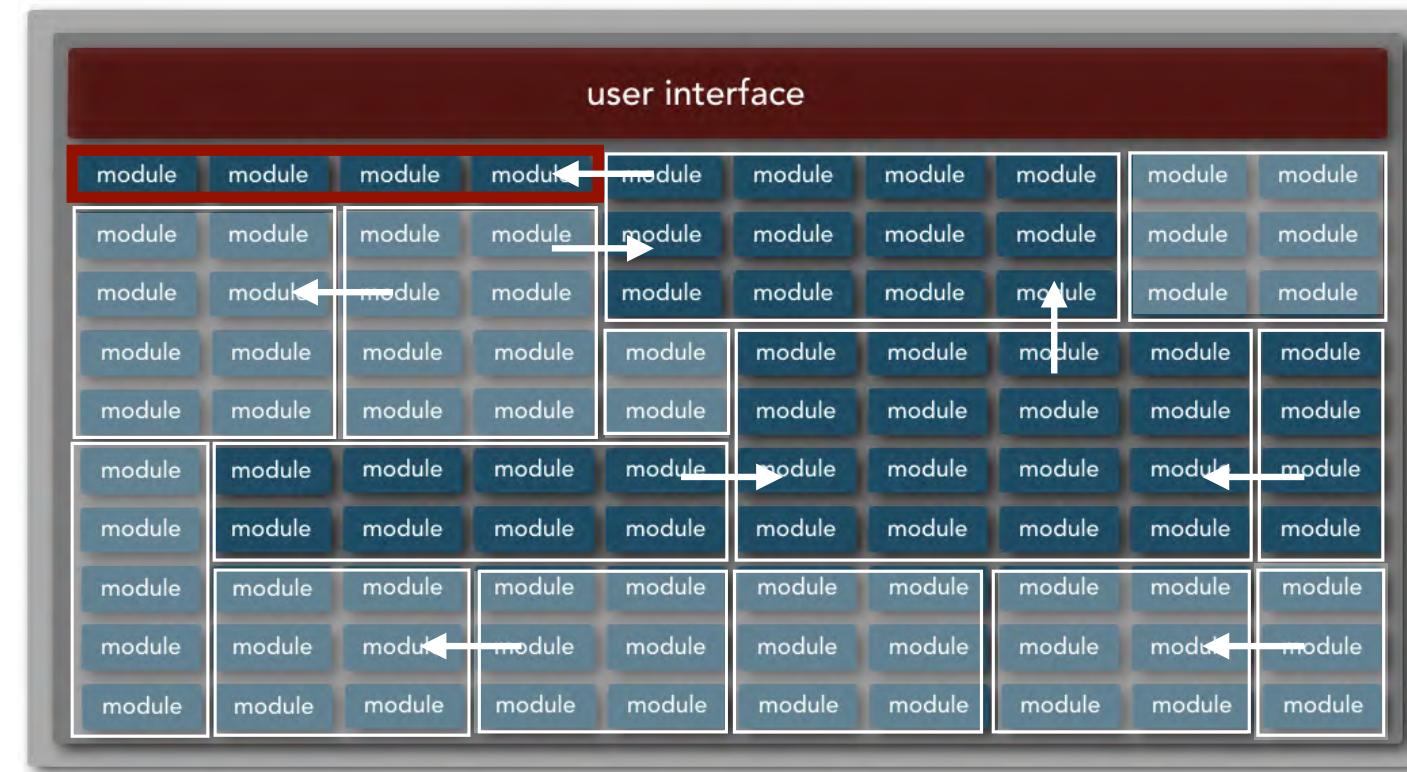
identify components dependencies



component coupling analysis

migration patterns

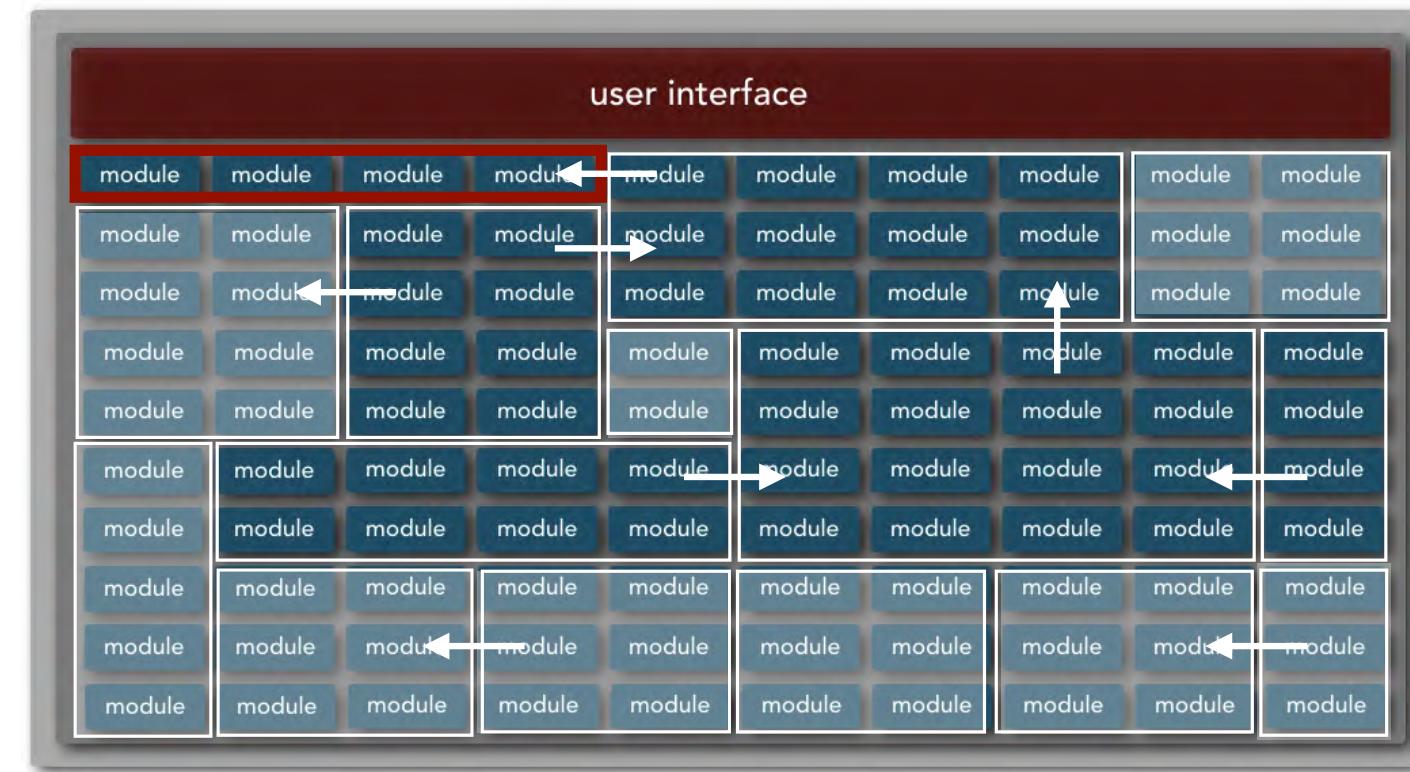
identify components dependencies



component coupling analysis

migration patterns

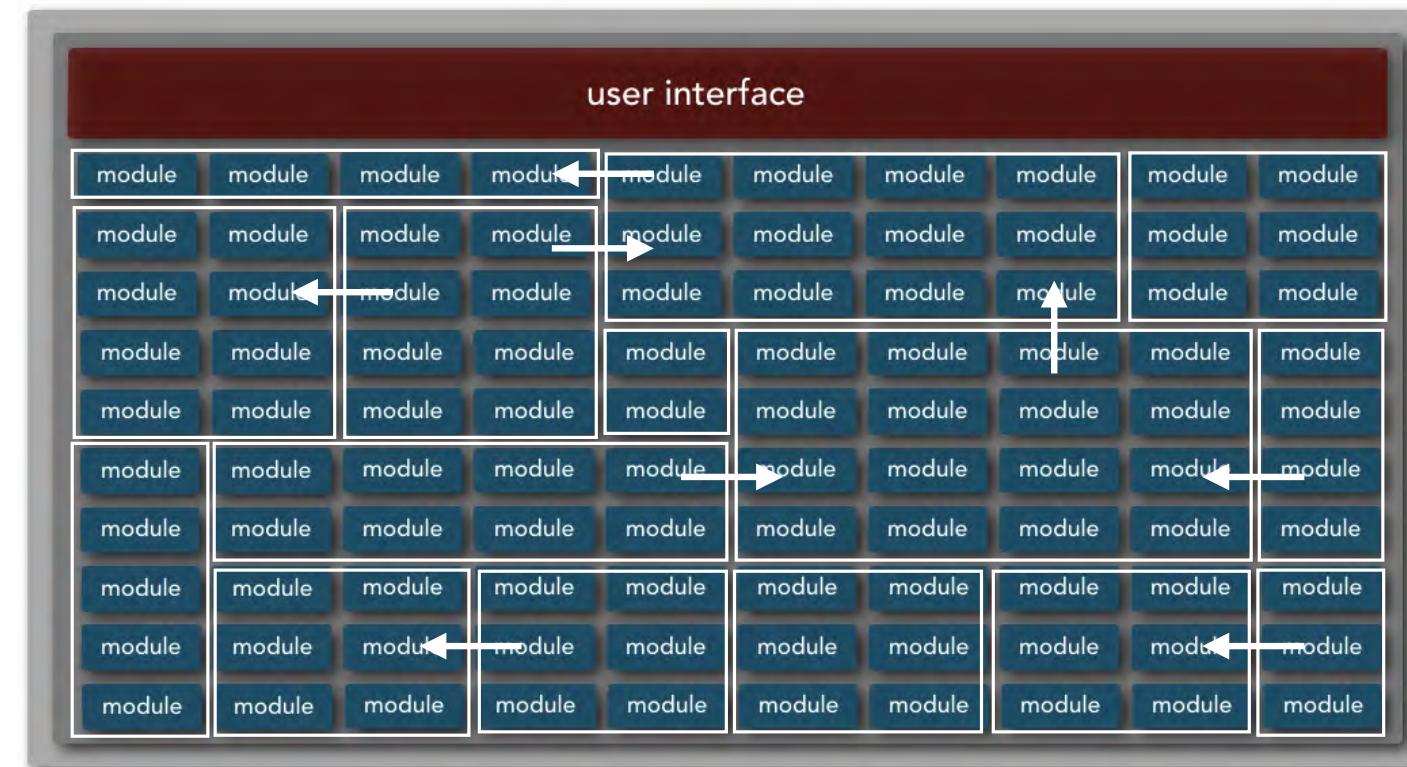
identify components dependencies



component coupling analysis

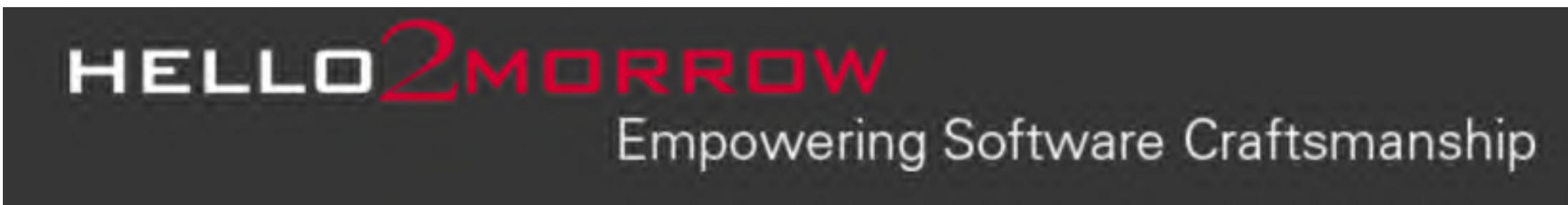
migration patterns

identify components dependencies



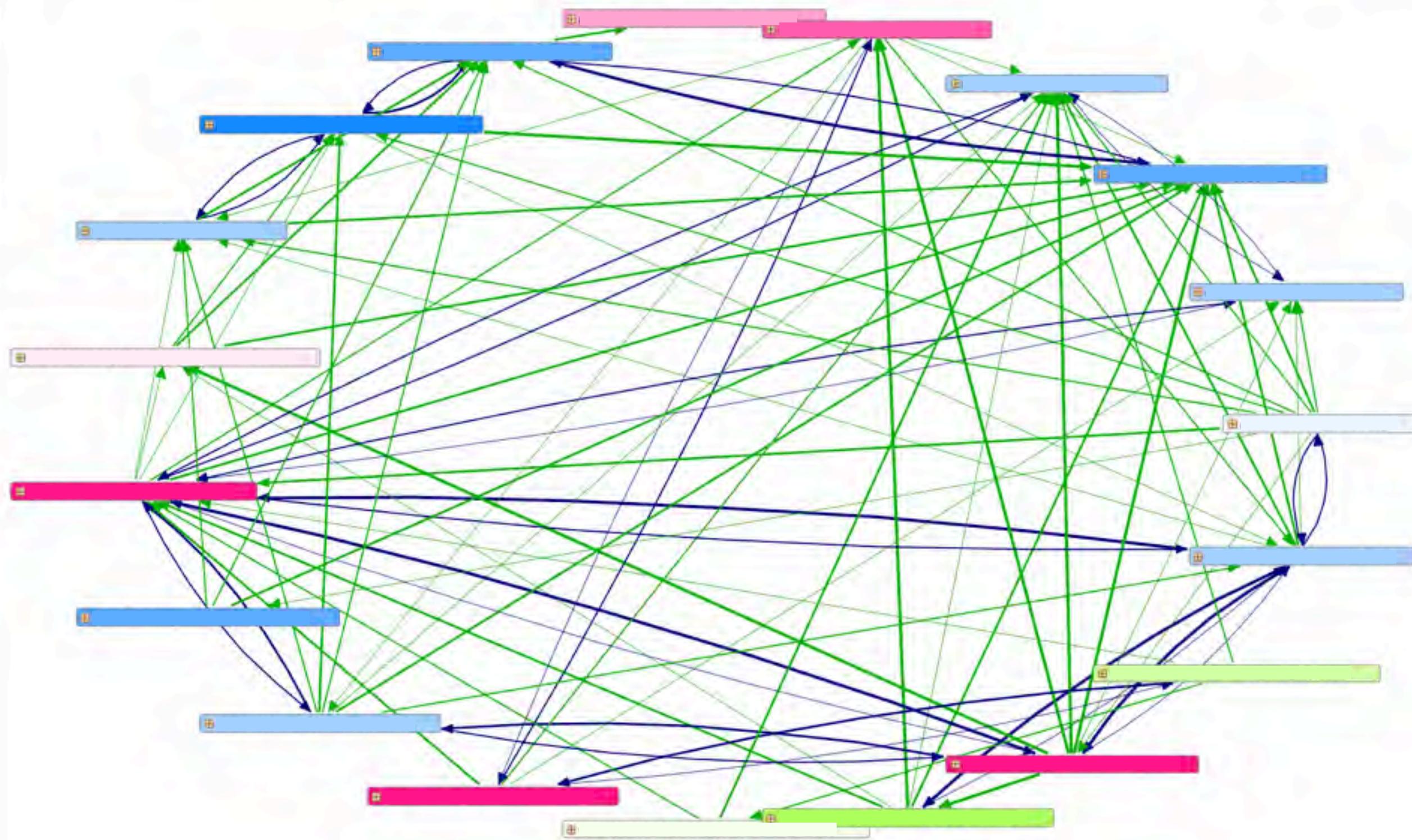
Sonargraph

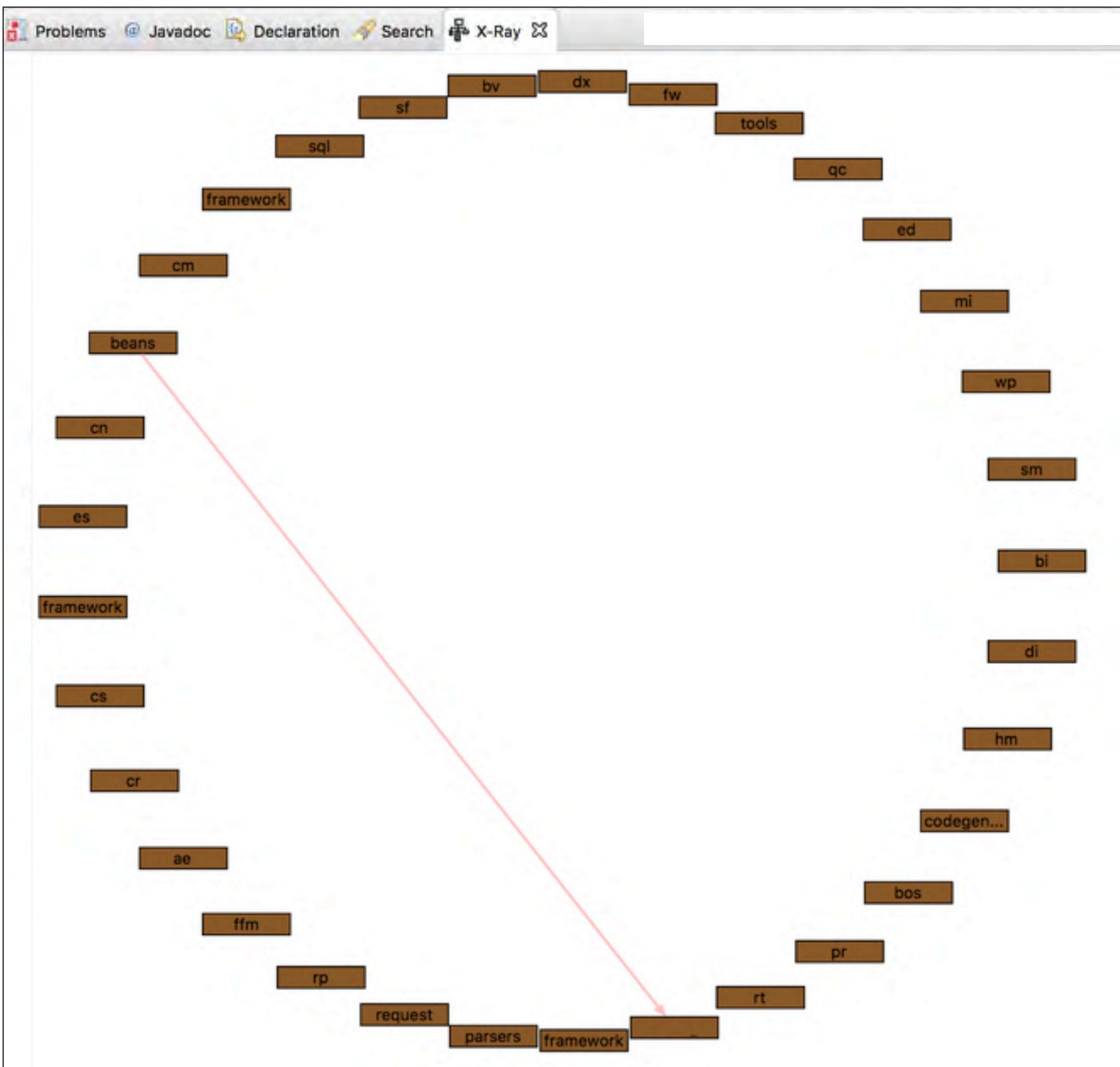
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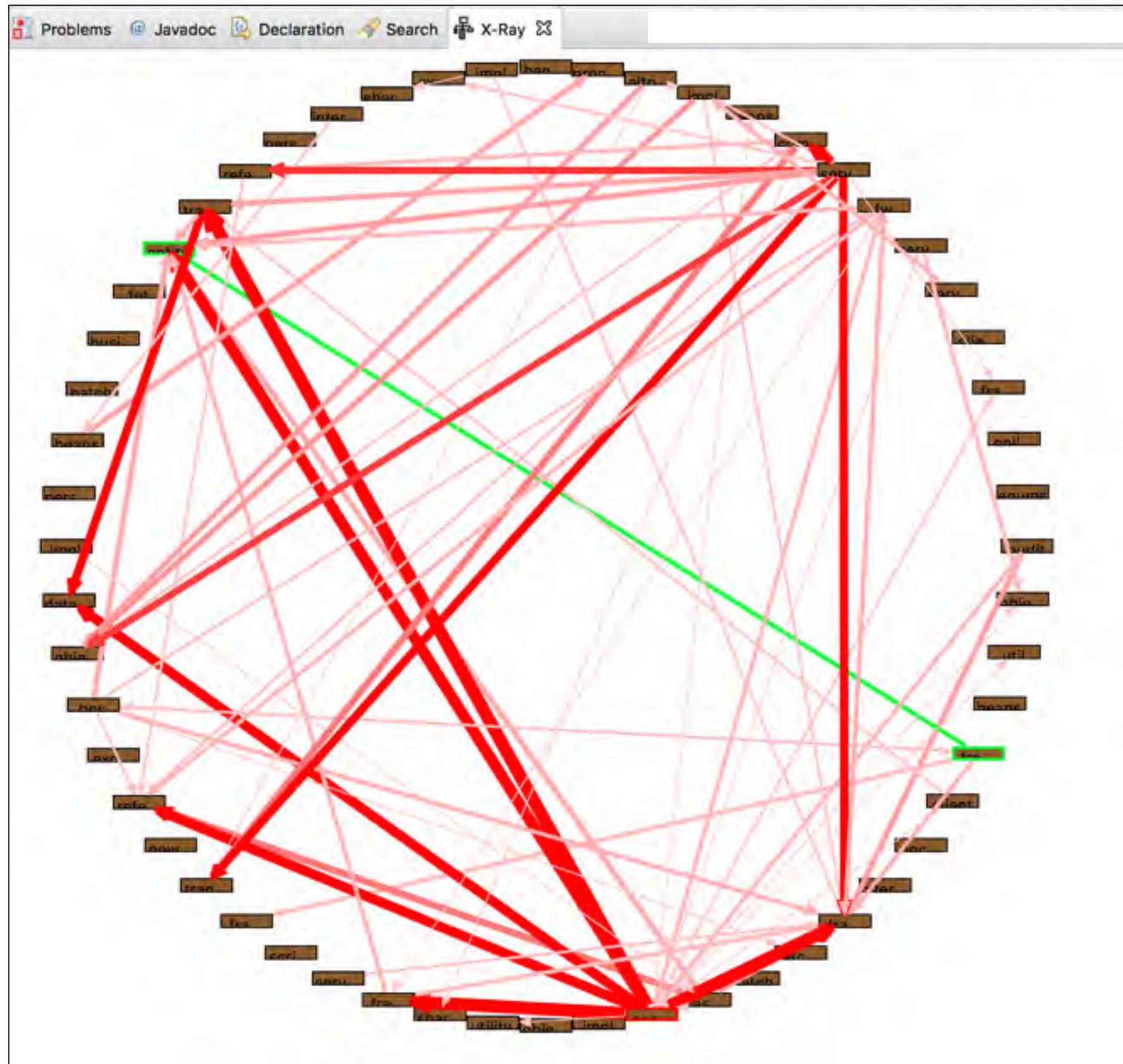


