

Posrednici umreženih sustava

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12. predavanje

Programirljivo internetsko okružje

***Programmable Internet Environment
(PIE)***

Dr.sc. Dejan Škvorc

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Zavod za elektroniku, mikroelektroniku, računalne i inteligentne sustave

Sadržaj predavanja

- **Uloga i funkcija PIE posrednika**
- **Arhitektura PIE posrednika**
- **Korisničke funkcije PIE posrednika**
 - Upravljanje prividnom mrežom
 - Gospodarenje uslugama
 - Upravljanje prevodenjem i izvođenjem programa
 - Kompozicija usluga

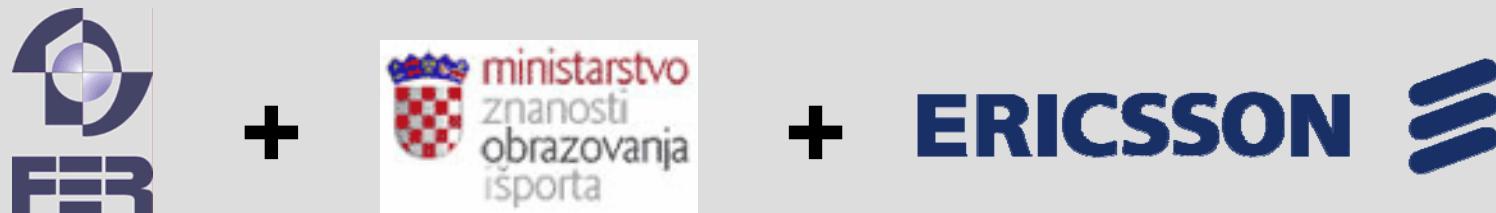
Projekti

- **Middleware Architecture in New Generation Networks**



- **Okrilje posrednika javnog informacijskog sustava**

– Tehnologiski projekt unutar nacionalnog ***cro-grid*** poliprojekta (<http://www.cro-grid.hr>)



Istraživači



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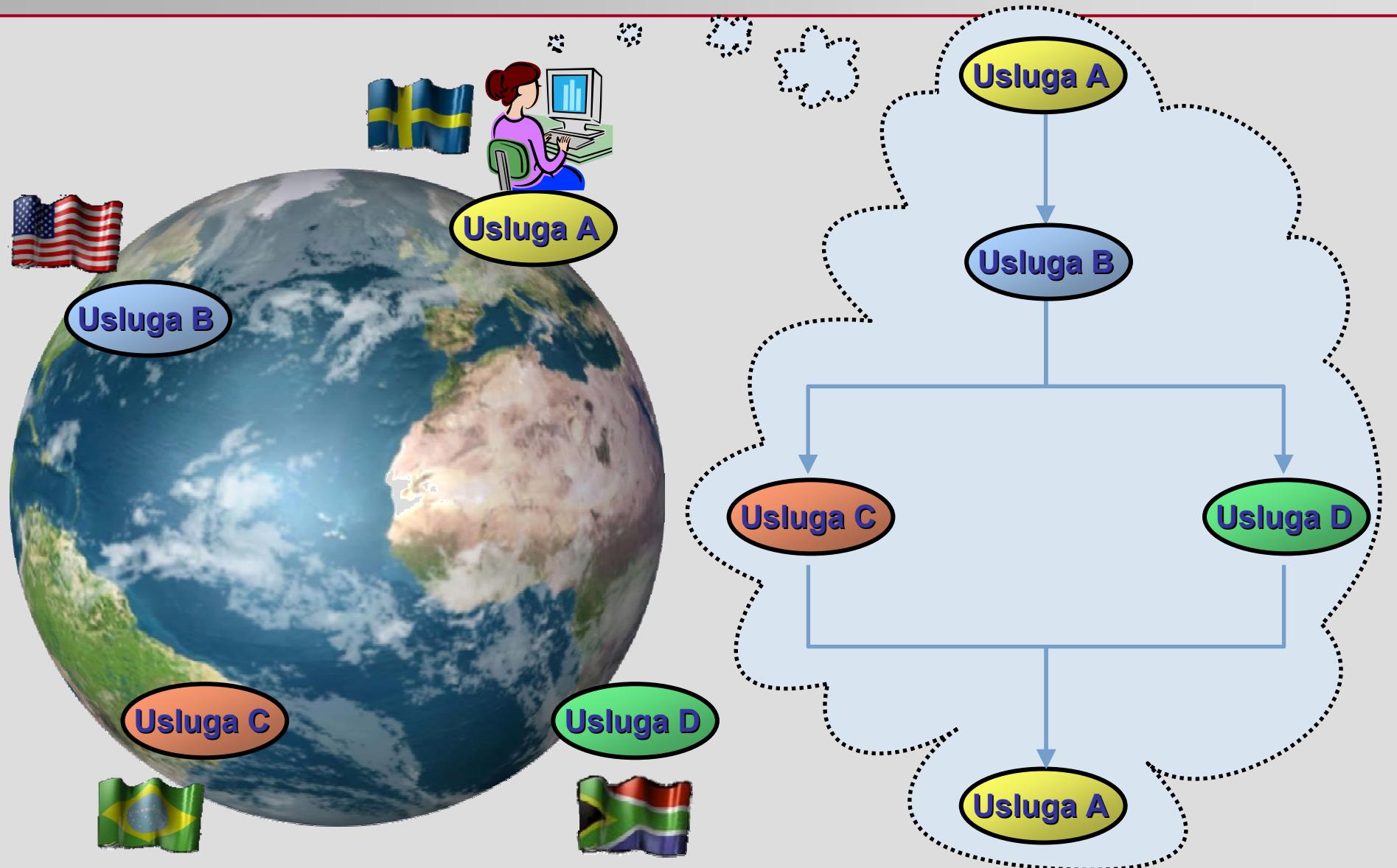
Damjan Sinković
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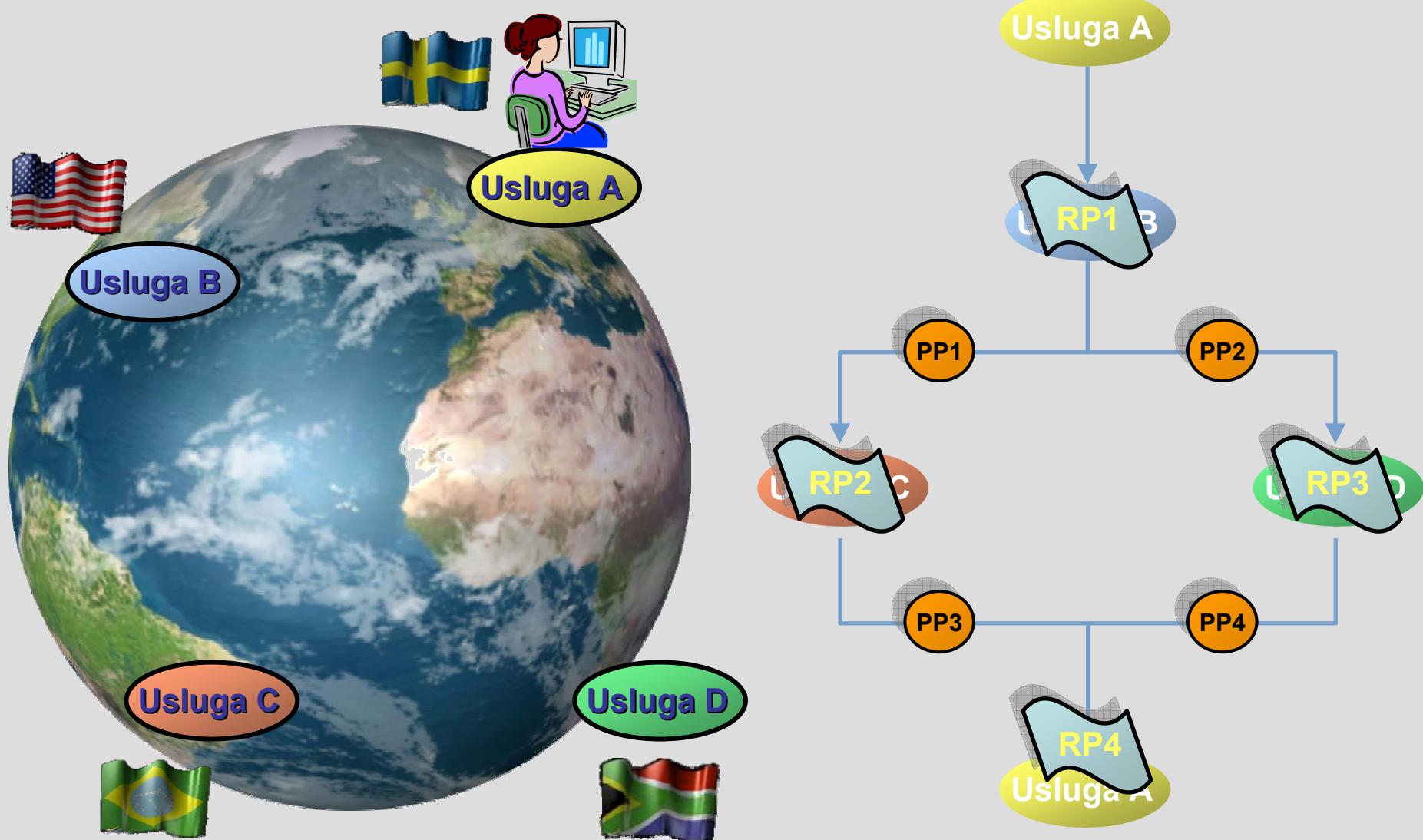
Uloga i funkcija PIE posrednika

- **Posrednički sustav za kompoziciju usluga**
 - Izgradnja kompozicije usluga
 - Izvođenje kompozicije usluga
 - Upravljanje okolinom za izvođenje kompozicije usluga
- **Ostvaruje programski model zasnovan na uslugama**
 - Primjenska logika → primjenske usluge
 - Koordinacijska logika → raspodijeljeni programi
 - Logika za međudjelovanje → usluge za suradnju i natjecanje

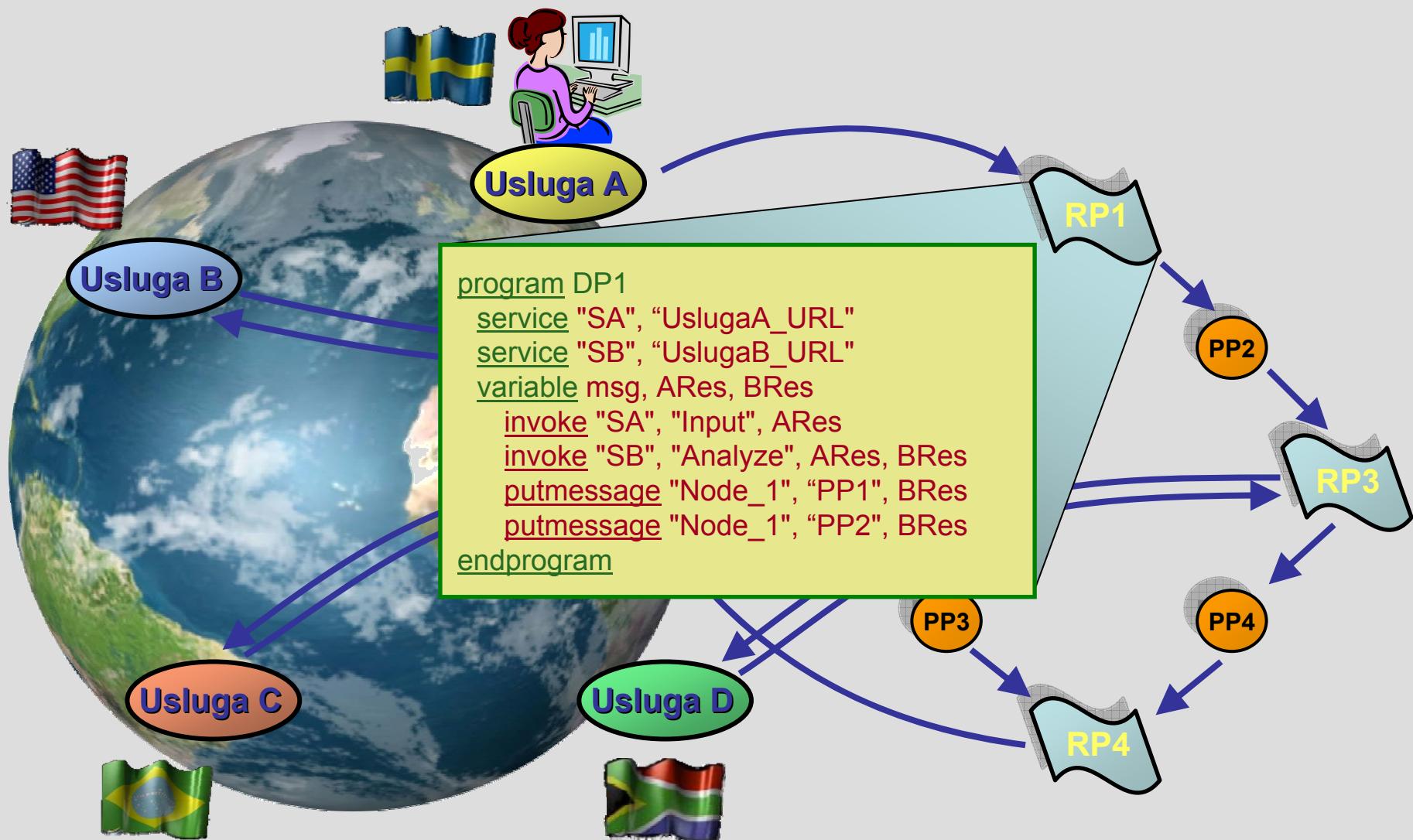
Uloga i funkcija PIE posrednika



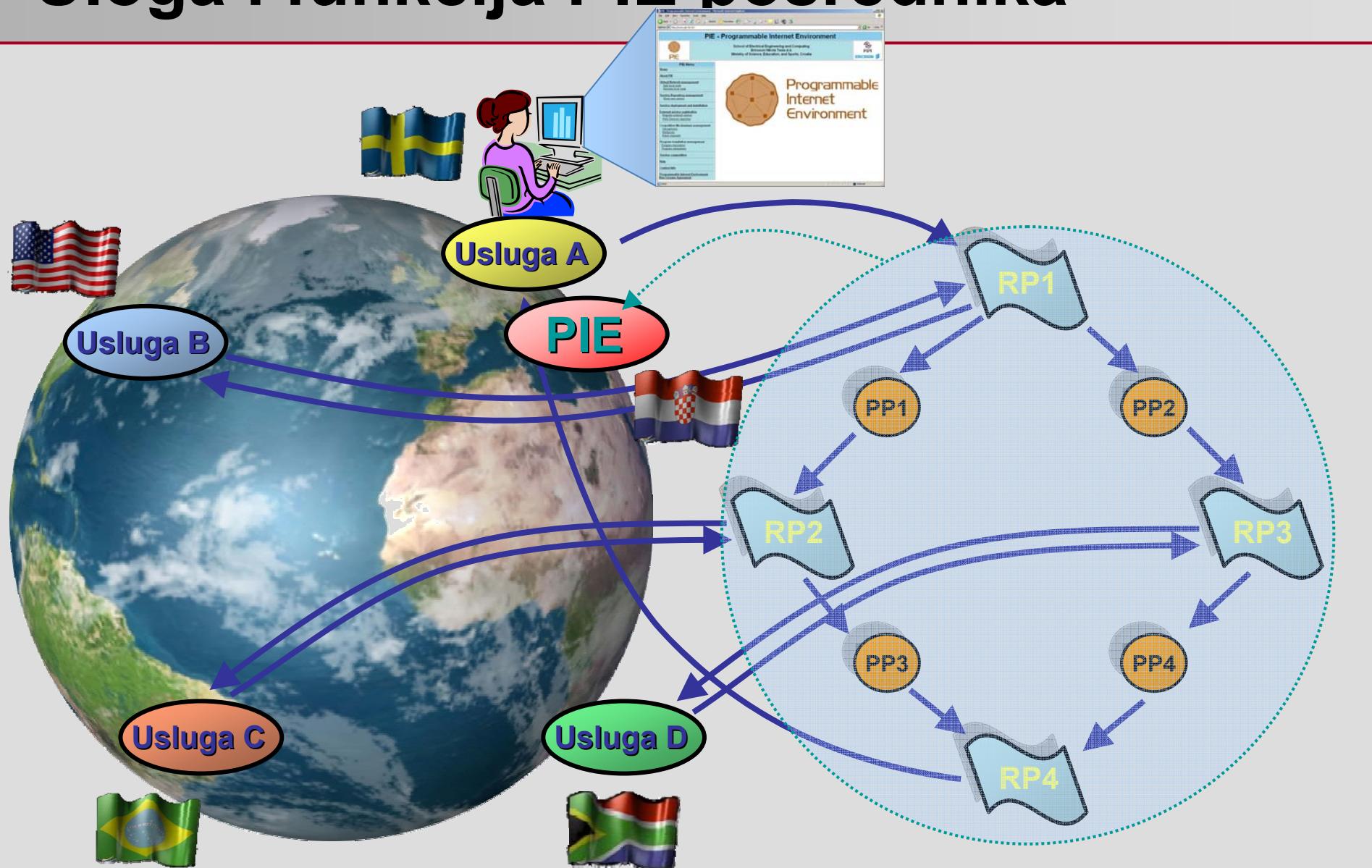
Uloga i funkcija PIE posrednika



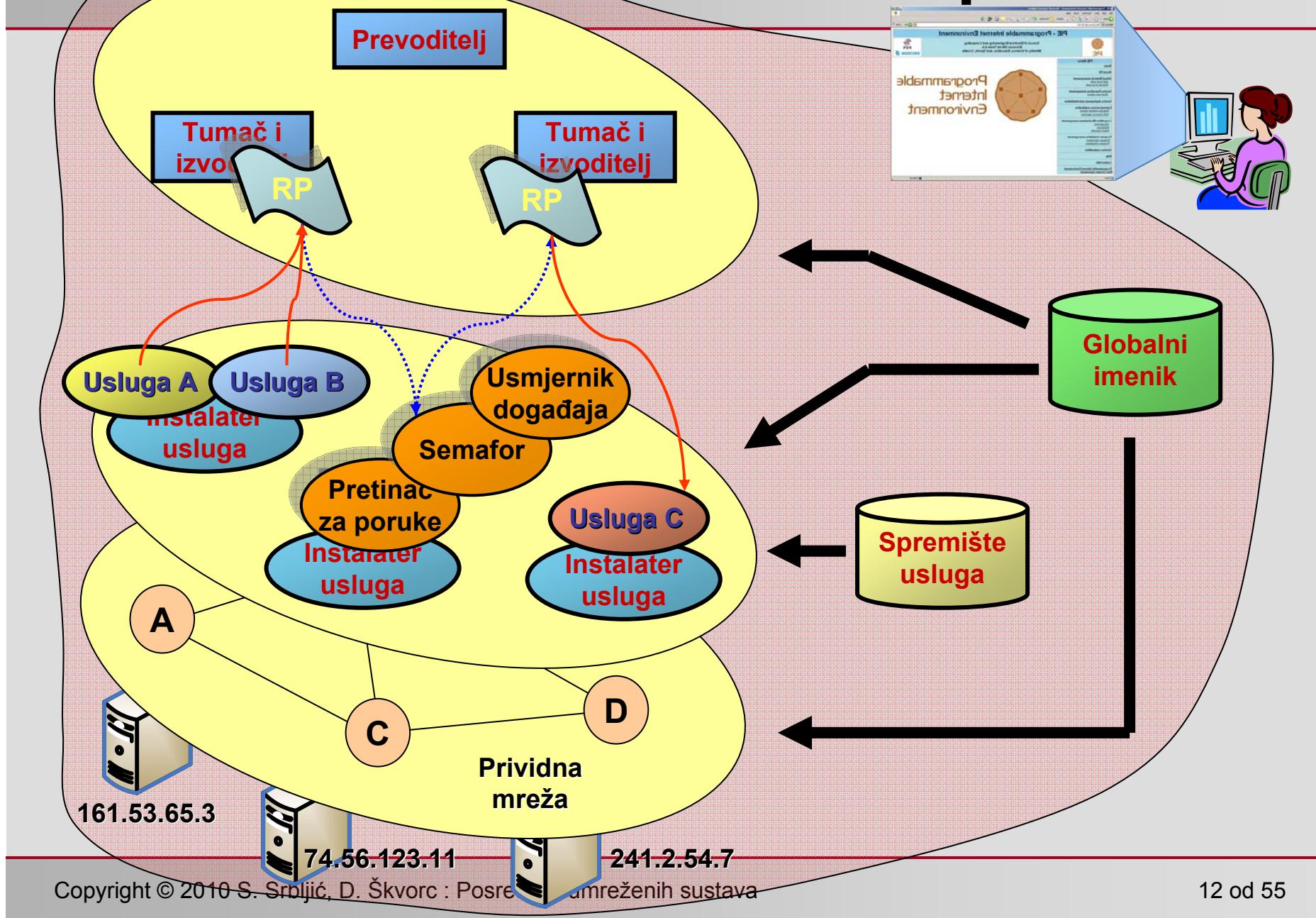
Uloga i funkcija PIE posrednika



Uloga i funkcija PIE posrednika



Arhitektura PIE posrednika



Arhitektura PIE posrednika

- Primjenske usluge