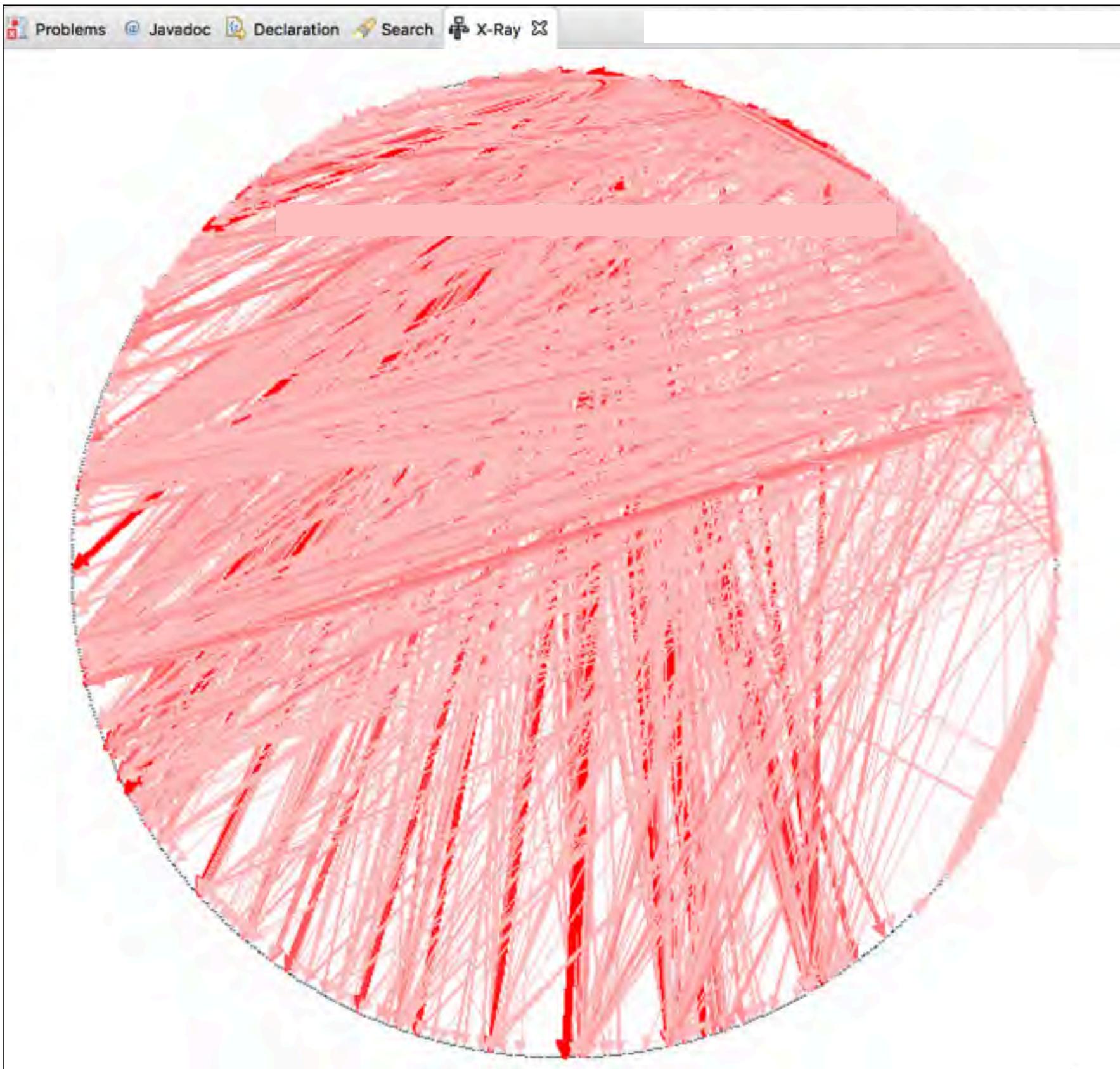
Sonargraph-Explorer Java, C#, Python3

Sonargraph-Architect Java, C#, C++, C, Python3









Problems

Javadoc

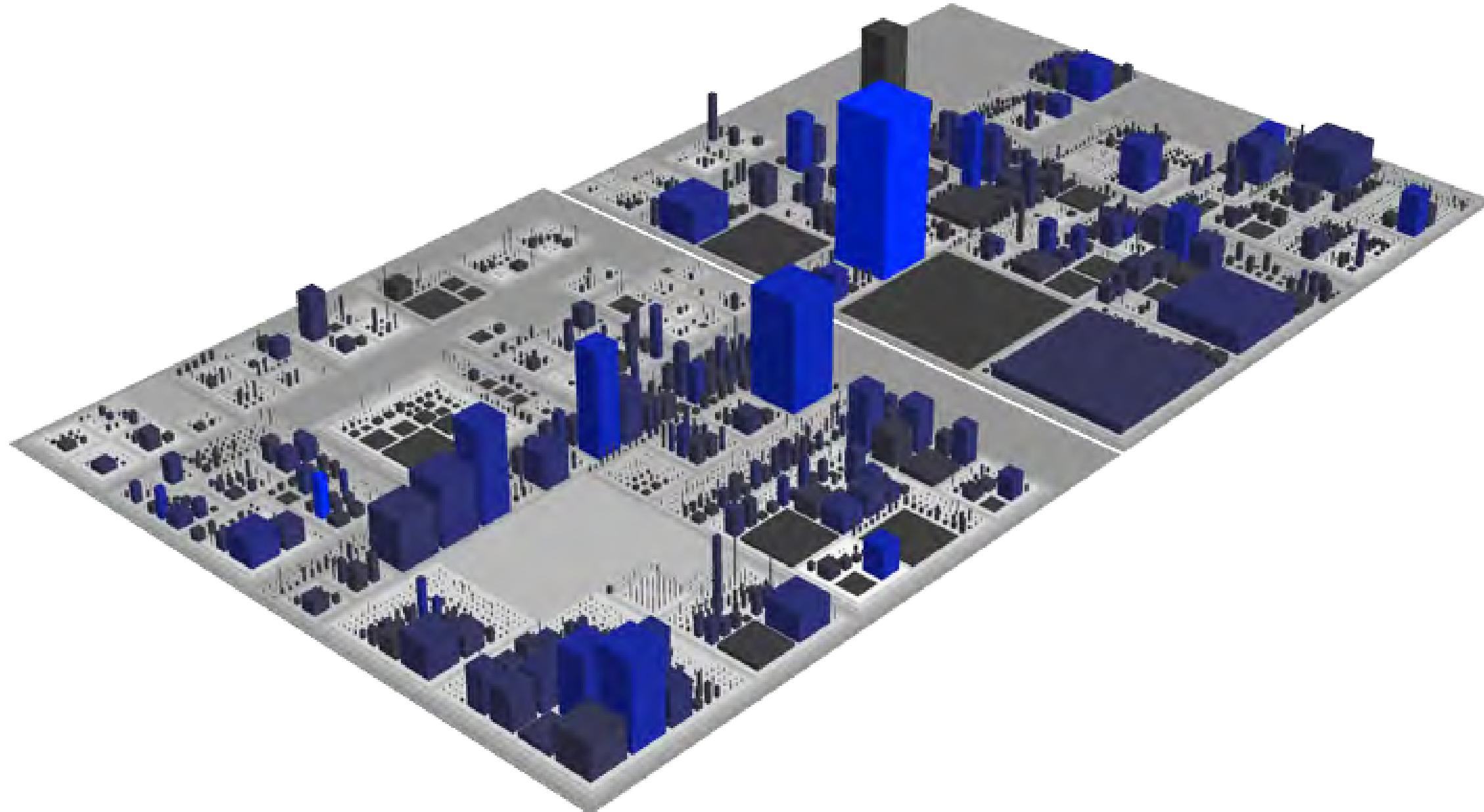
Declaration

Search X-Ray

Code City



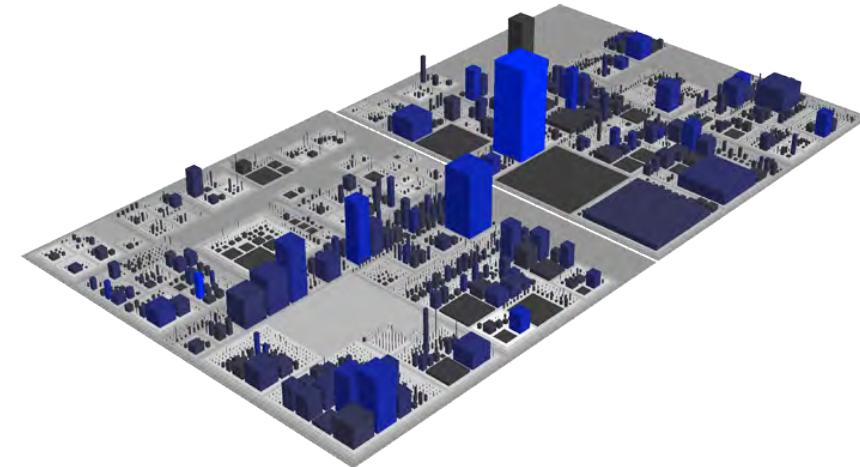
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Code City



<http://www.inf.usi.ch/phd/wettel/codecity.html>



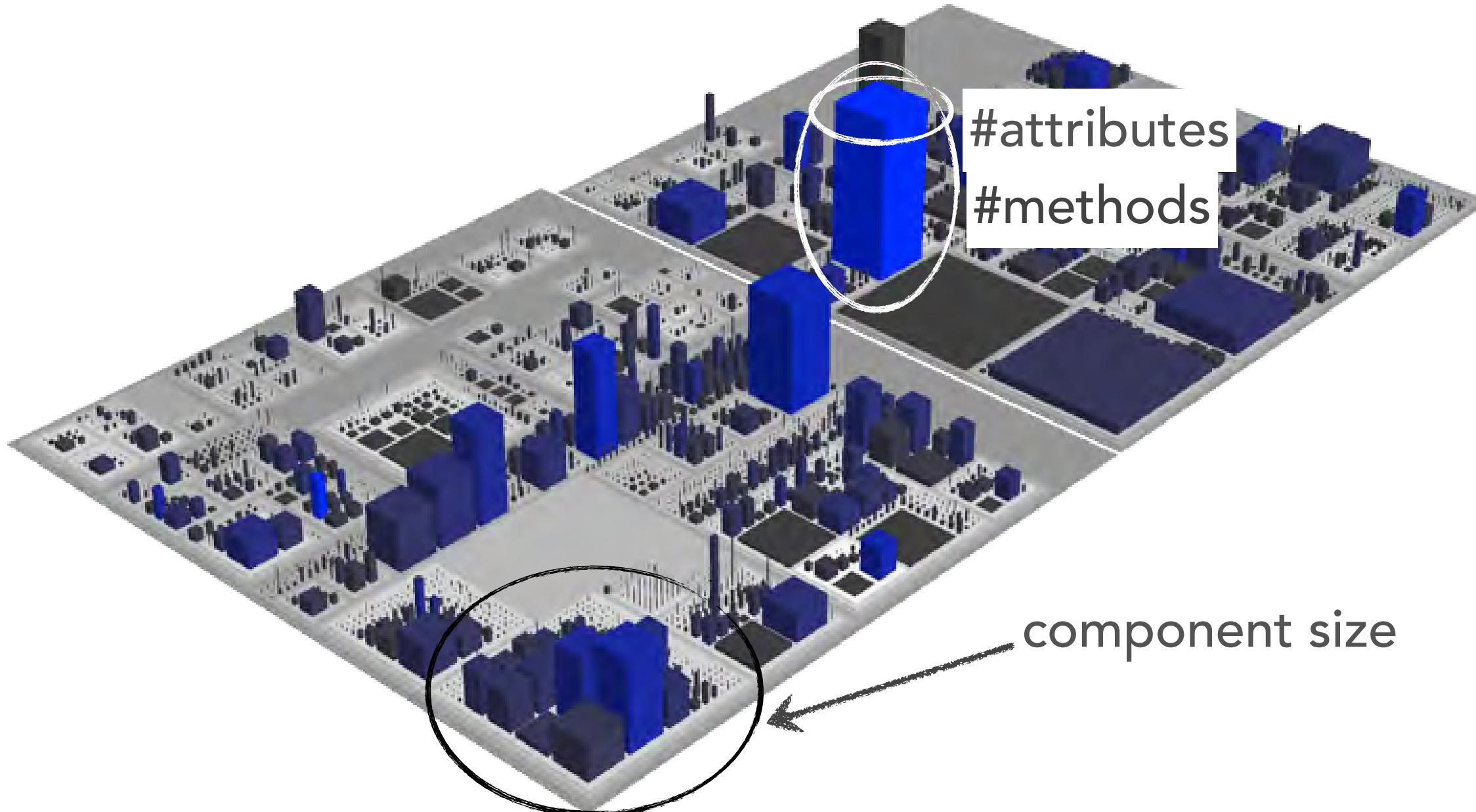
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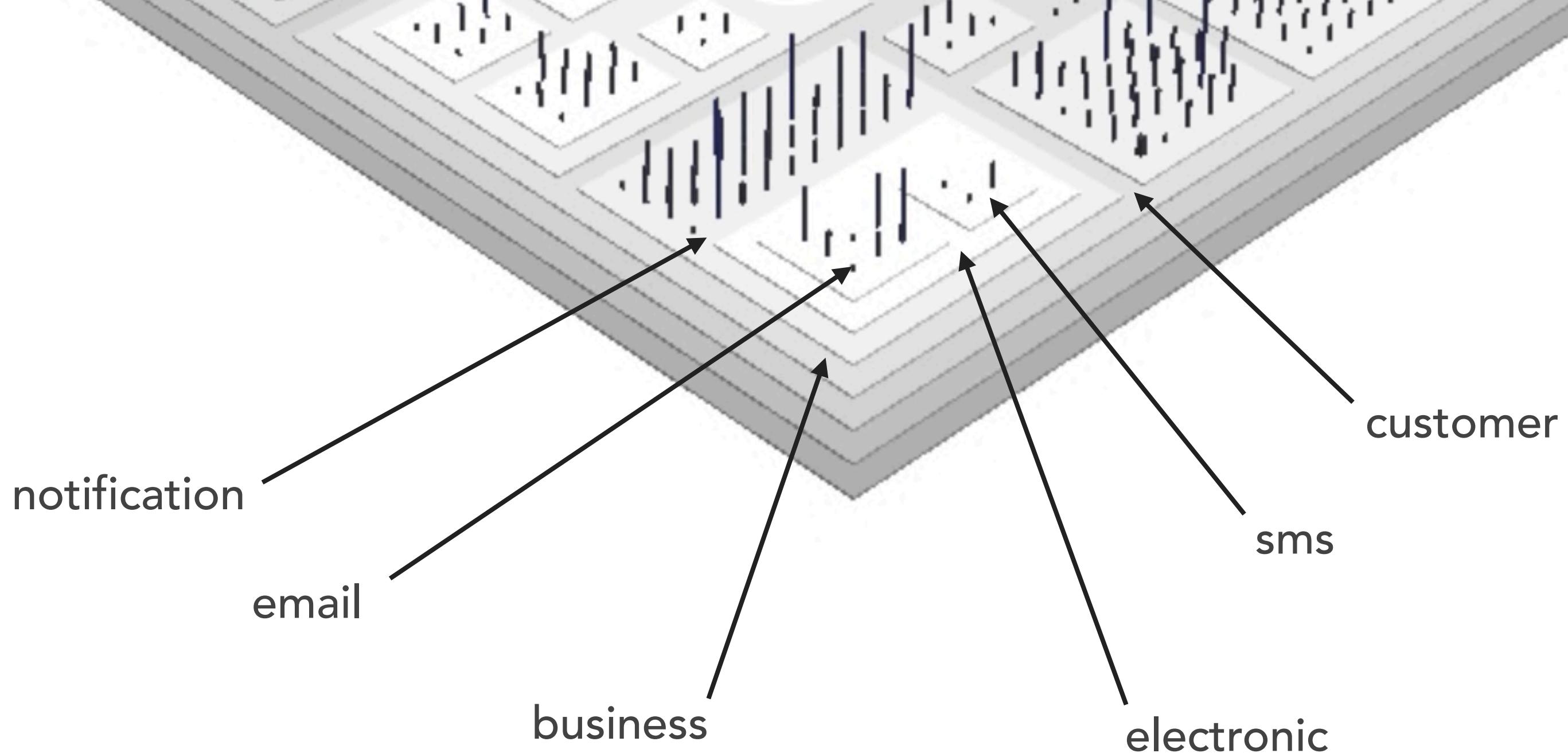
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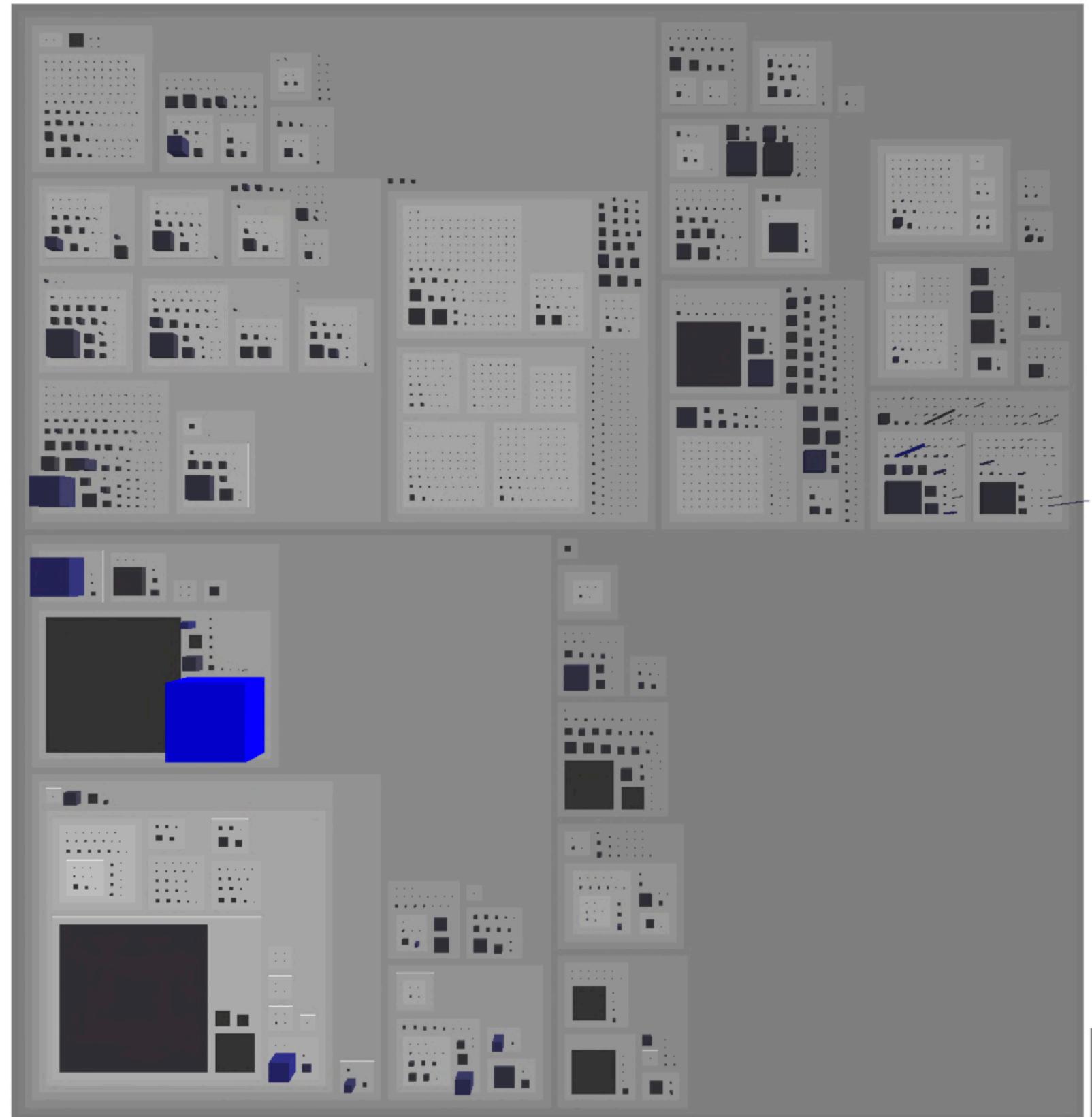
Code City

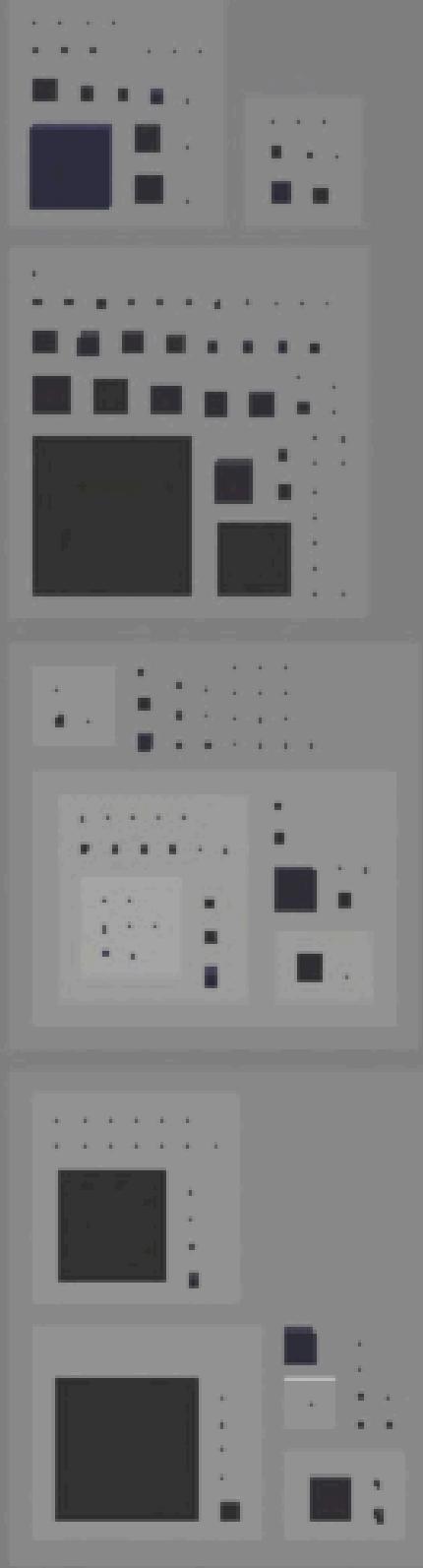
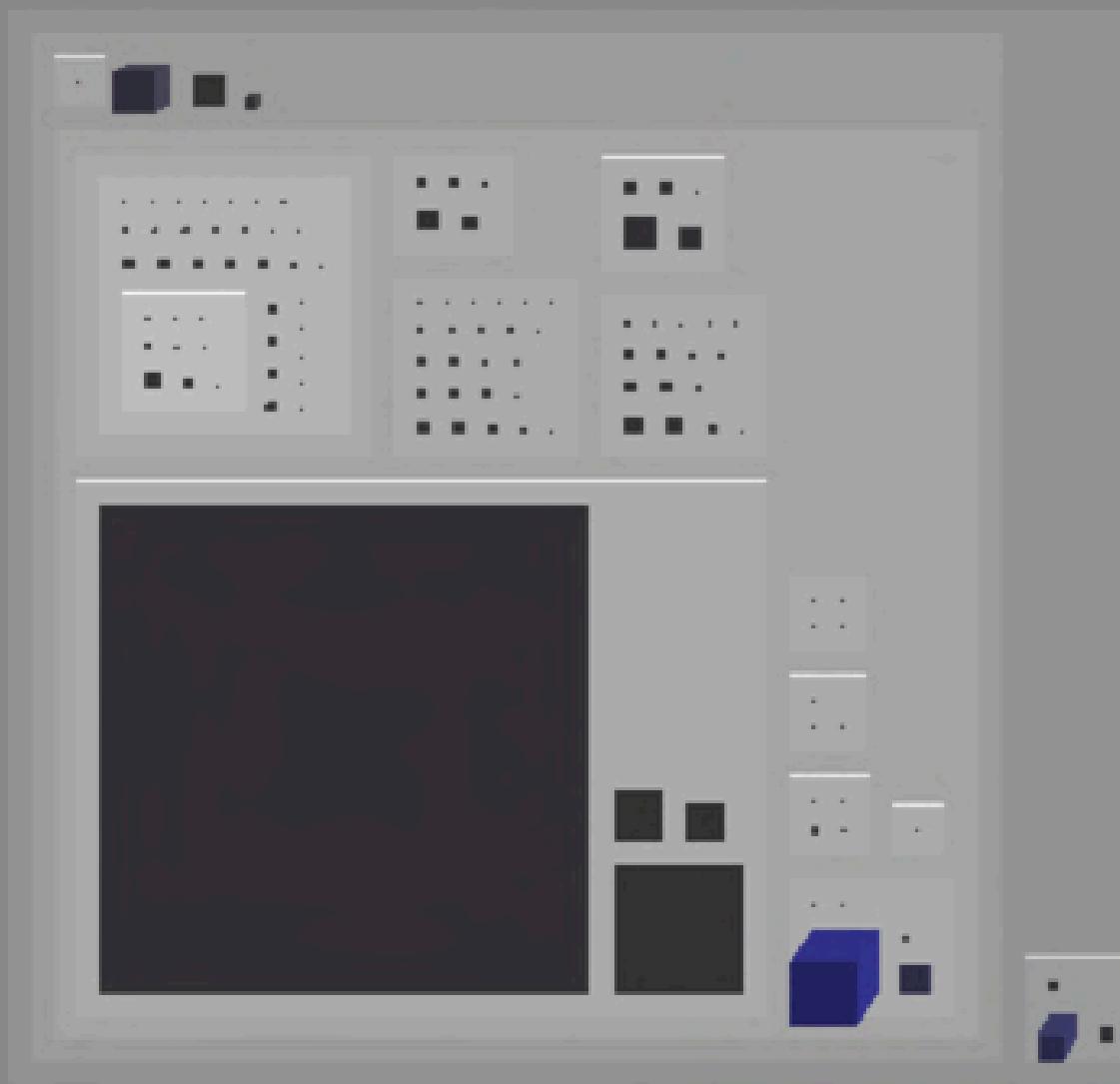
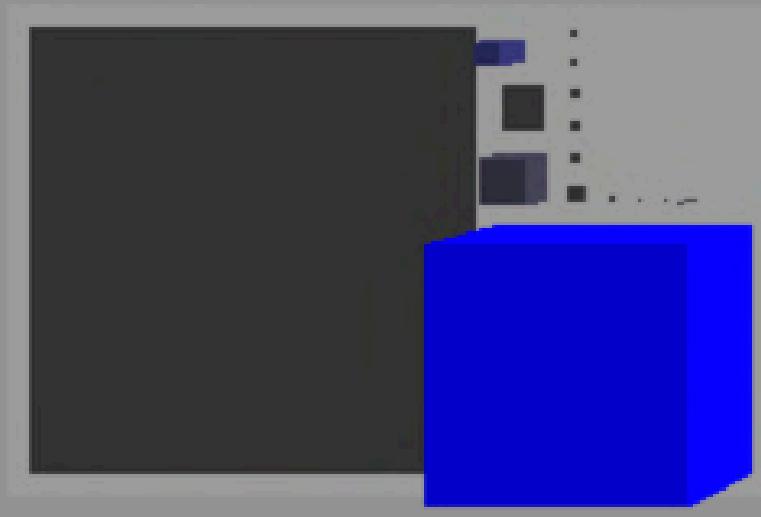


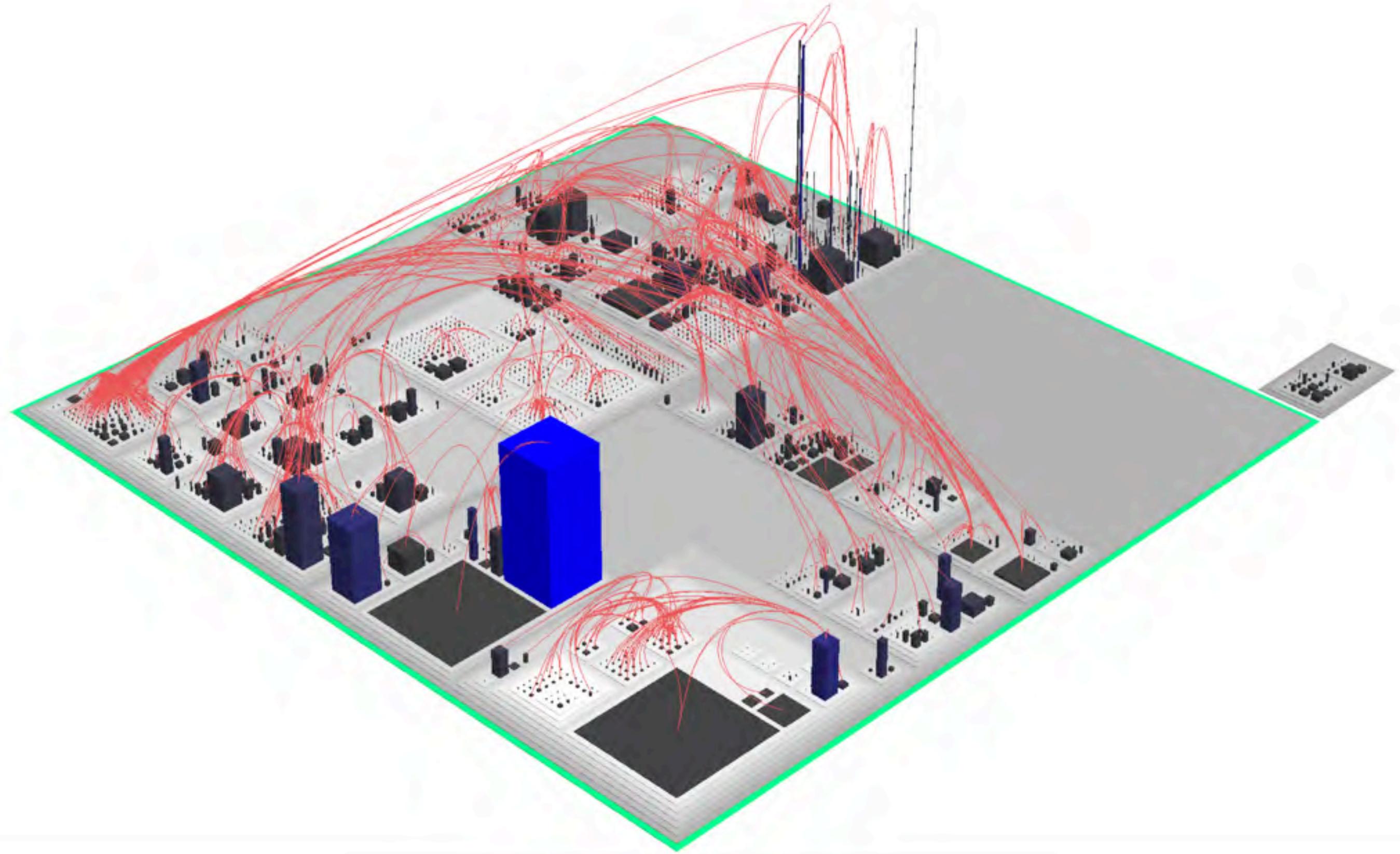
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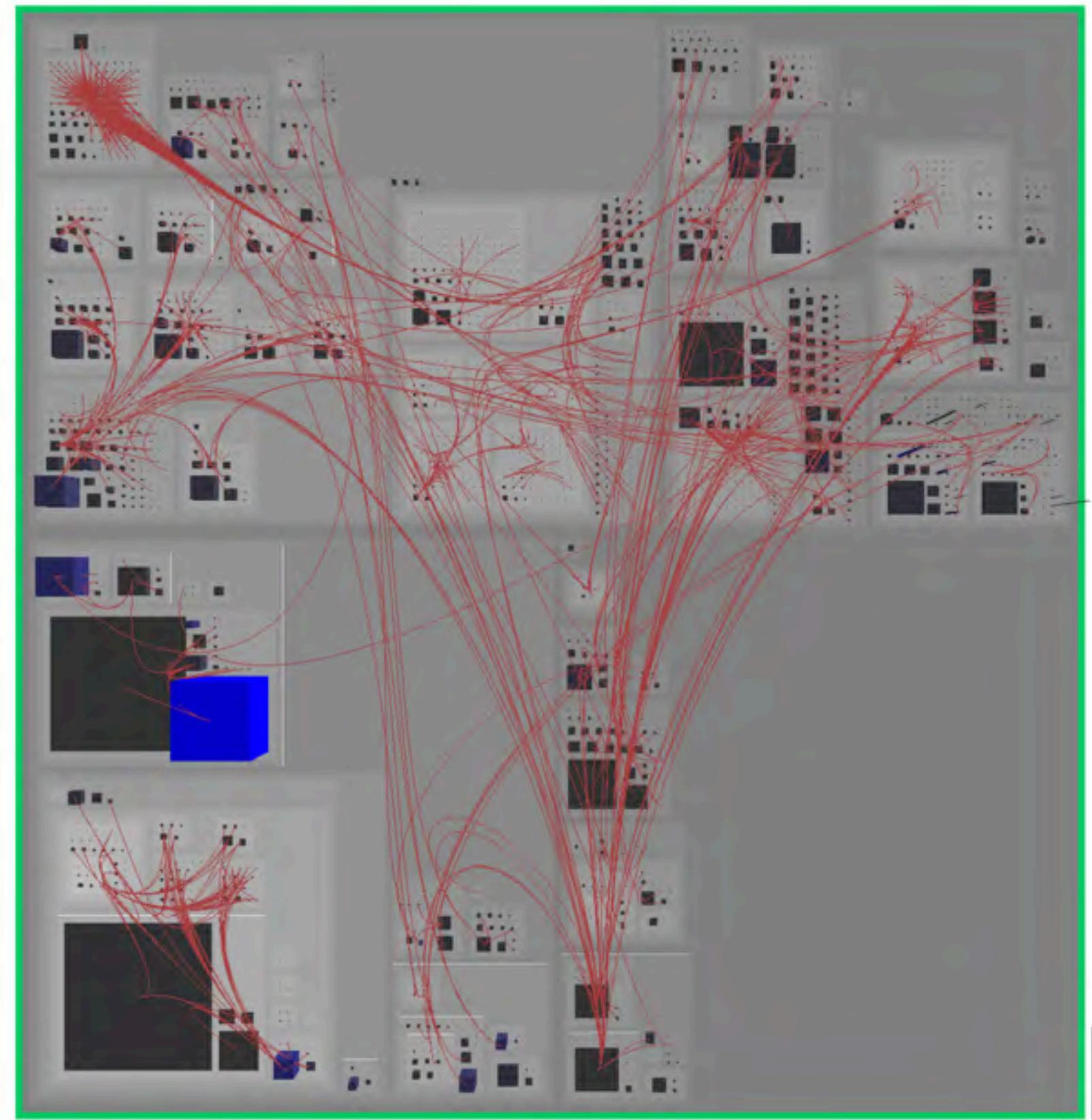