- Usluge suradnje i natjecanja (*pretinac za poruke, semafor, usmjernik događaja*)
- Raspodijeljeni programi
- Infrastrukturne usluge
 - Usluga prividne mreže
 - Spremište usluga
 - Instalater usluga
 - Usluge za prevođenje i izvođenje raspodijeljenih programa
 - Globalni imenik
 - Lokalni imenik
- Korisničko sučelje

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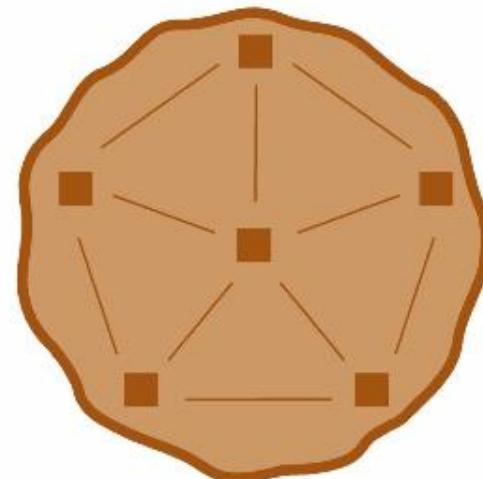
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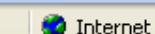
Virtual Network Management

List of members of Virtual Network

Search node by name:

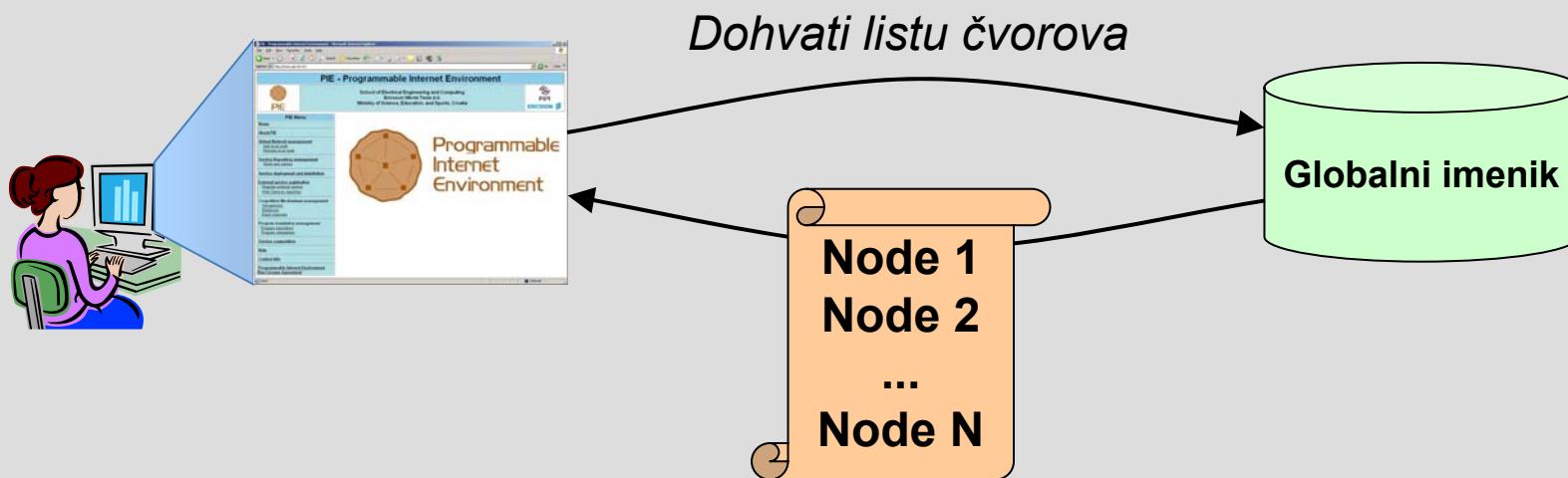
Search node by physical address:

Logical Node	Physical Address
Marge	damrod.zemris.fer.hr
Bart	gwaihir.zemris.fer.hr
Homer	mablung.zemris.fer.hr
Lisa	161.53.65.187
MrBurns	161.53.65.186
Itchy	161.53.65.222

[Help](#)

Korisničke funkcije PIE posrednika

- **Upravljanje prividnom mrežom**
 - Dohvat liste mrežnih čvorova



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Virtual Network Management

Adding Local Computer to the Virtual Network

Your computer will become a part of the Virtual Network. To join your computer to the Virtual Network, you have to do the following steps:

- 1) Download the Virtual Network Setup Application

[Download Virtual Network Setup Application](#)

- 2) Run the Virtual Network Setup Application from local computer

- 3) Specify the name of your node within the Virtual Network and root URL of your computer, and then click the **Join** button