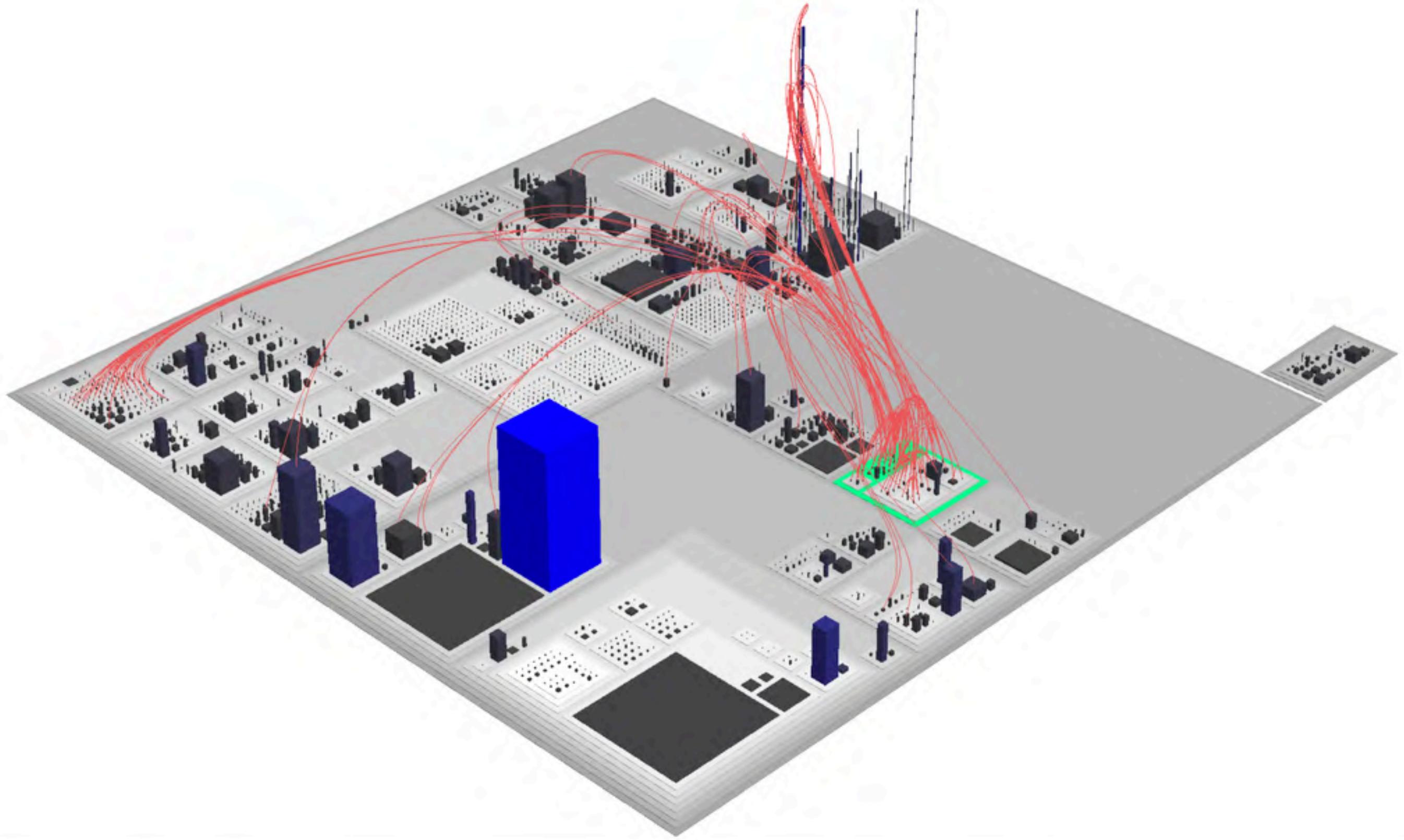




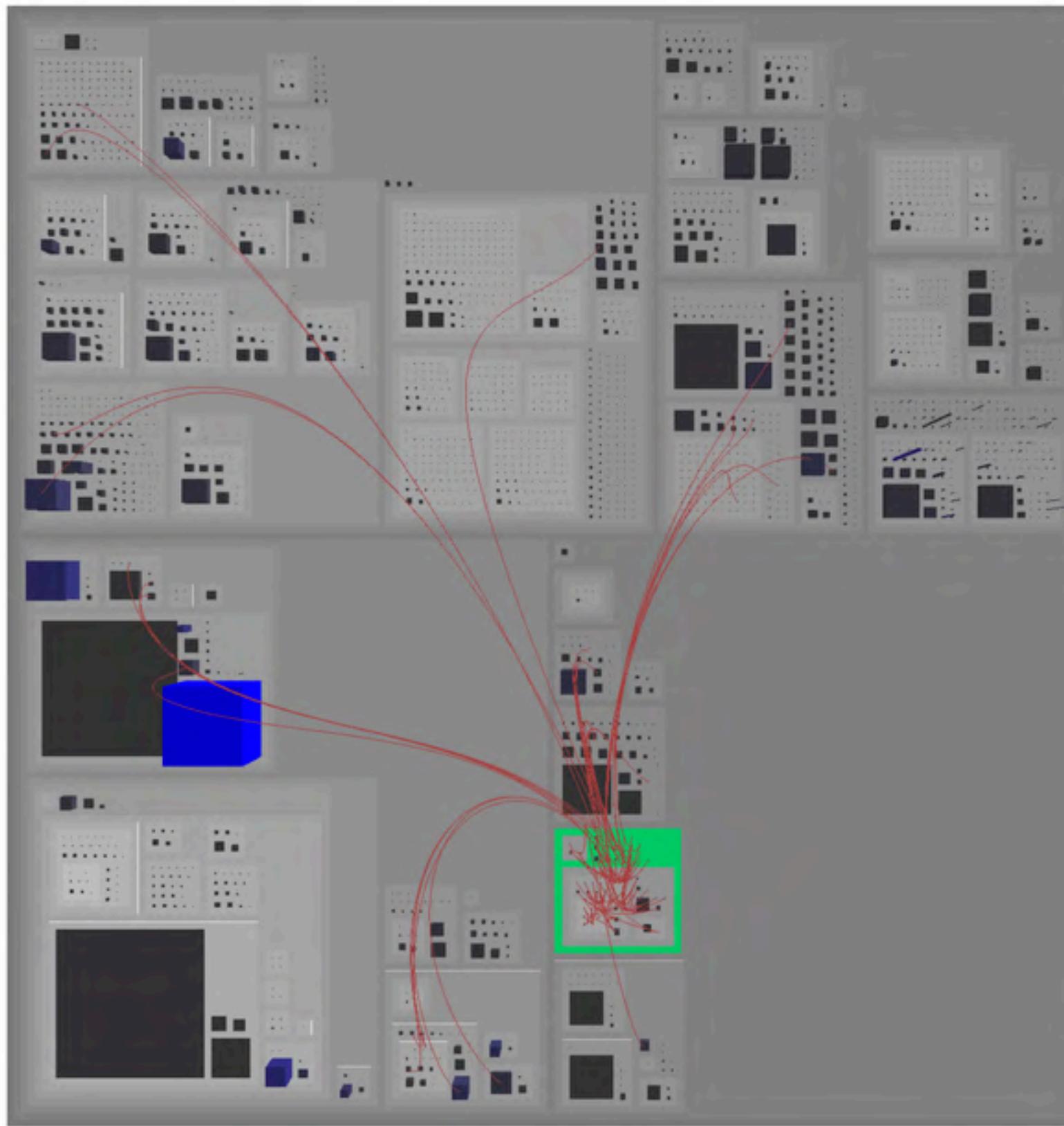




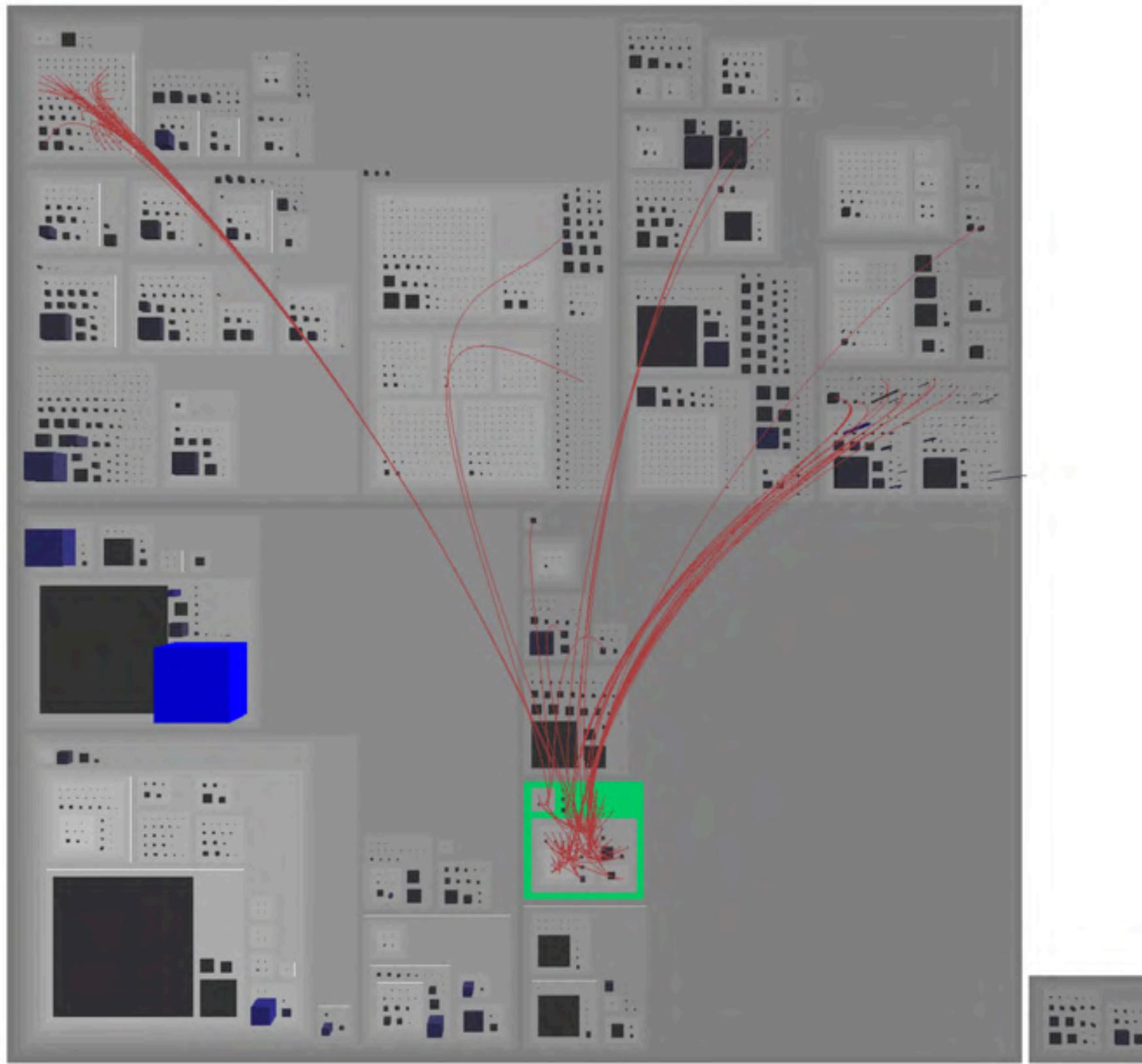




incoming
dependencies

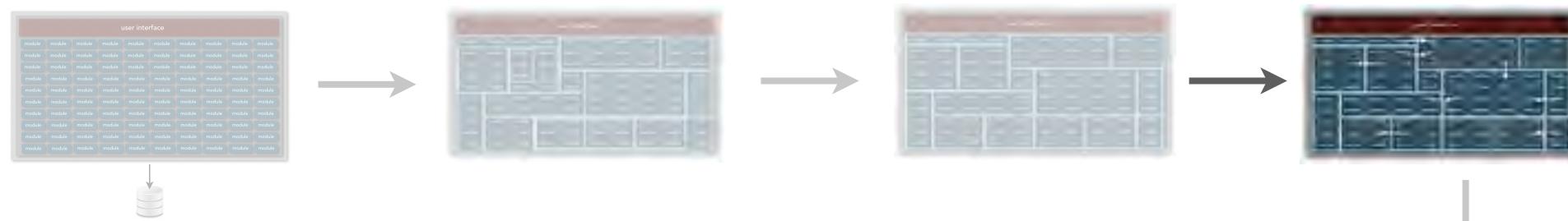


outgoing
dependencies

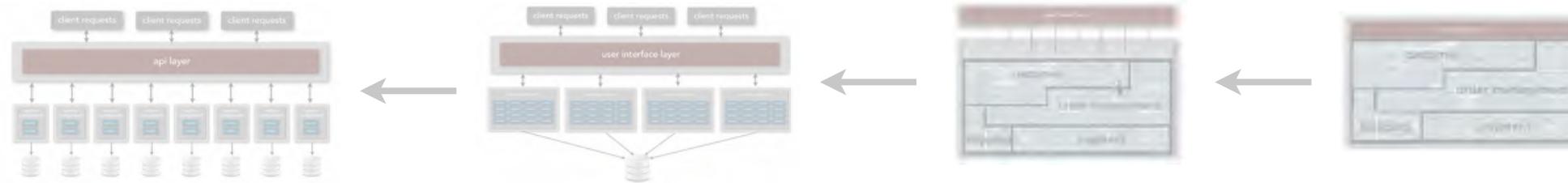


migration patterns

microservices roadmap



identify component dependencies

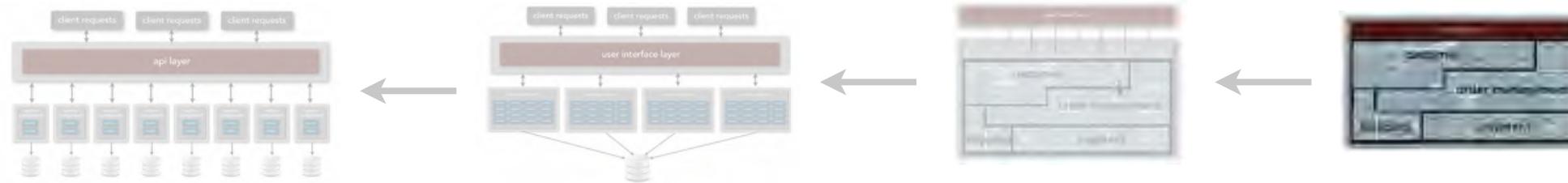


migration patterns

microservices roadmap

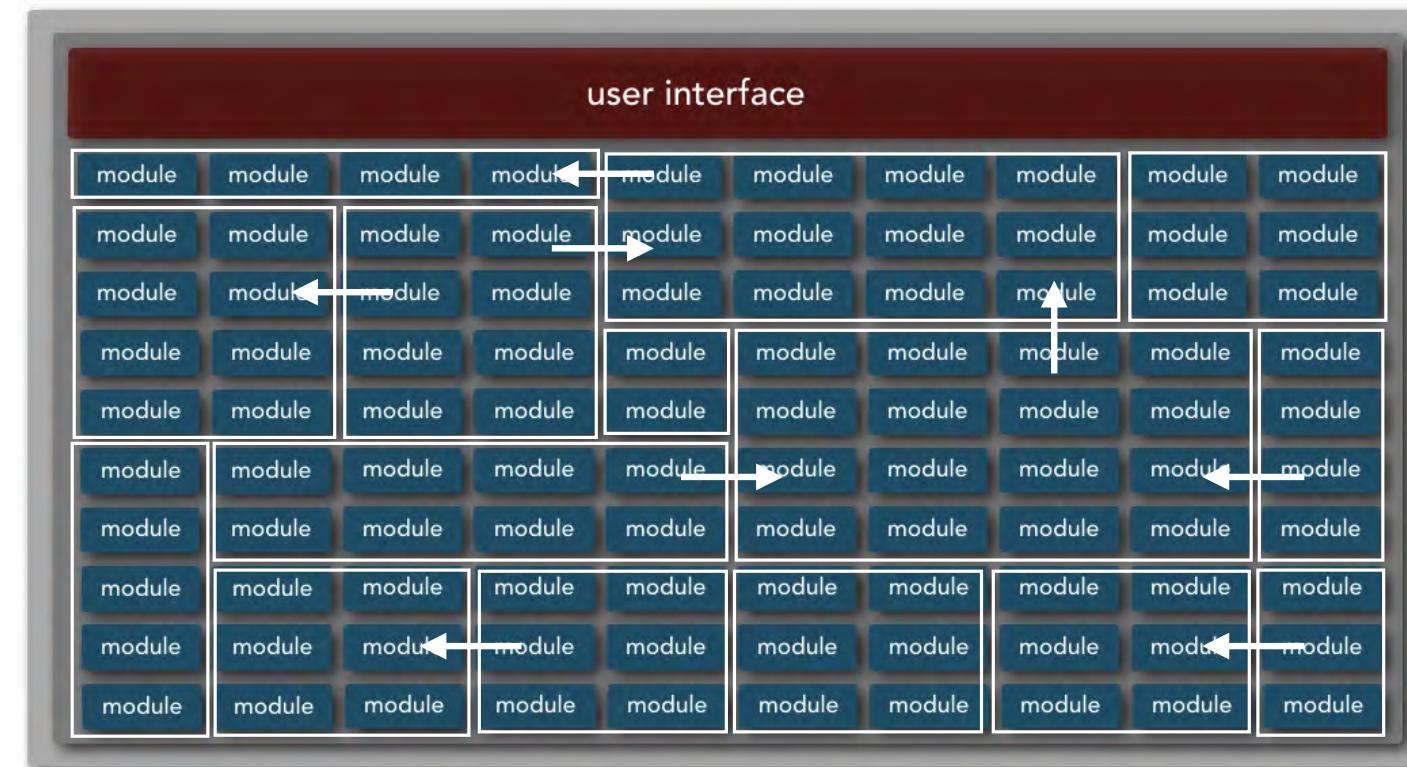


identify component groups (domains)



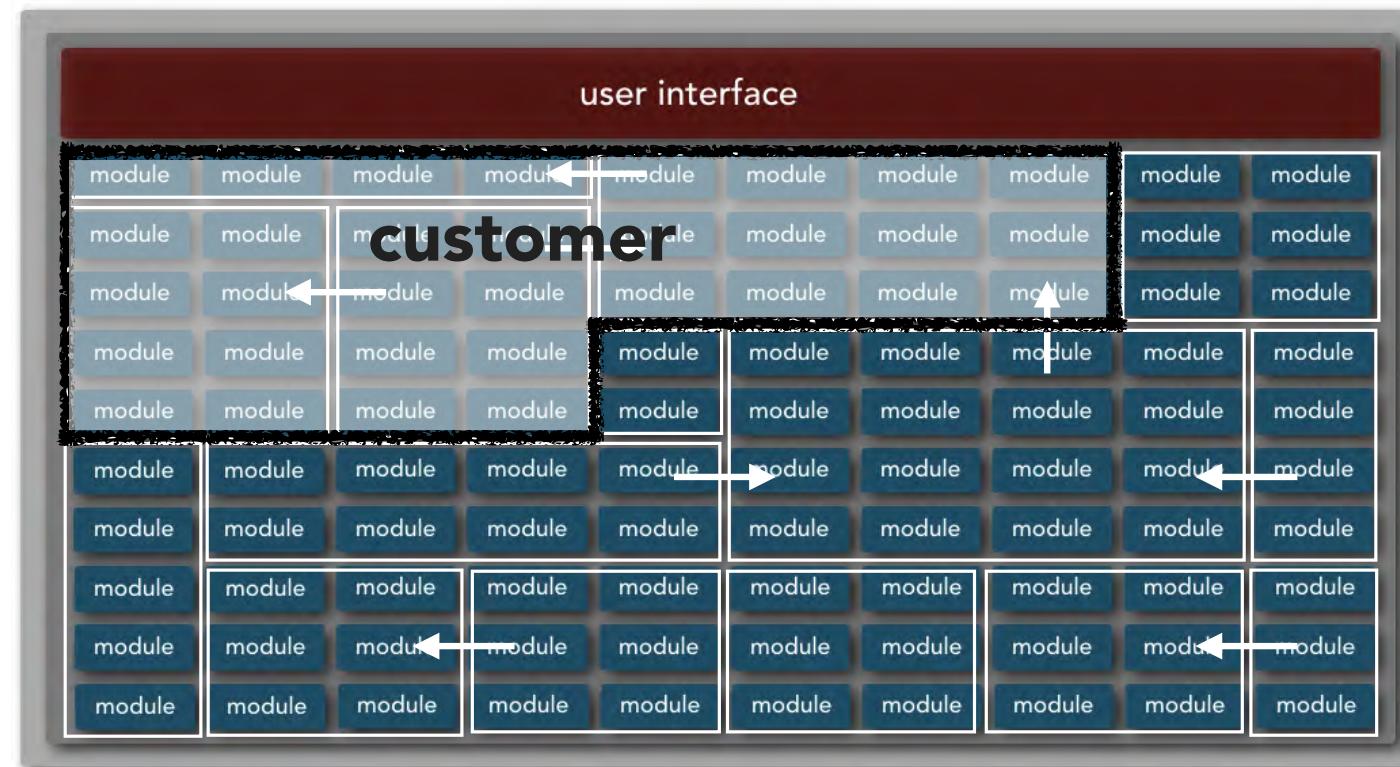
migration patterns

identify component groups (domains)



migration patterns

identify component groups (domains)



app.customer.info

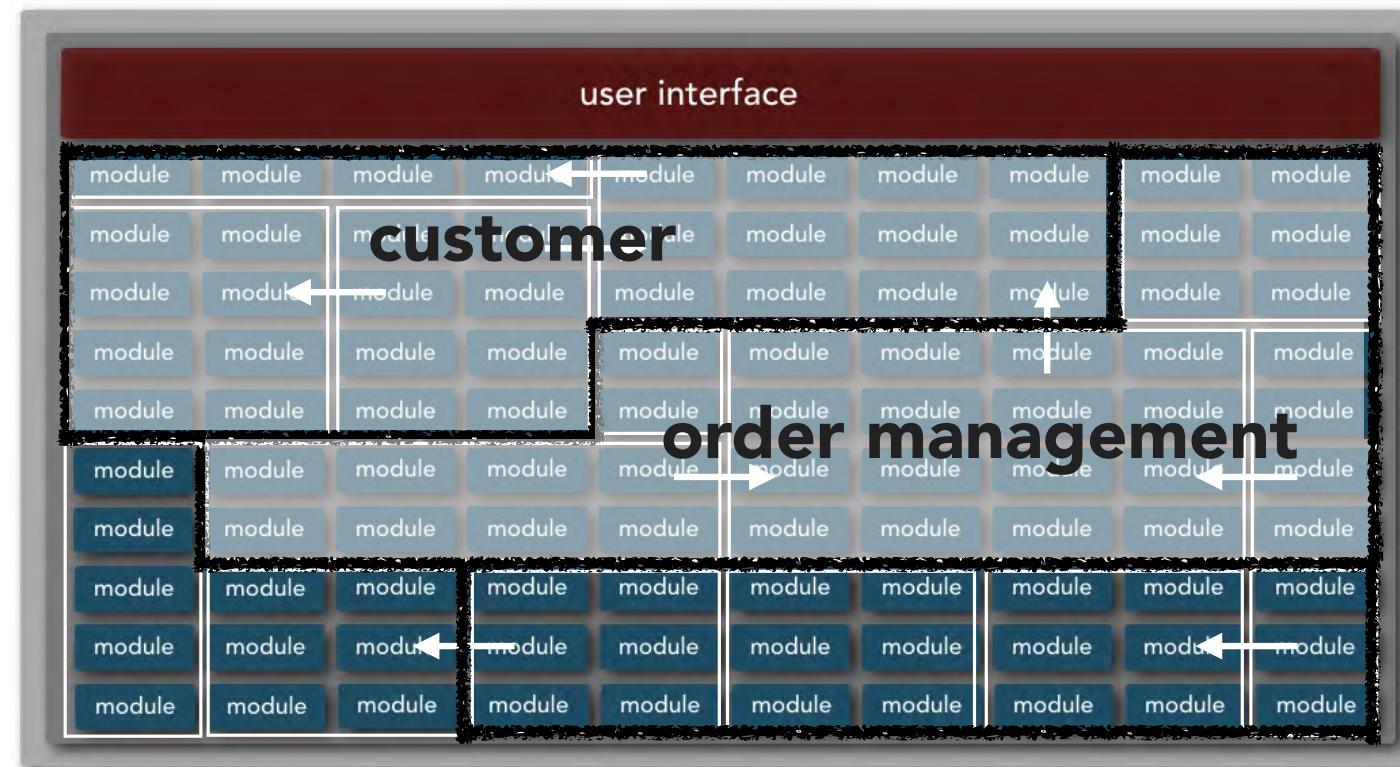
app.customer.preferences

app.customer.notification

app.customer.tracking

migration patterns

identify component groups (domains)



app.order.history

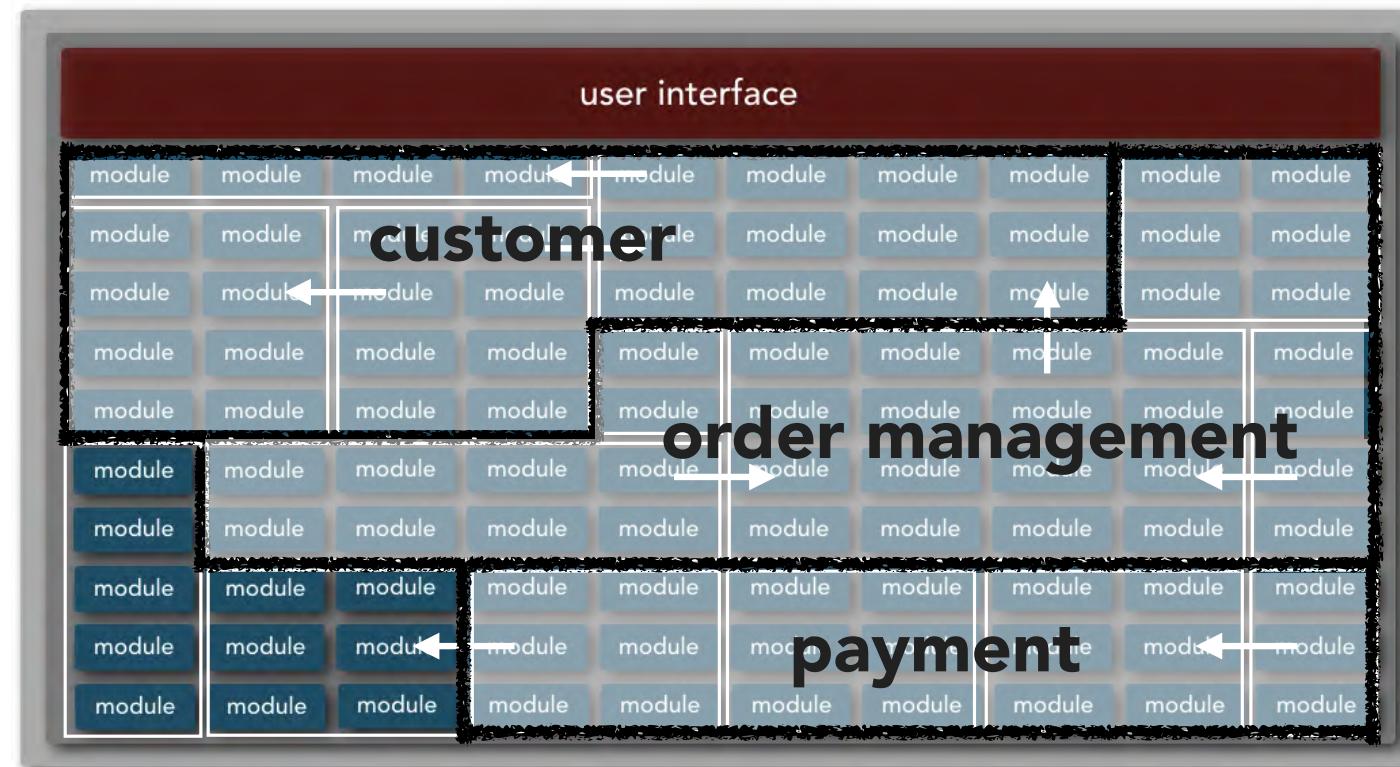
app.order.placement

app.order.cancel

app.order.wishlist

migration patterns

identify component groups (domains)

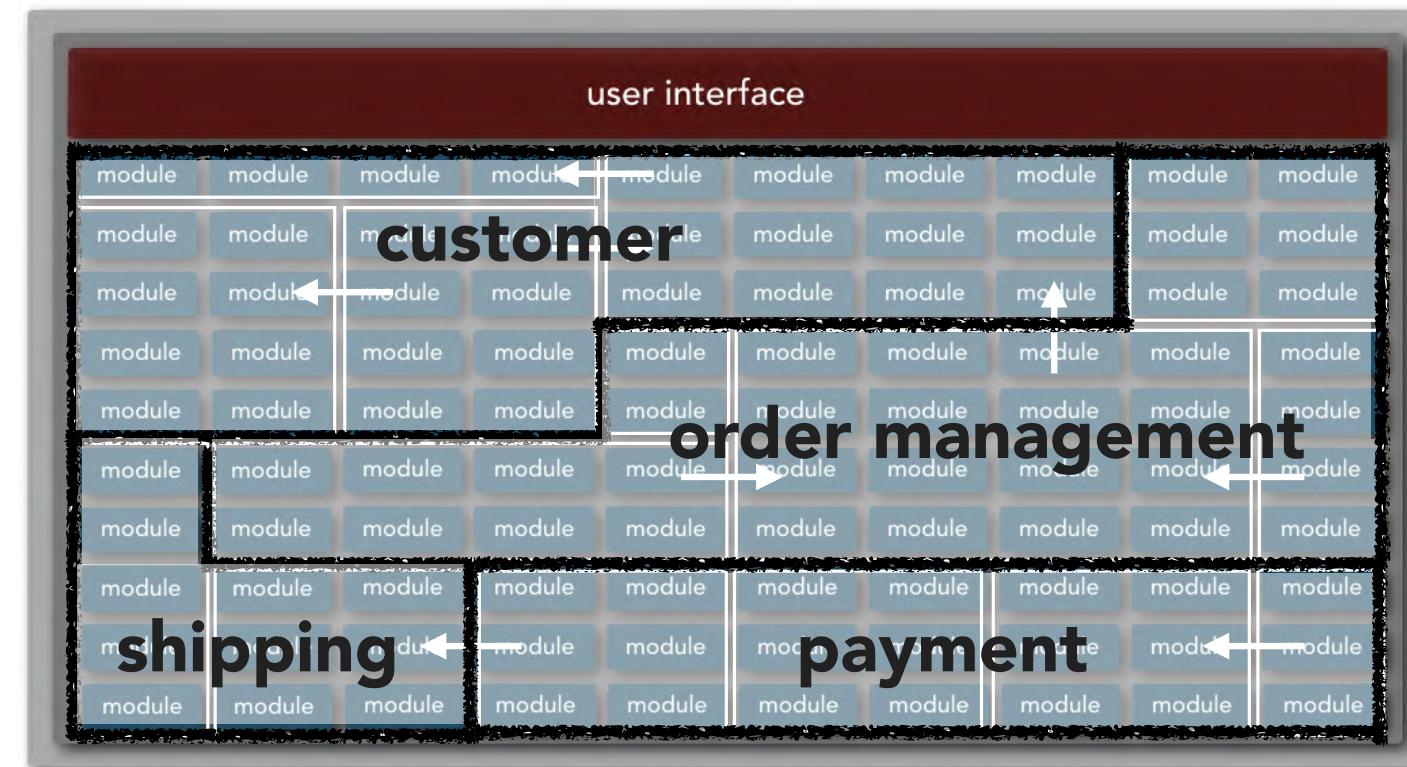


app.payment.invoicing
app.payment.history

app.payment.returns
app.payment.credit

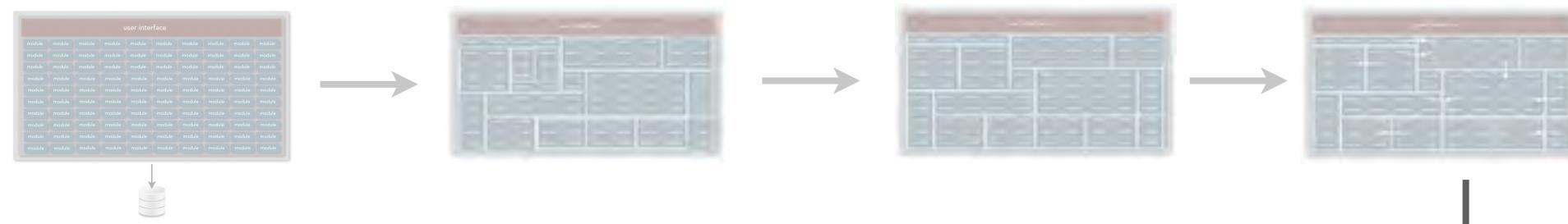
migration patterns

identify component groups (domains)

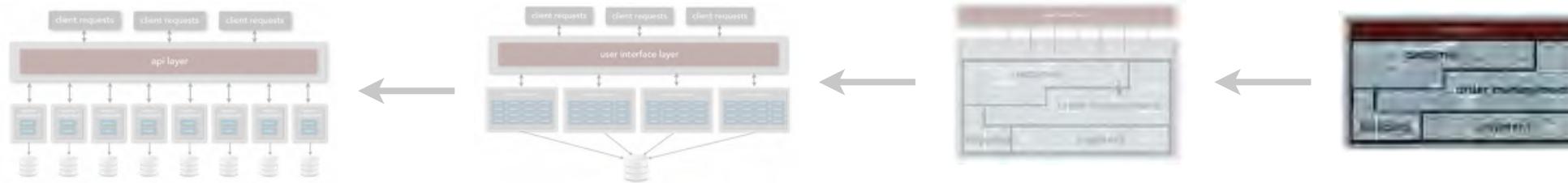


migration patterns

microservices roadmap

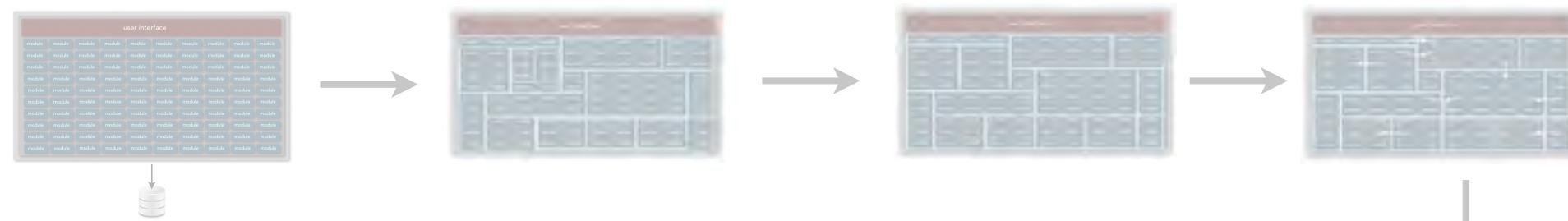


identify component groups (domains)