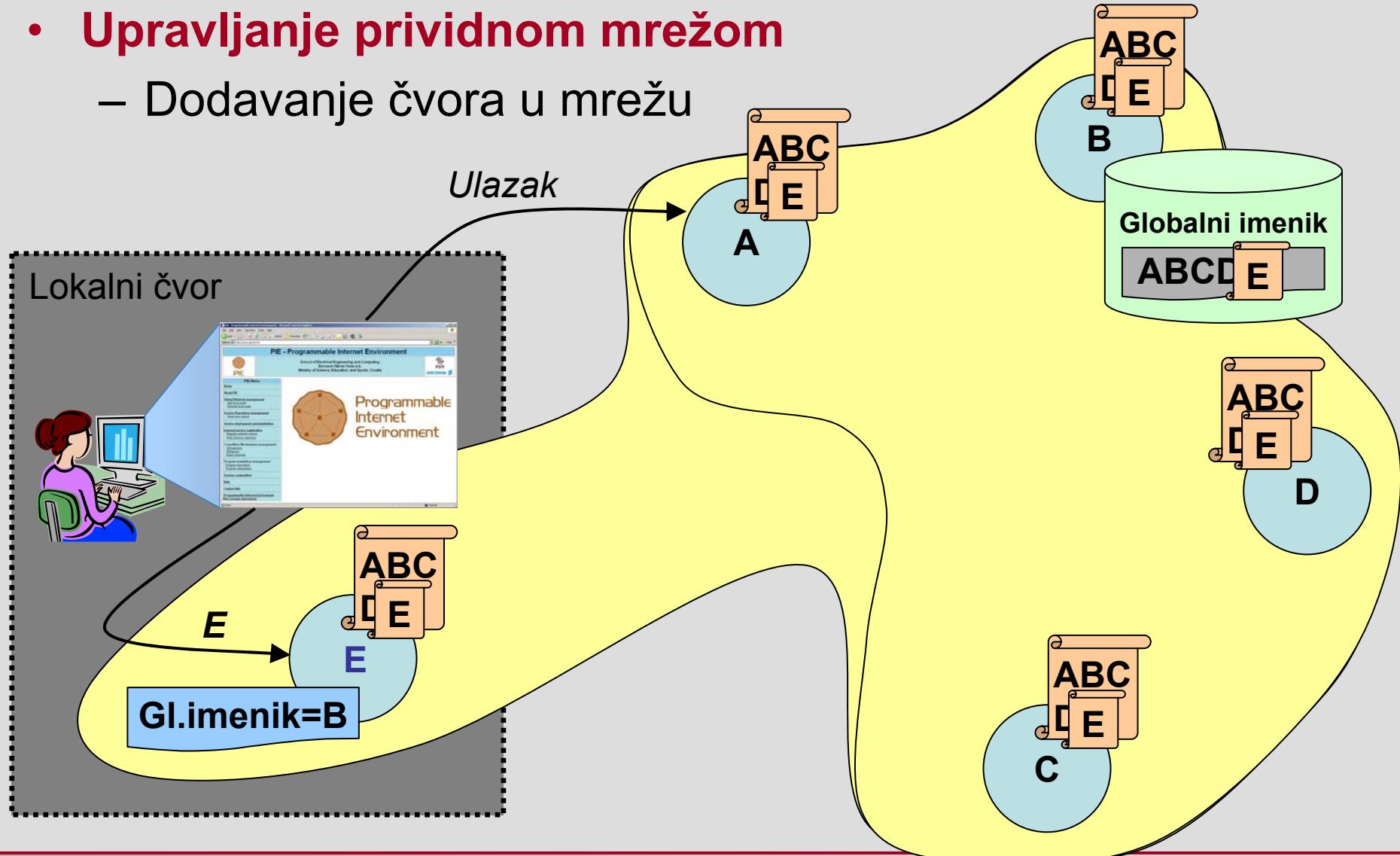
Node name:

Root URL: http://193.198.140.80/MidArc/PIE

Join

Korisničke funkcije PIE posrednika

- **Upravljanje prividnom mrežom**
 - Dodavanje čvora u mrežu



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Virtual Network Management

Removing Local Computer from the Virtual Network

Your computer will be removed from the Virtual Network. If you are sure you want to remove your computer from the Virtual Network, fill in the node name and root URL and click the **Leave** button.

Node name:

Root URL: <http://161.53.65.106/MidArc/PIE>

[Leave](#)

Contacting your computer...

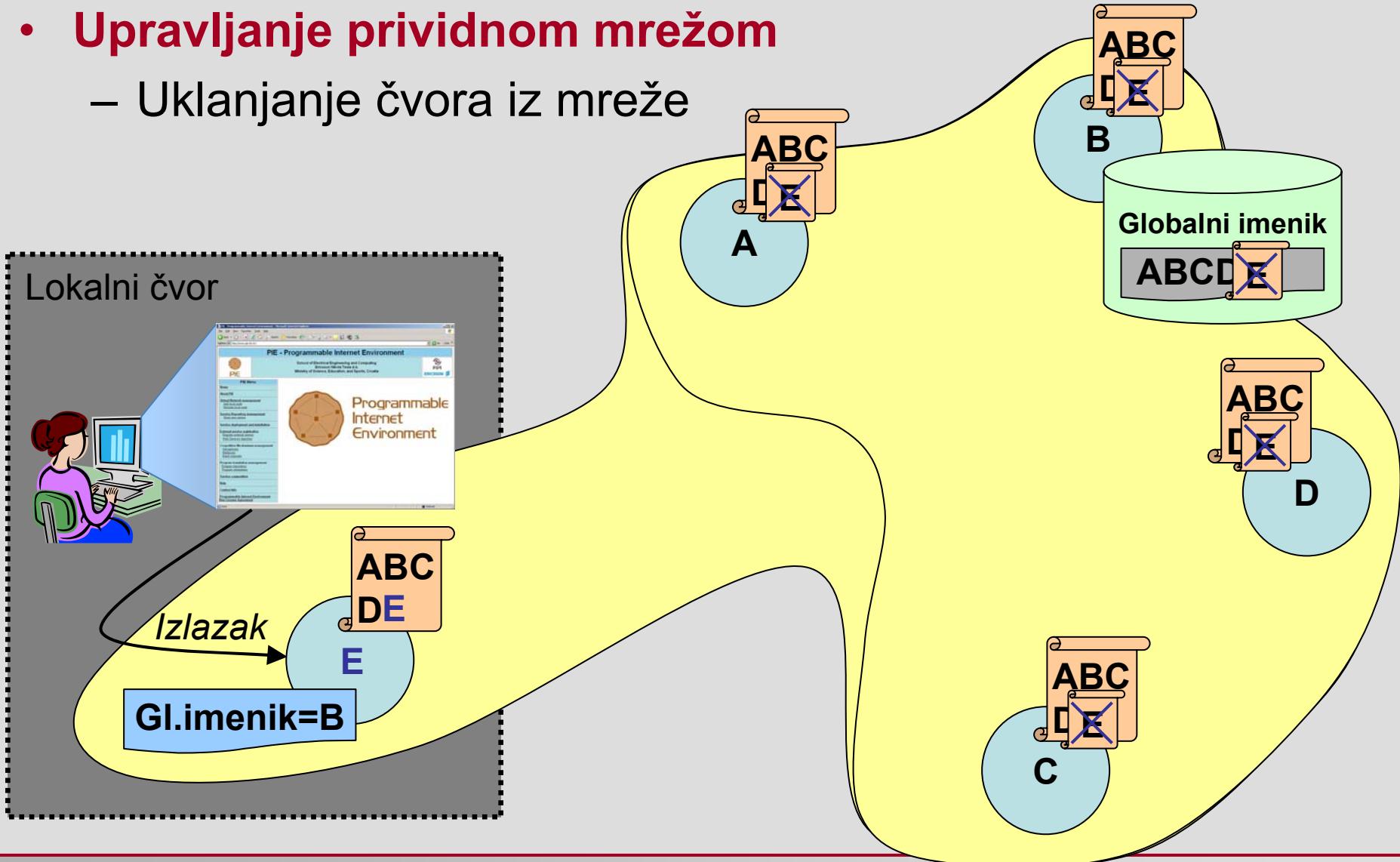
Removing logical node from your computer...