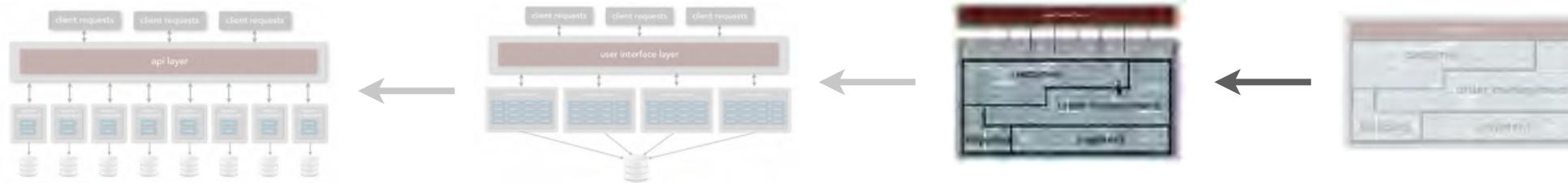


migration patterns

microservices roadmap

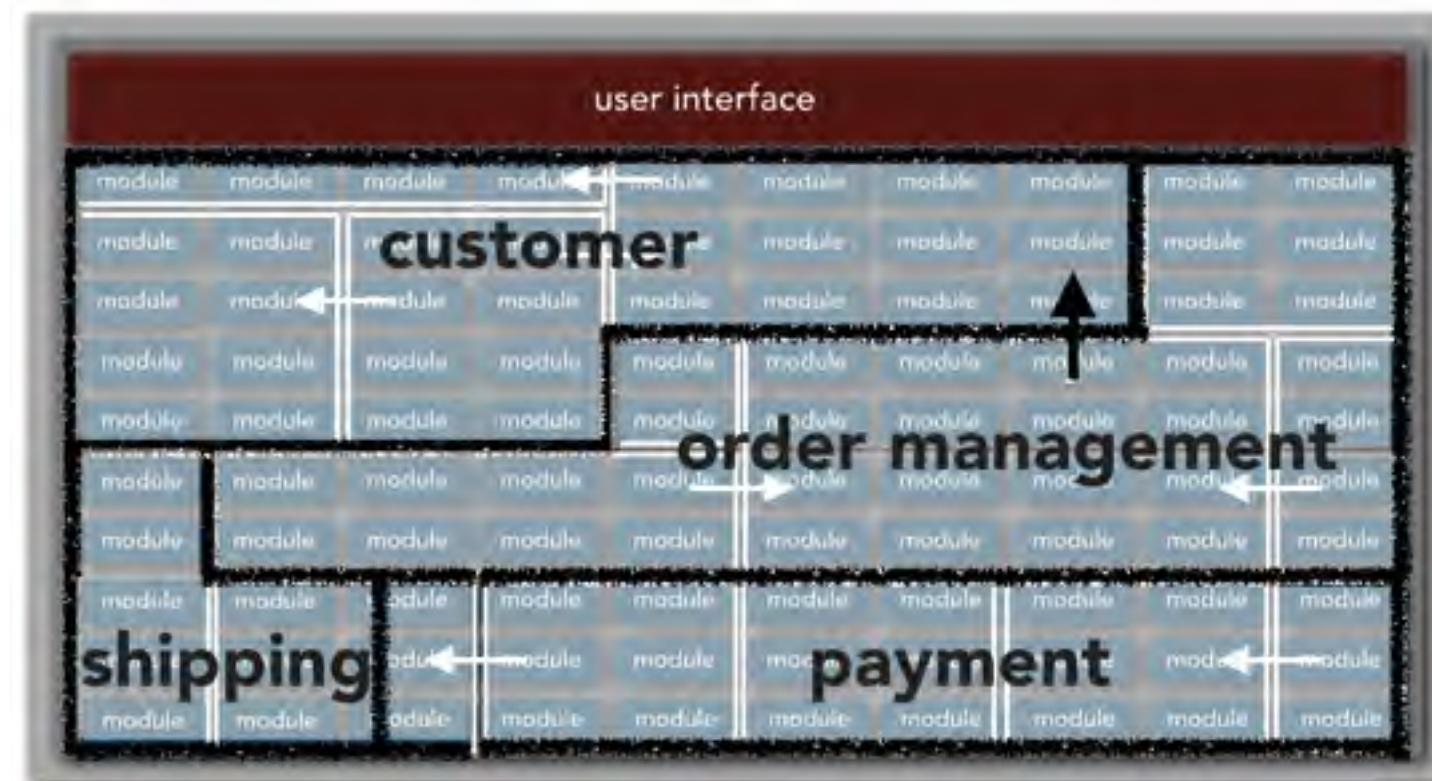


create remote user interface



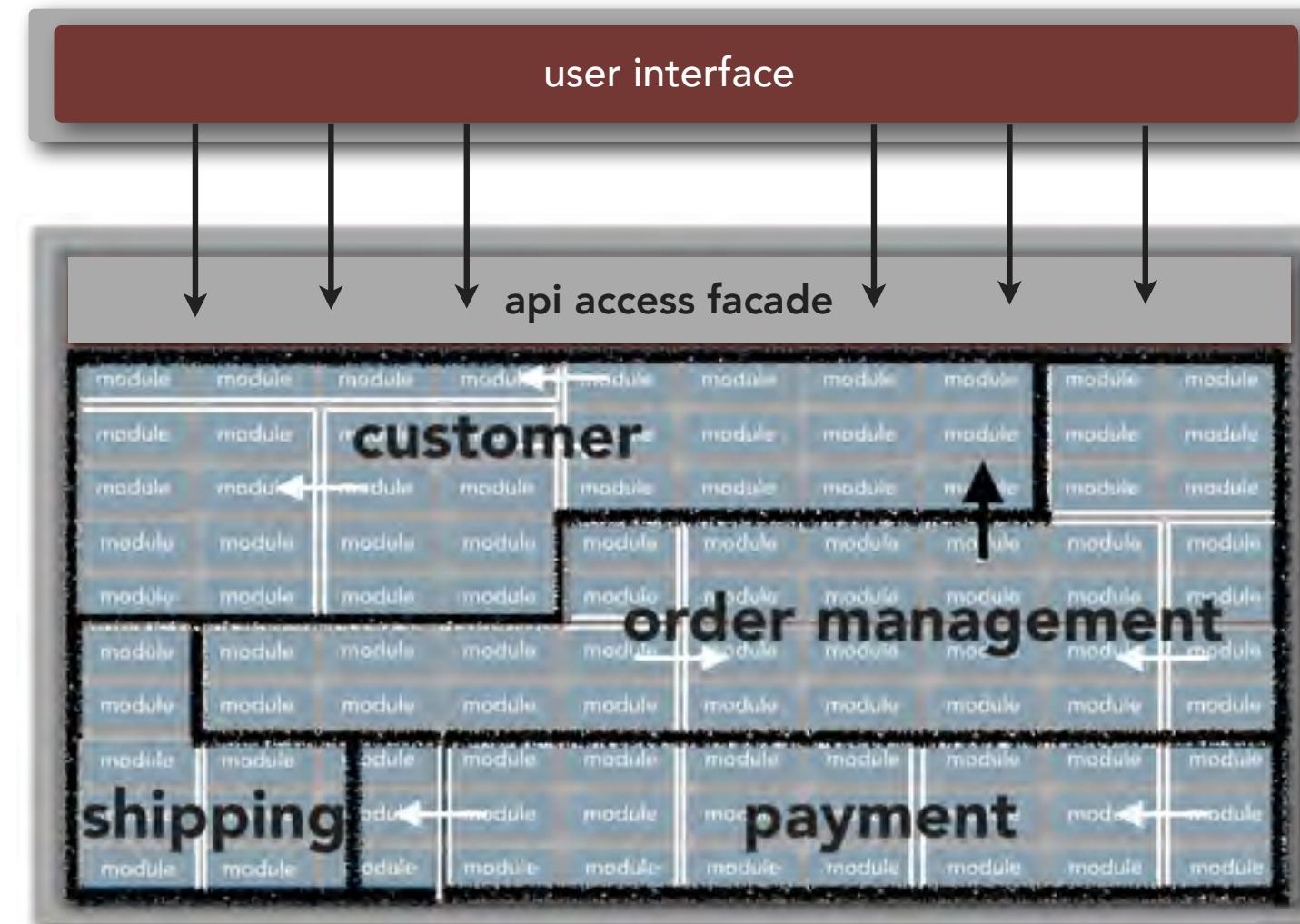
migration patterns

create remote user interface



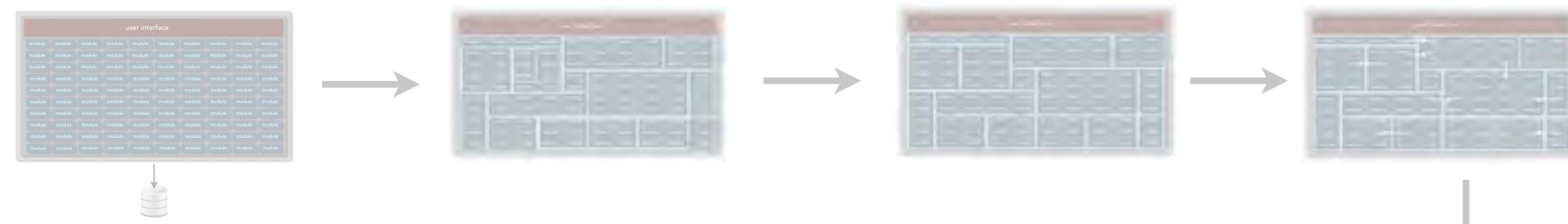
migration patterns

create remote user interface

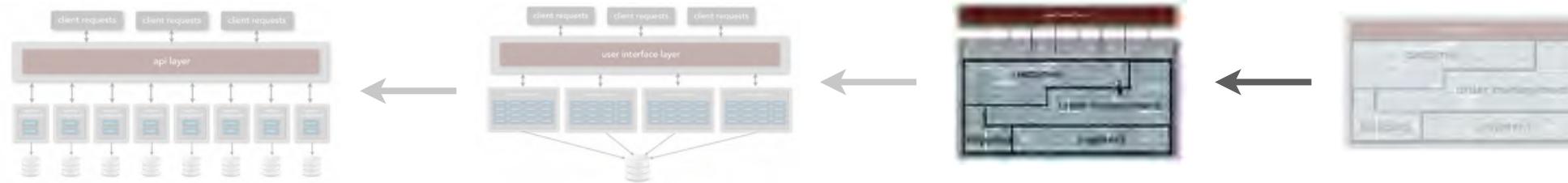


migration patterns

microservices roadmap

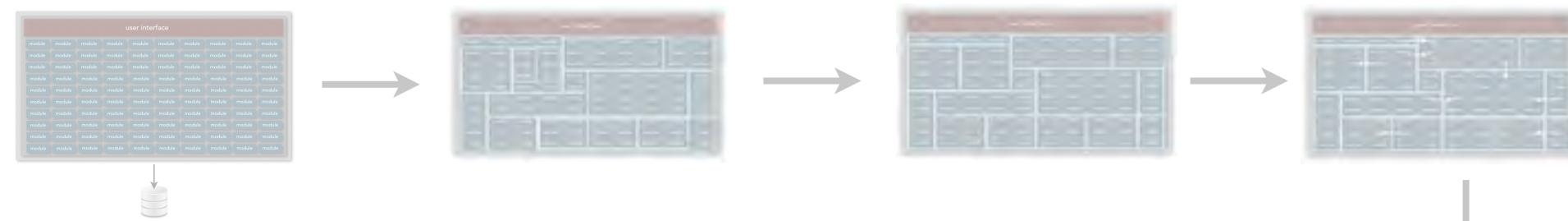


create remote user interface

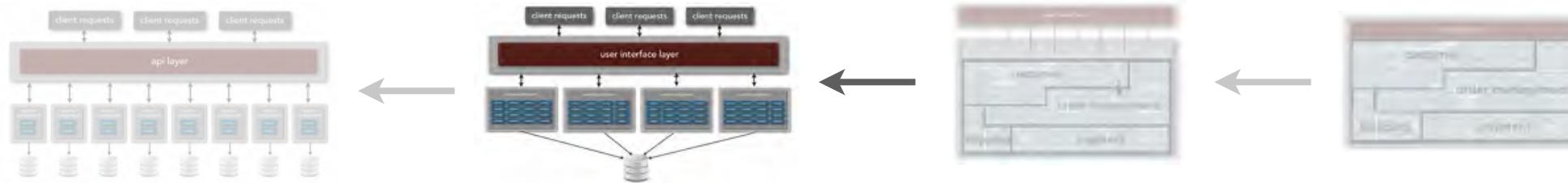


migration patterns

microservices roadmap

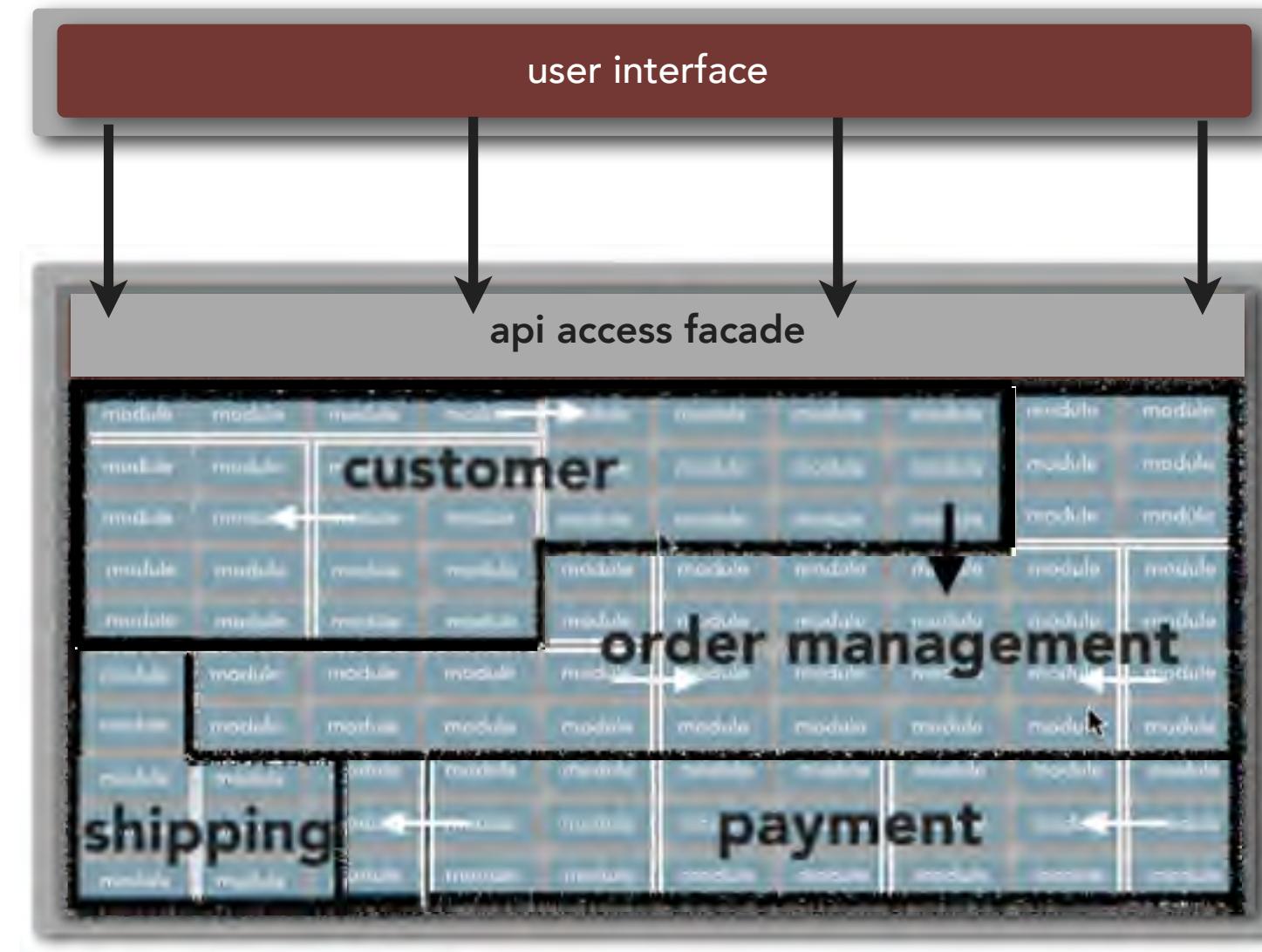


migrate domains to macro services



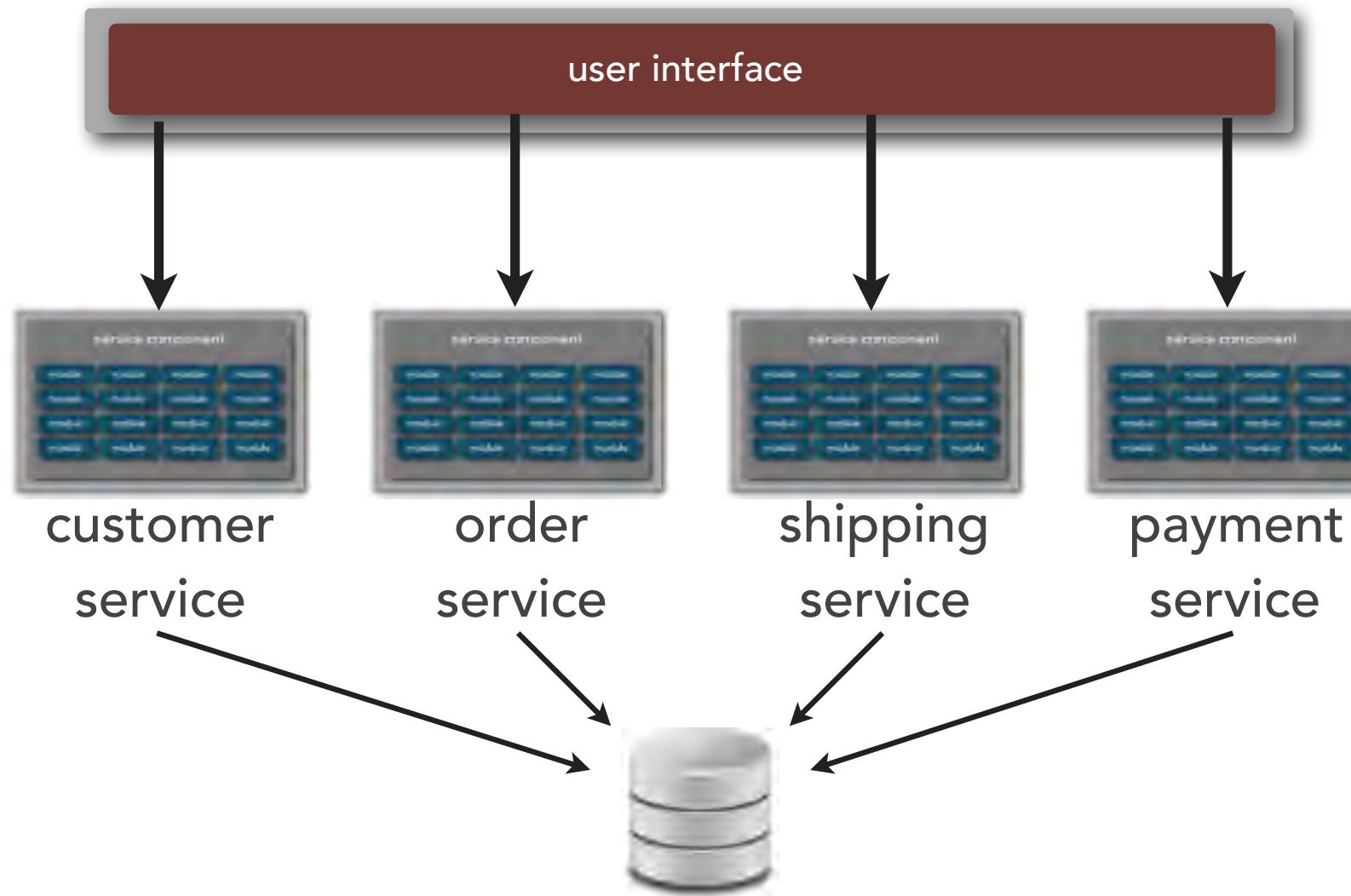
migration patterns

migrate domains to macro services



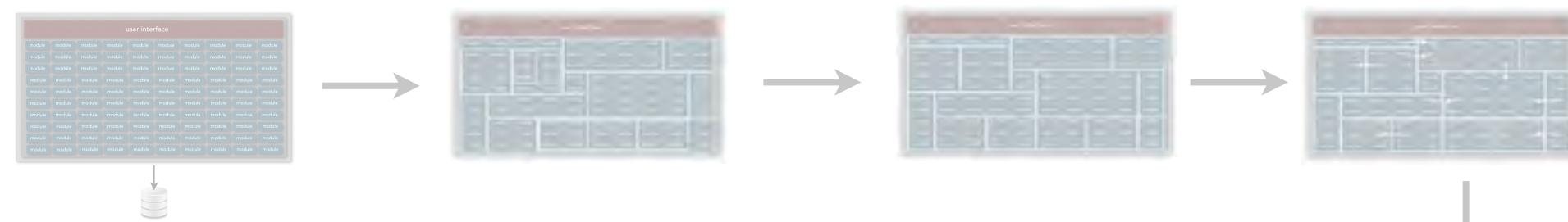
migration patterns

migrate domains to macro services

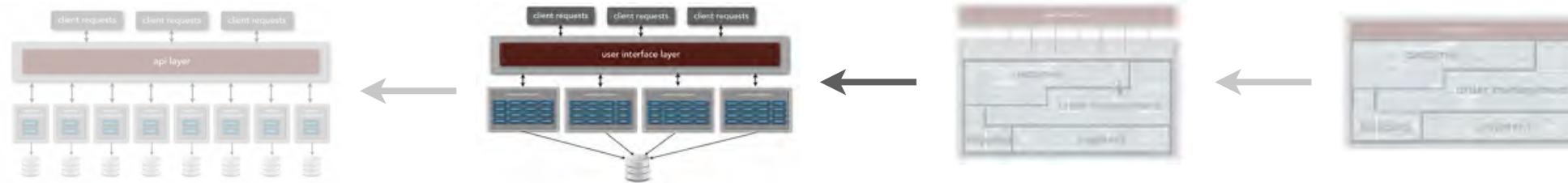


migration patterns

microservices roadmap



migrate domains to macro services

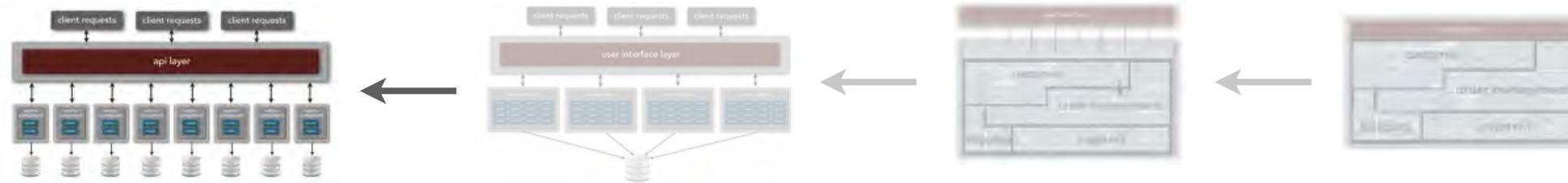


migration patterns

microservices roadmap

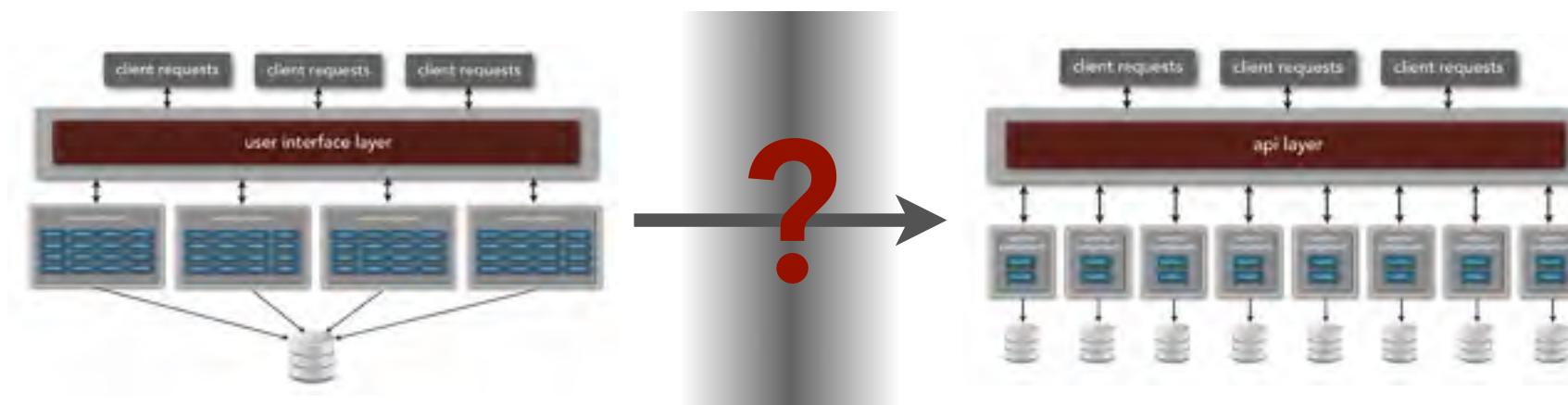


migrate macro services to microservices



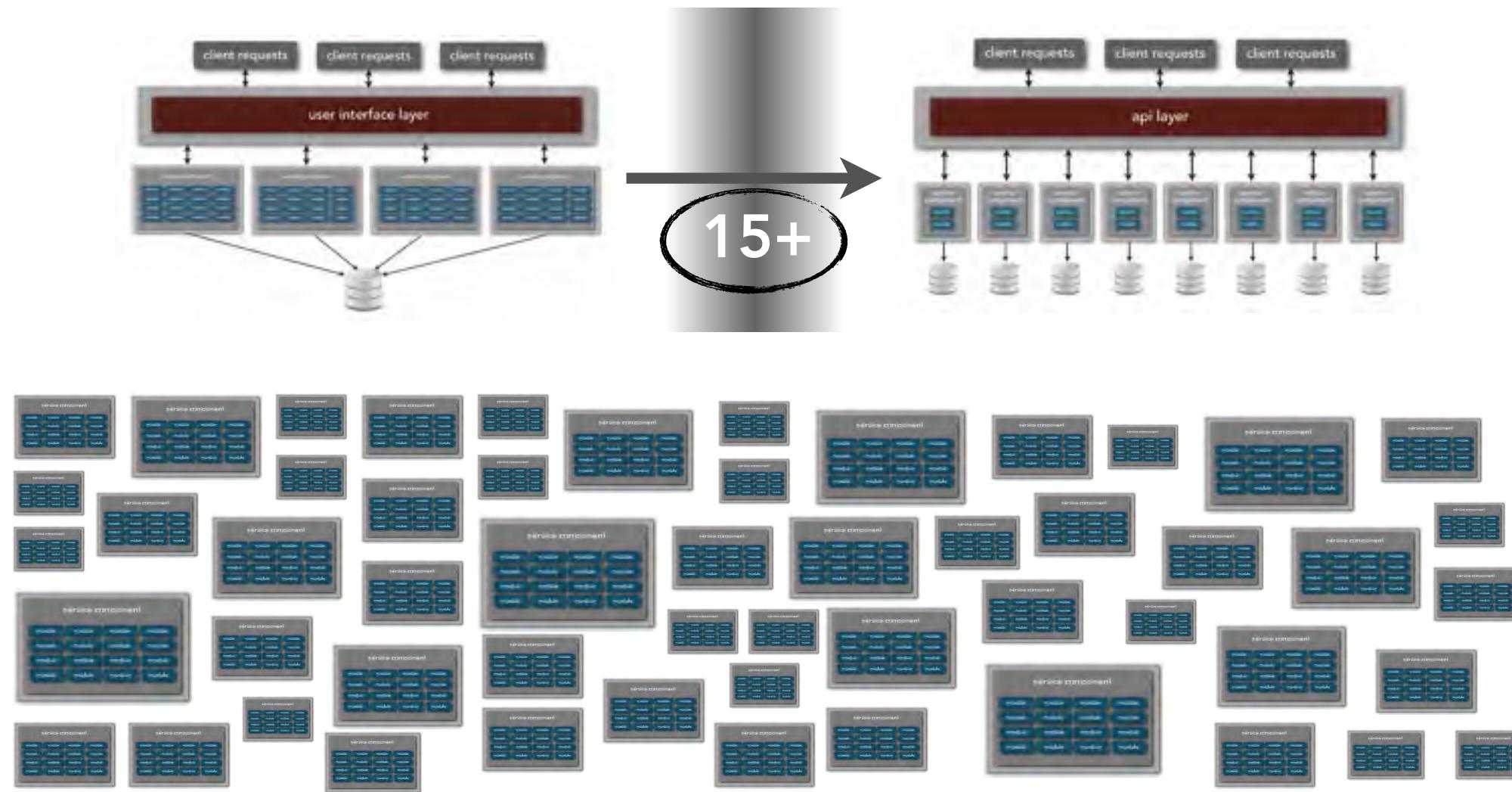
service-based vs. microservices

when do you cross the gray area from service-based architecture to microservices?