Exchanging virtual network topology information with other computers...

To completely uninstall the Virtual Network components from your computer, you should manually uninstall the Virtual Network Setup Application

Korisničke funkcije PIE posrednika

- **Upravljanje prividnom mrežom**
 - Uklanjanje čvora iz mreže



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Service Repository Management

Select the criterium for listing:

All nodes

Merge

All services

MailBox

BinarySemaphore

CountingSemaphore

ProgramInstaller

Refresh list

Repository Node	Service Name	Removal Mark
Merge	MailBox	<input type="checkbox"/>
Merge	BinarySemaphore	<input type="checkbox"/>
Merge	CountingSemaphore	<input type="checkbox"/>
Merge	ProgramInstaller	<input type="checkbox"/>
Merge	SSCLTranslator	<input type="checkbox"/>
Merge	ProgramInterpreter	<input type="checkbox"/>
Merge	ProgramTranslator	<input type="checkbox"/>
Merge	EventChannel	<input type="checkbox"/>
Merge	SimpleCalculator	<input type="checkbox"/>

Submit

Korisničke funkcije PIE posrednika

- **Gospodarenje uslugama**
 - Pretraživanje spremišta usluga



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Service Repository Management

Storing new service into Service Repository

Node of repository to store your service:

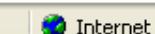
Merge

ZIP file of your service:

WSDL file of your service:

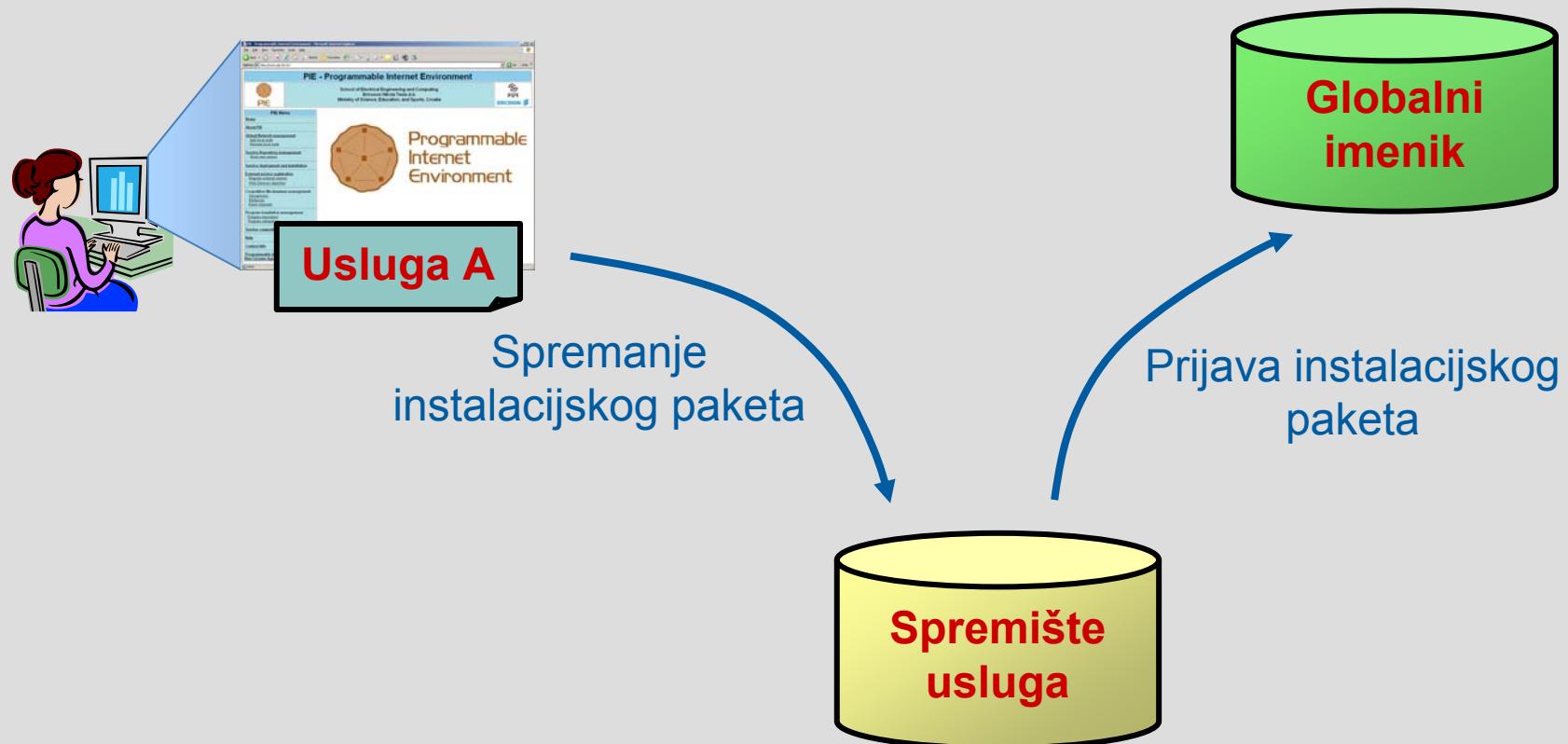
Installation script file of your service:

Name of service to be stored:



Korisničke funkcije PIE posrednika

- **Gospodarenje uslugama**
 - Spremanje instalacijskih paketa u spremište usluga



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Service Deployment & Installation

Select the criterium for listing:

All nodes
Merge
Bart
Homer
Lisa

All services
MailBox
BinarySemaphore
CountingSemaphore
ProgramInstaller

Refresh list

Logical Node	Service Name	Installed Status
Merge	MailBox	<input checked="" type="checkbox"/>
Merge	BinarySemaphore	<input type="checkbox"/>
Merge	CountingSemaphore	<input type="checkbox"/>
Merge	ProgramInstaller	<input checked="" type="checkbox"/>
Merge	SSCLTranslator	<input checked="" type="checkbox"/>
Merge	ProgramInterpreter	<input checked="" type="checkbox"/>
Merge	ProgramTranslator	<input checked="" type="checkbox"/>
Merge	EventChannel	<input type="checkbox"/>
Merge	SimpleCalculator	<input checked="" type="checkbox"/>

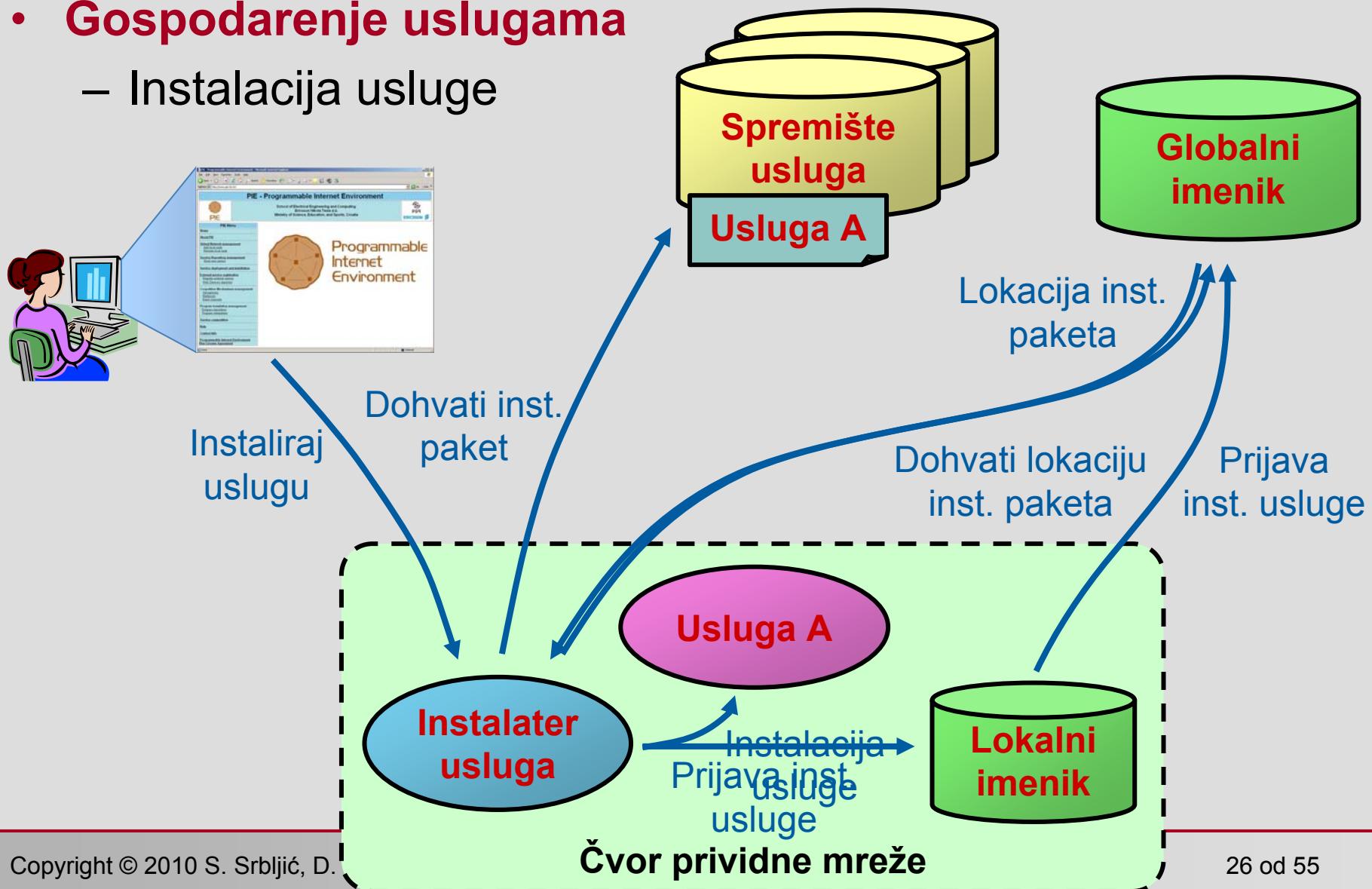
Submit



Internet

Korisničke funkcije PIE posrednika

- **Gospodarenje uslugama**
 - Instalacija usluge



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External Service Registration

List of registered external services

Search service by URL:

Service URL

<http://www.bs-byg.dk/hashclass.asmx><http://161.53.65.189/mailserver/mailsending.asmx><http://localhost/WebService1/Service1.asmx><http://localhost/CinestarWebService/CinestarWS.asmx><http://161.53.65.187/OutputService/ItemOutputService.asmx><http://161.53.65.187/BNService/BNService.asmx><http://161.53.65.187/AmazonService/AmazonService.asmx><http://161.53.65.187/GoogleLangWrapper/GoogleLTSService.asmx><http://161.53.65.187/InputService/ItemInputService.asmx><http://www.abysal.com/soap/soapmail.wdtp><http://localhost/Pie/TaskSendMail/TaskSendMail.asmx>