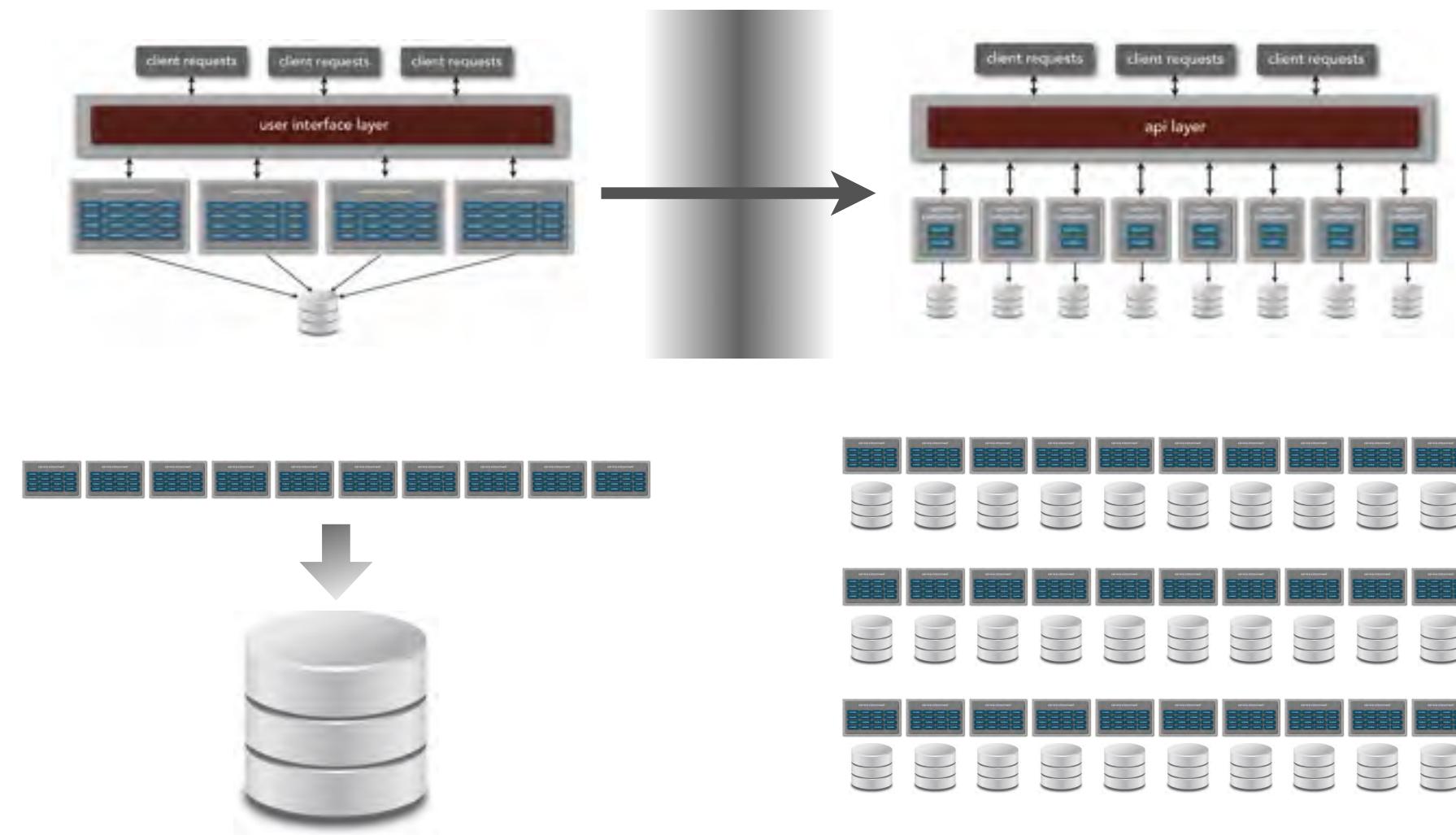
service-based vs. microservices

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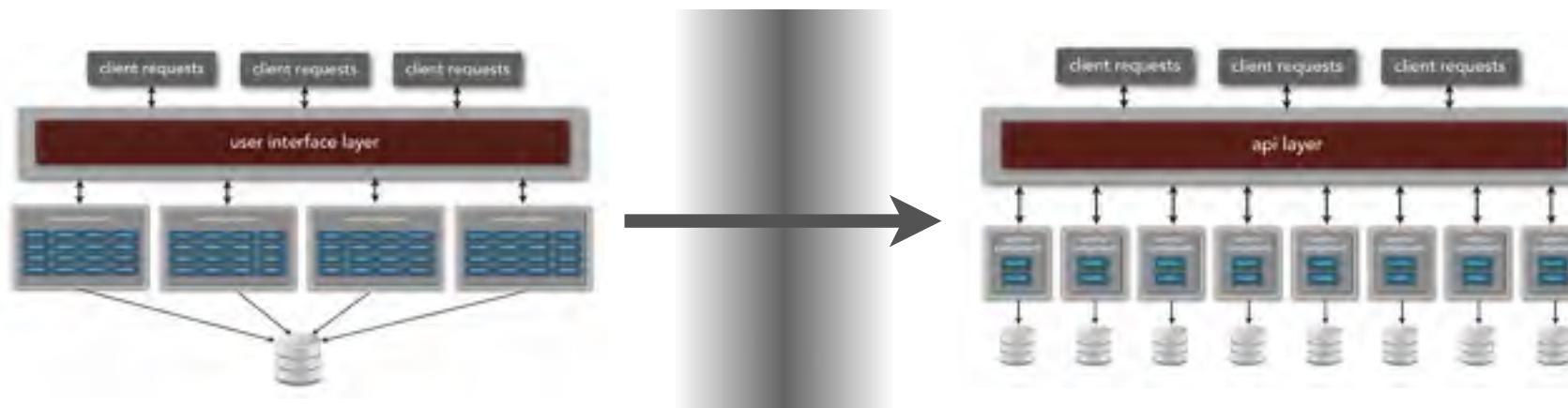
service-based vs. microservices

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service-based vs. microservices

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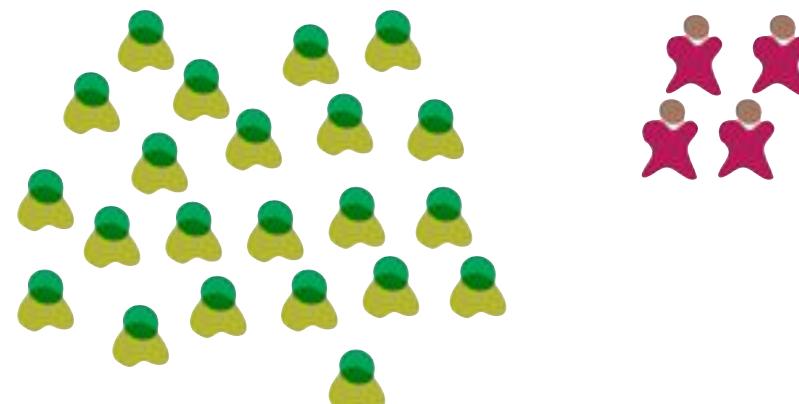
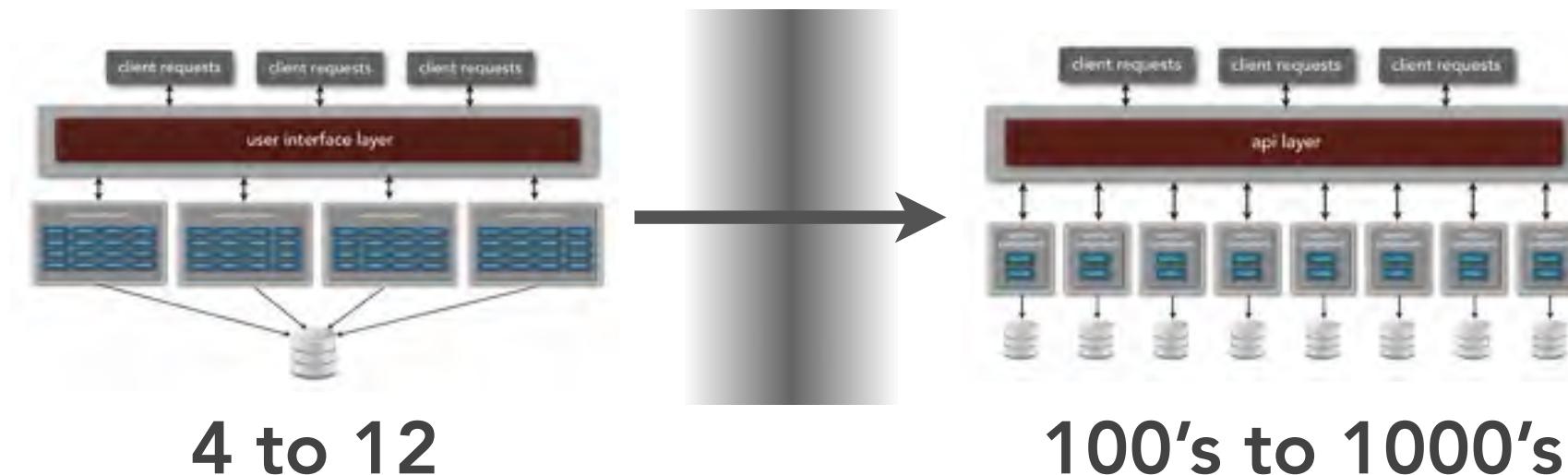
4 to 12

100's to 1000's



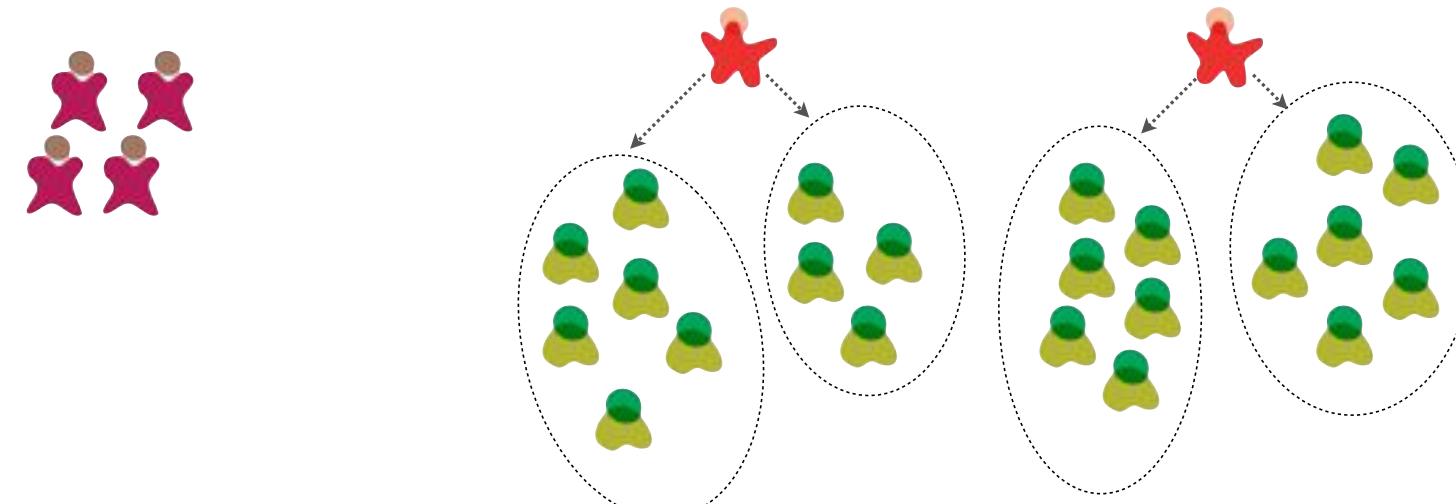
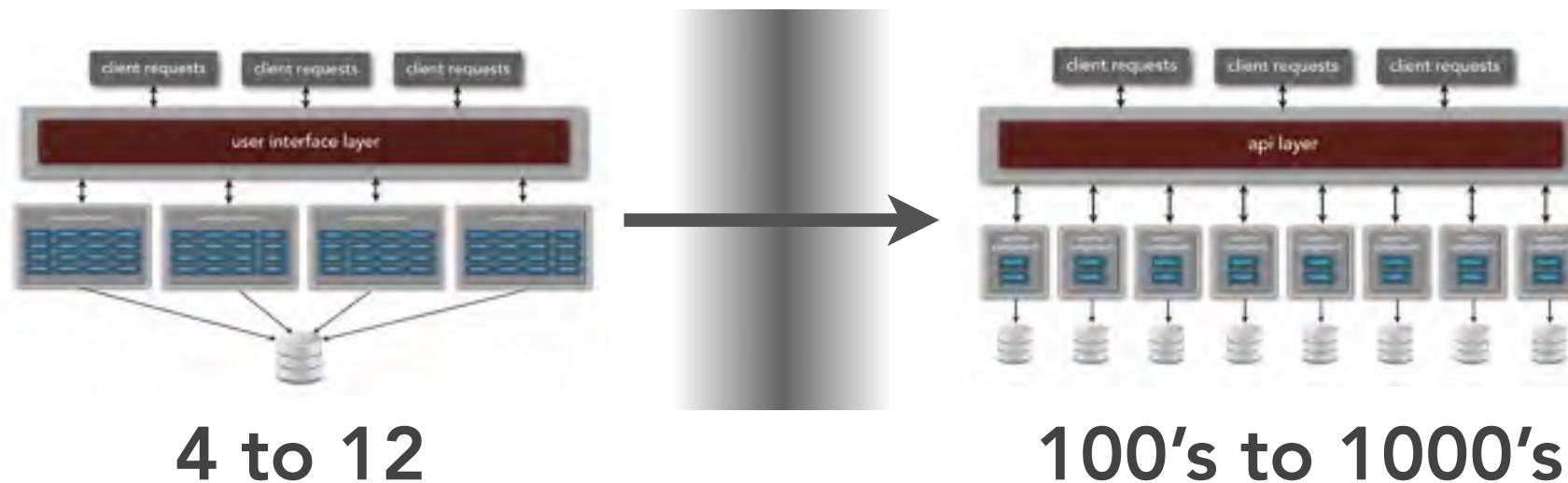
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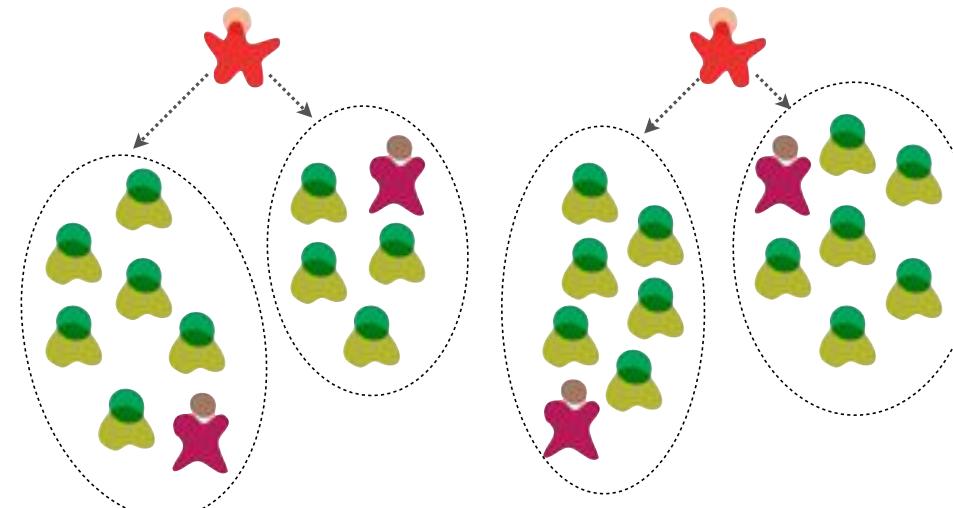
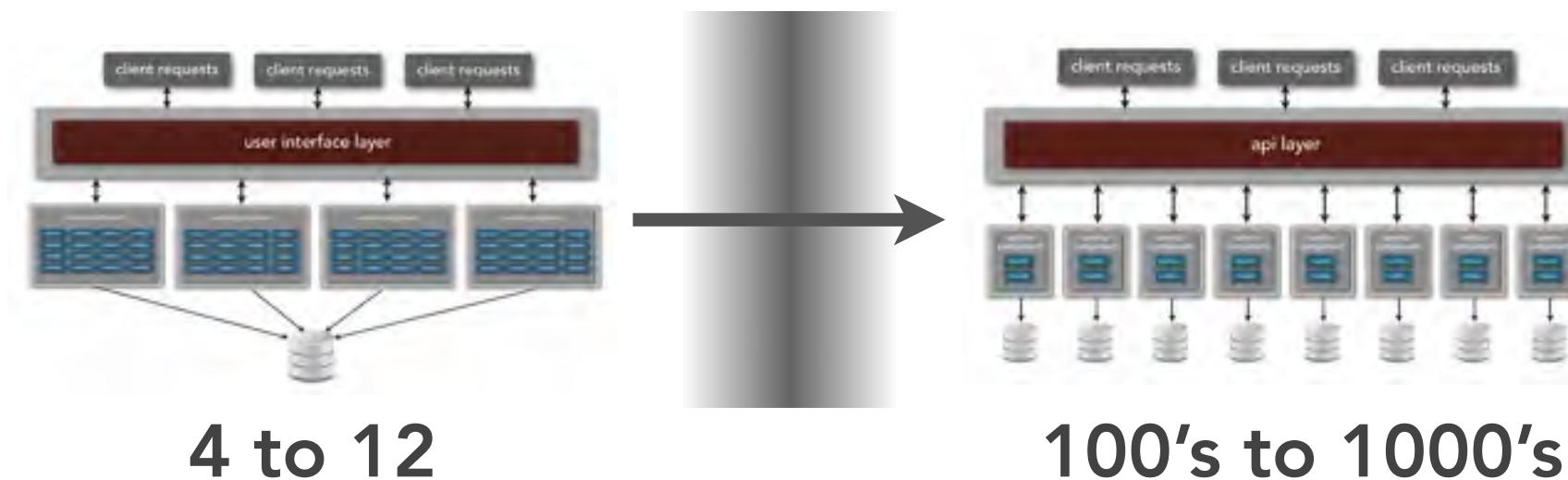
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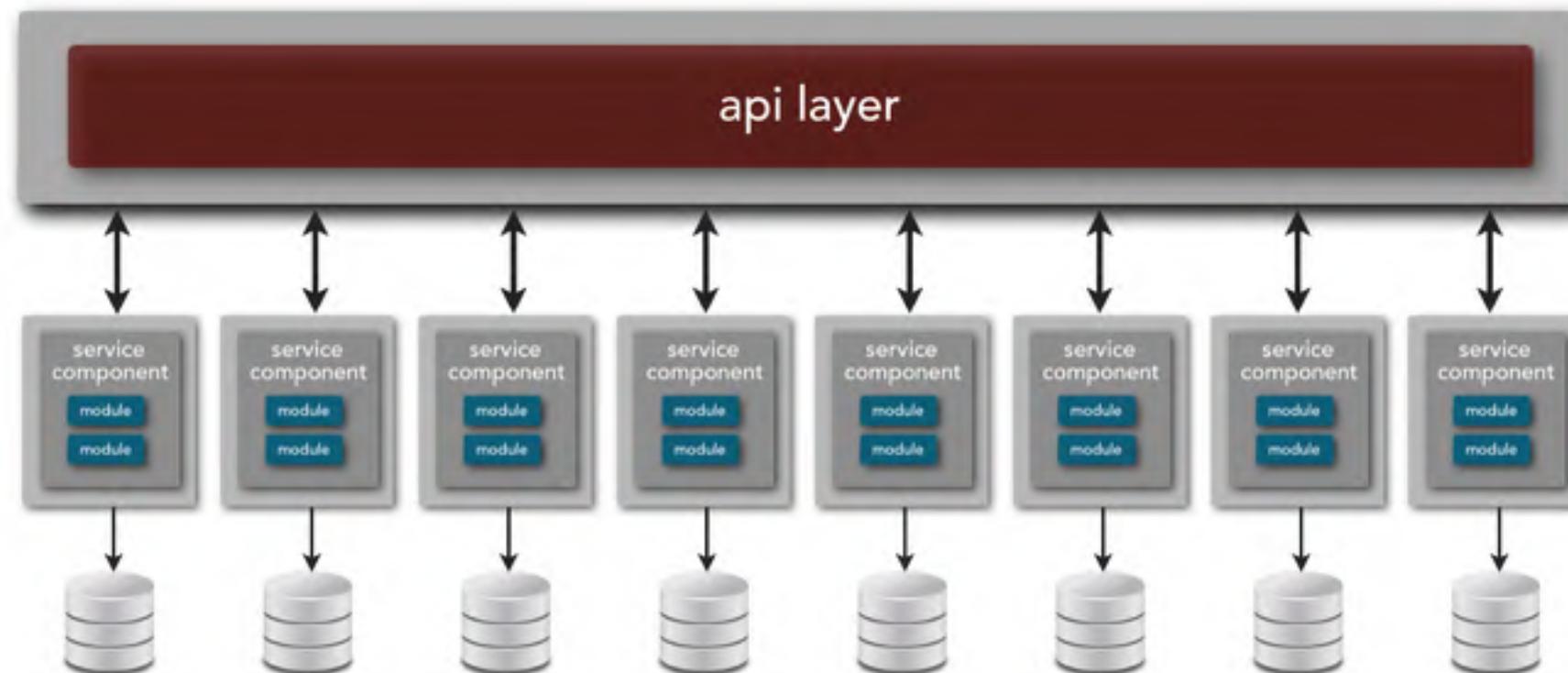
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migration patterns

migrate macro services to microservices







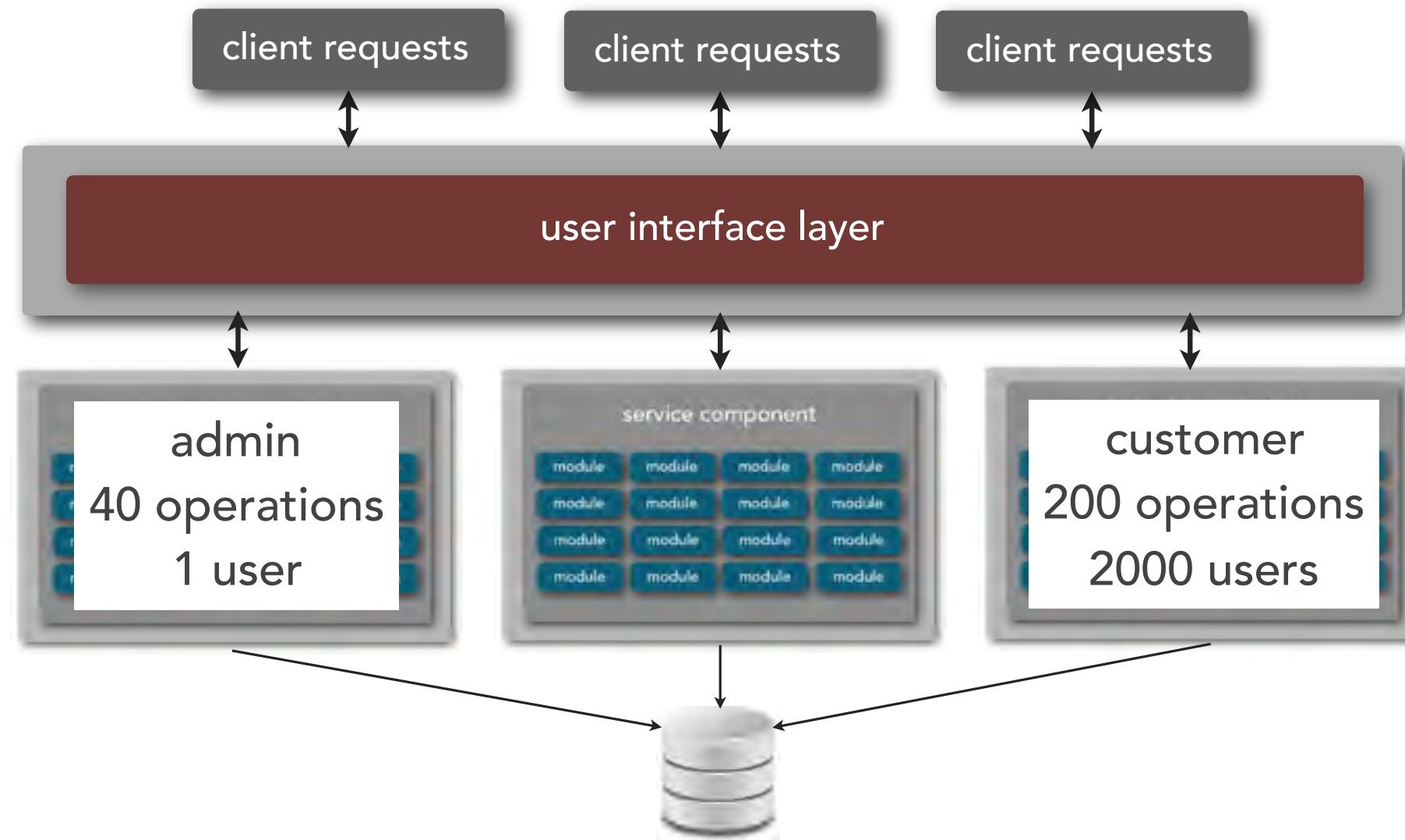






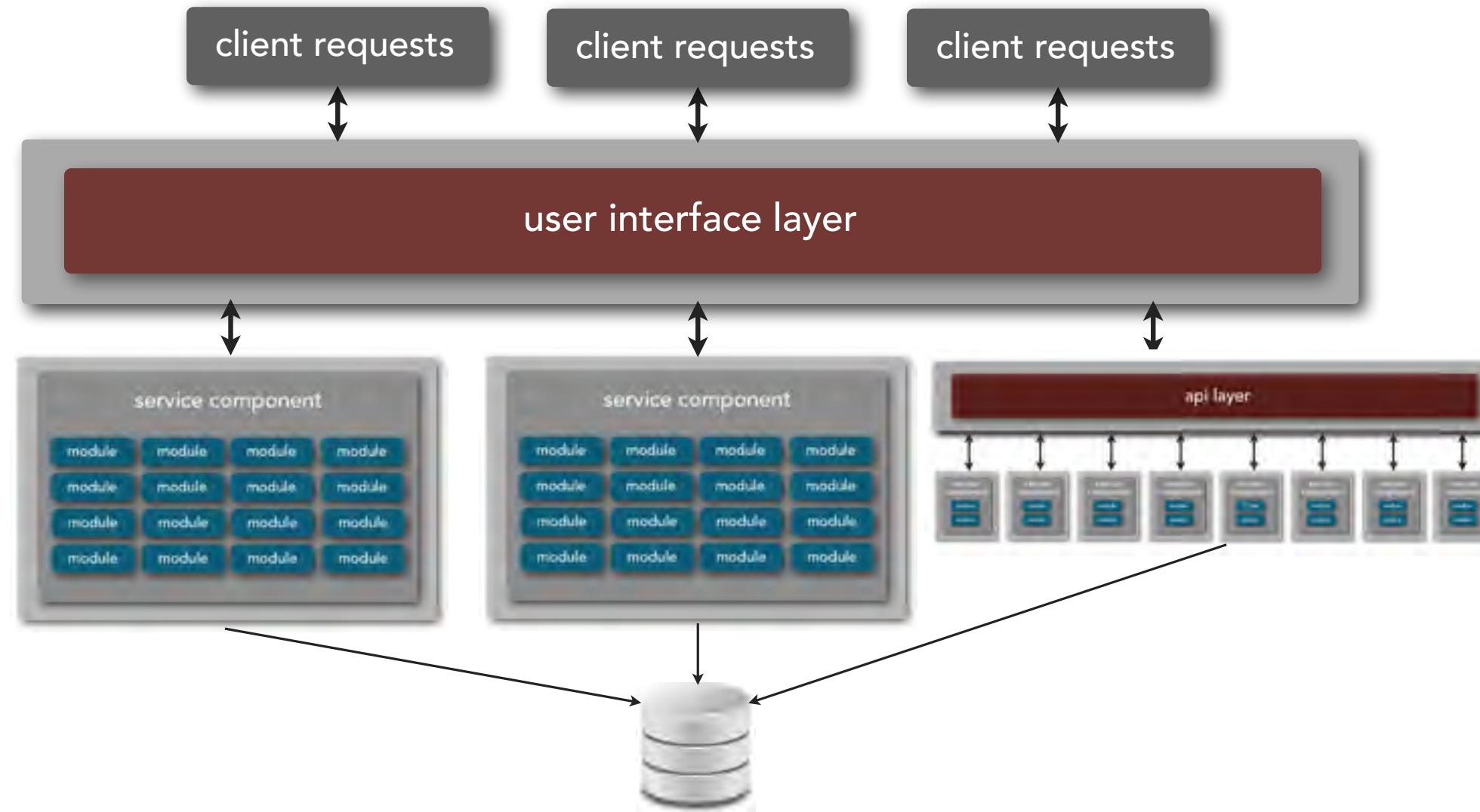
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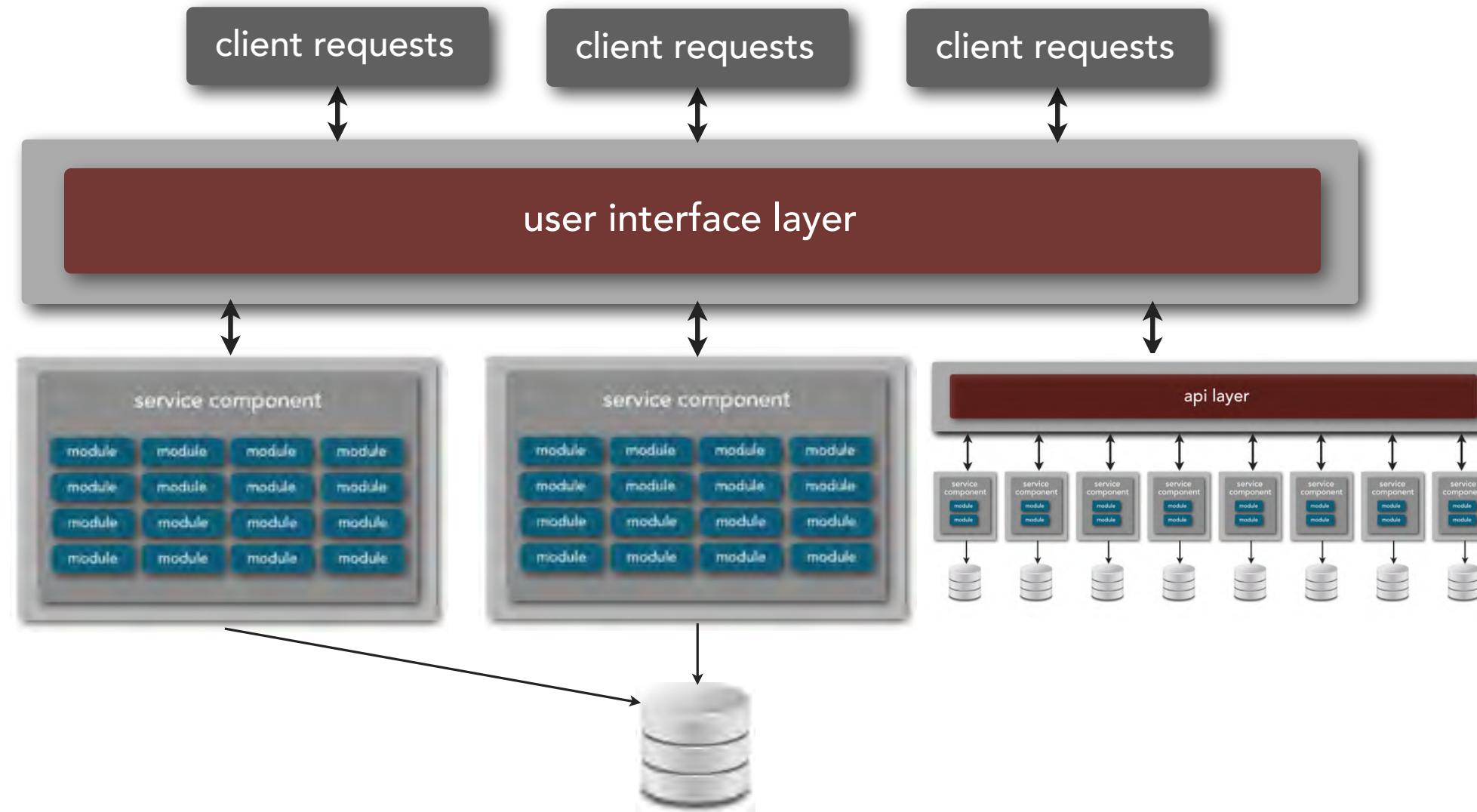
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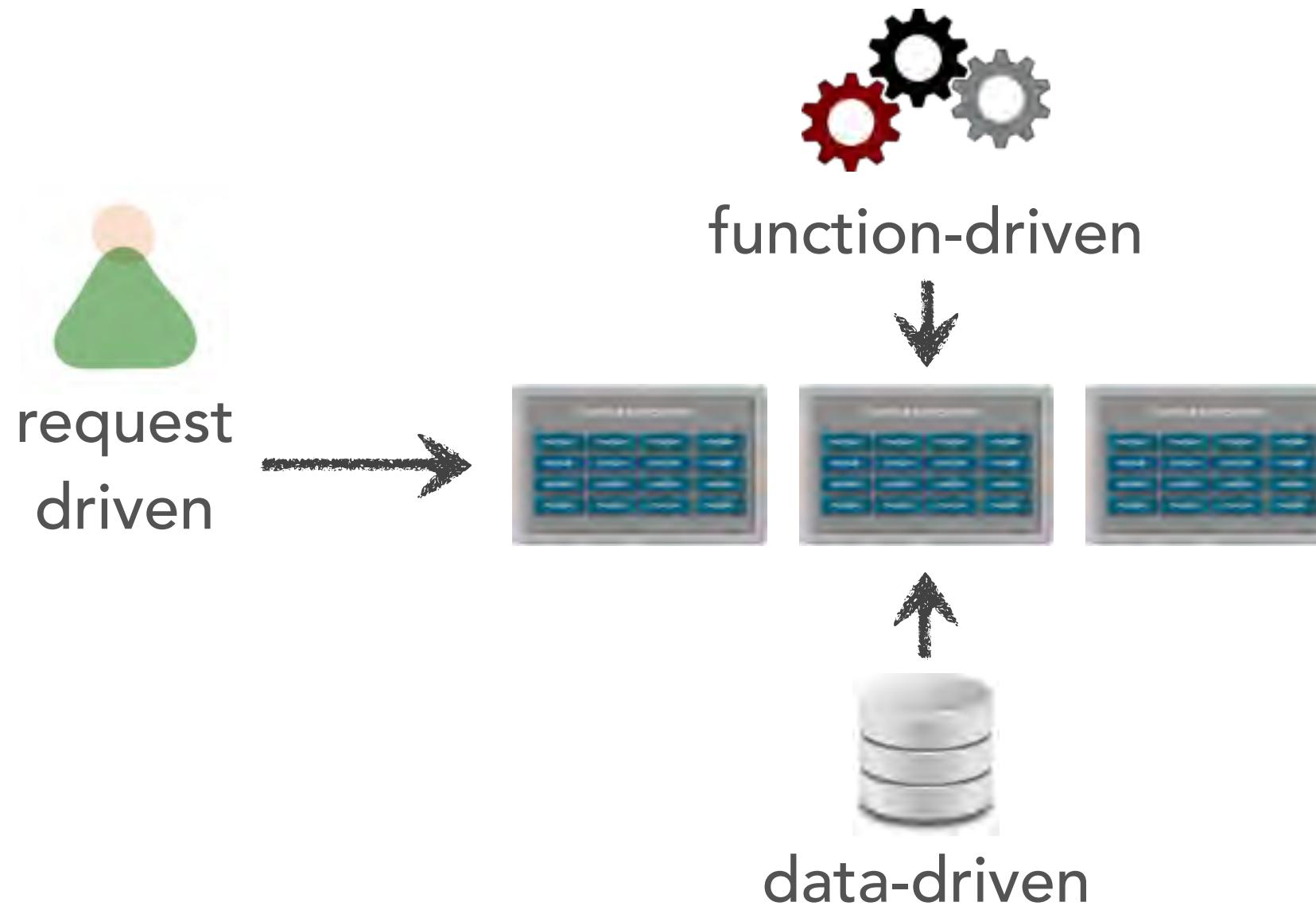
migration patterns

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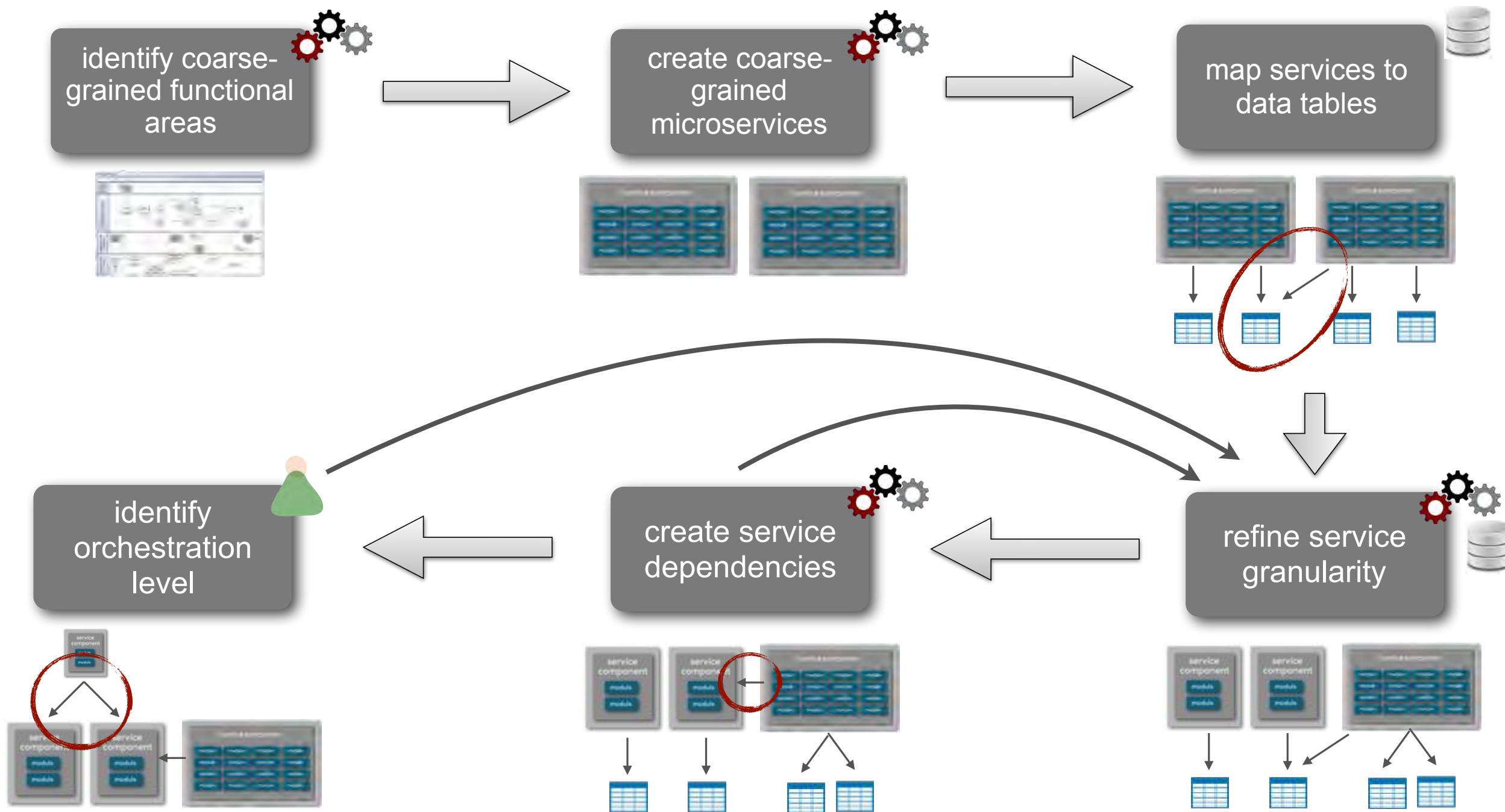


migration patterns

migrate macro services to microservices



migration patterns



Microservices Migration Patterns



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Independent Consultant

Hands-on Software Architect / Published Author
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<http://www.wmrichards.com>

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