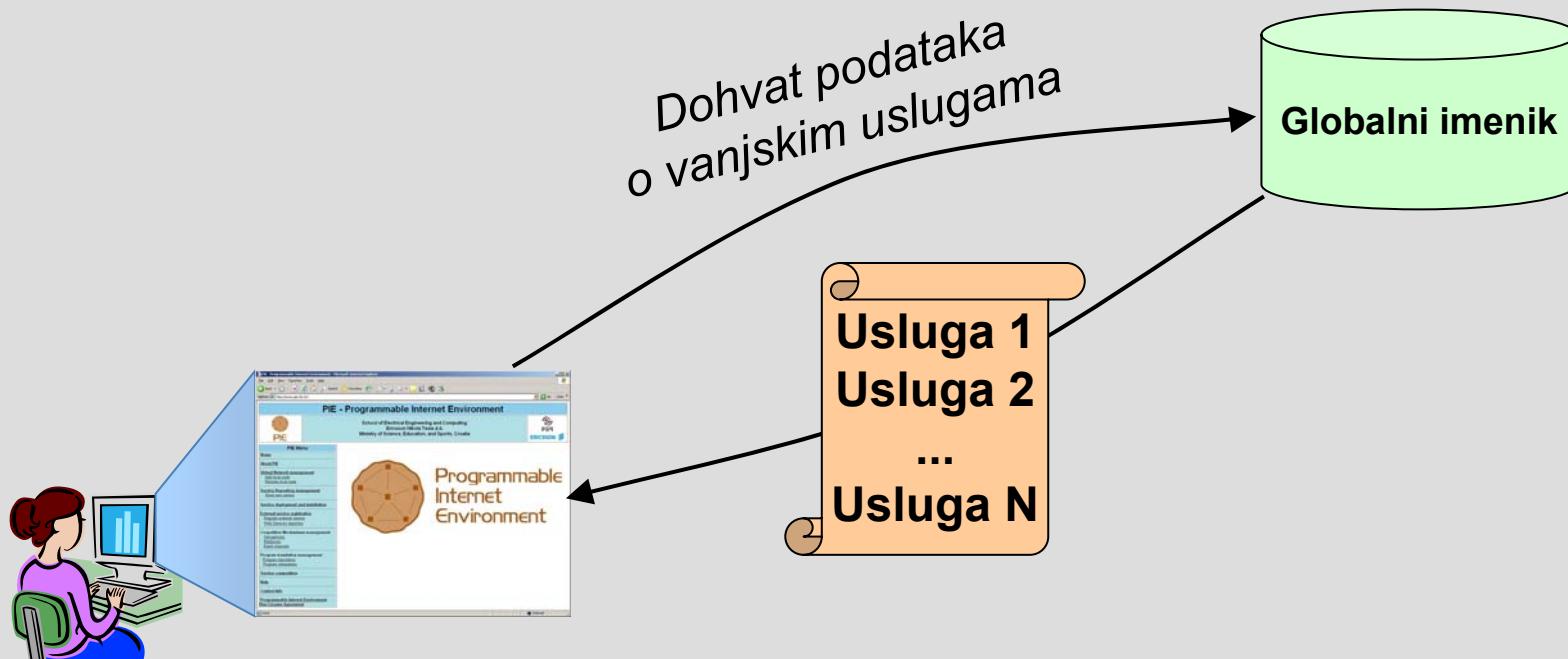
Service Description

[http://www.xmethods.com/ve2/Vie\(QHyMHiRM\)?key=uuid:FD46043](http://www.xmethods.com/ve2/Vie(QHyMHiRM)?key=uuid:FD46043)<http://161.53.65.189/mailserver/mailsending.asmx>[Item Input Service](#)<http://www.abysal.com/soap/Abys>[TaskSendMail](#)

Internet

Korisničke funkcije PIE posrednika

- **Gospodarenje uslugama**
 - Dohvat podataka o vanjskim uslugama



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External Service Registration

Registration of new external service

To register external service, you should provide its WSDL description.

Use the form below to upload the WSDL file of the service you want to register.

You should use an out-of-band method to retrieve the service WSDL. For example, you can visit official web site of the required service and download the service WSDL.

WSDL file: [Browse...](#)

Optionally, you can use the form below to set the link to the detailed service description.

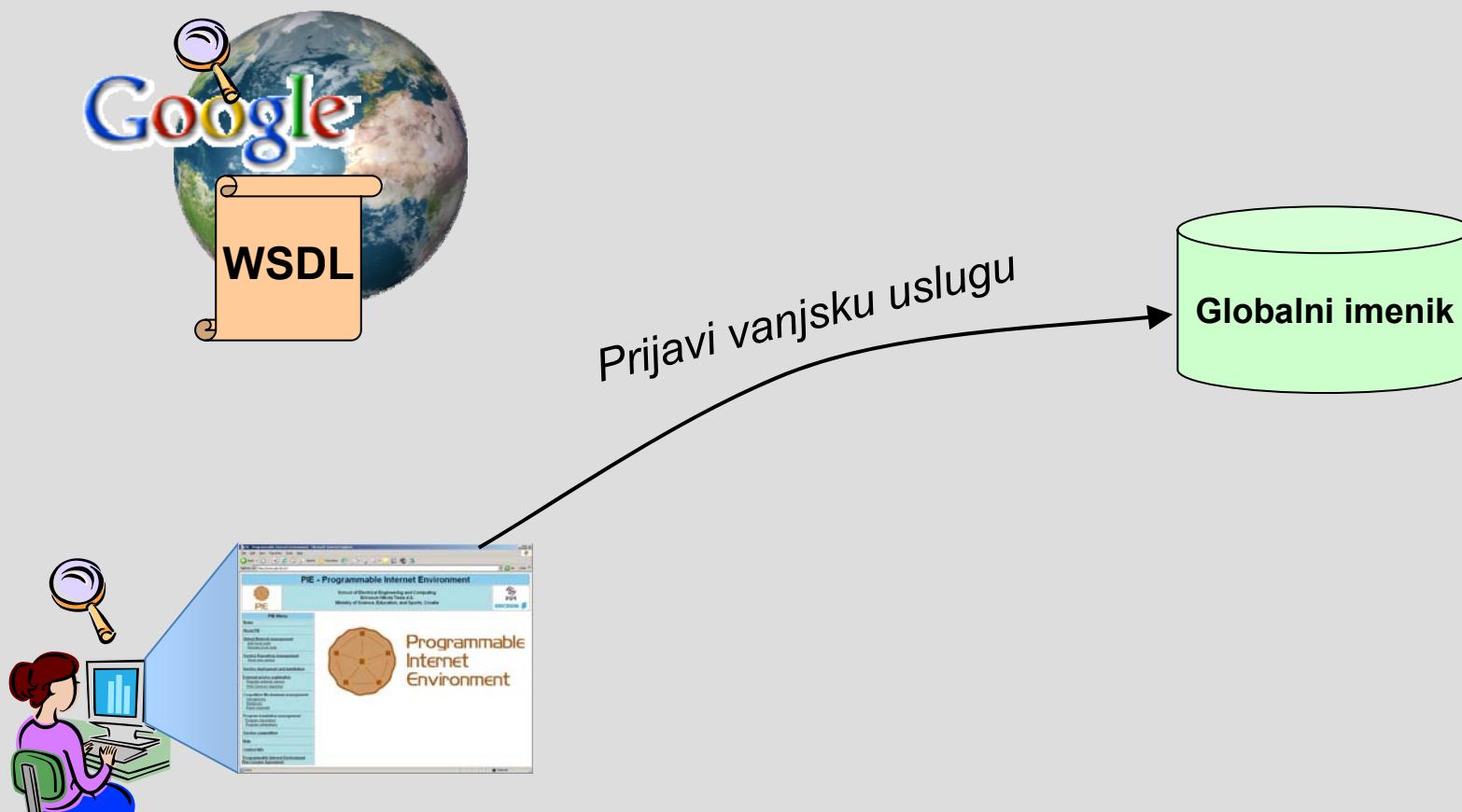
Link to service description:

[Register Service](#)



Korisničke funkcije PIE posrednika

- **Gospodarenje uslugama**
 - Prijava vanjskih usluga u imenik



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Web Services registries

List of Web Services registries

Web Service registry provider name	Web address
XMethods	www.xmethods.com
Strikelron	www.strikeiron.com

[Help](#)



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MailBox Management

Destination node of virtual network

All nodes
Marge
Bart
Homer

[Refresh lists](#)

Installed MailBoxes

Logical Node	Installed
Marge	<input checked="" type="checkbox"/>

[Submit changes](#)

Instantiated MailBoxes

Logical Node	Instance Name	Instantiated

[Submit changes](#)

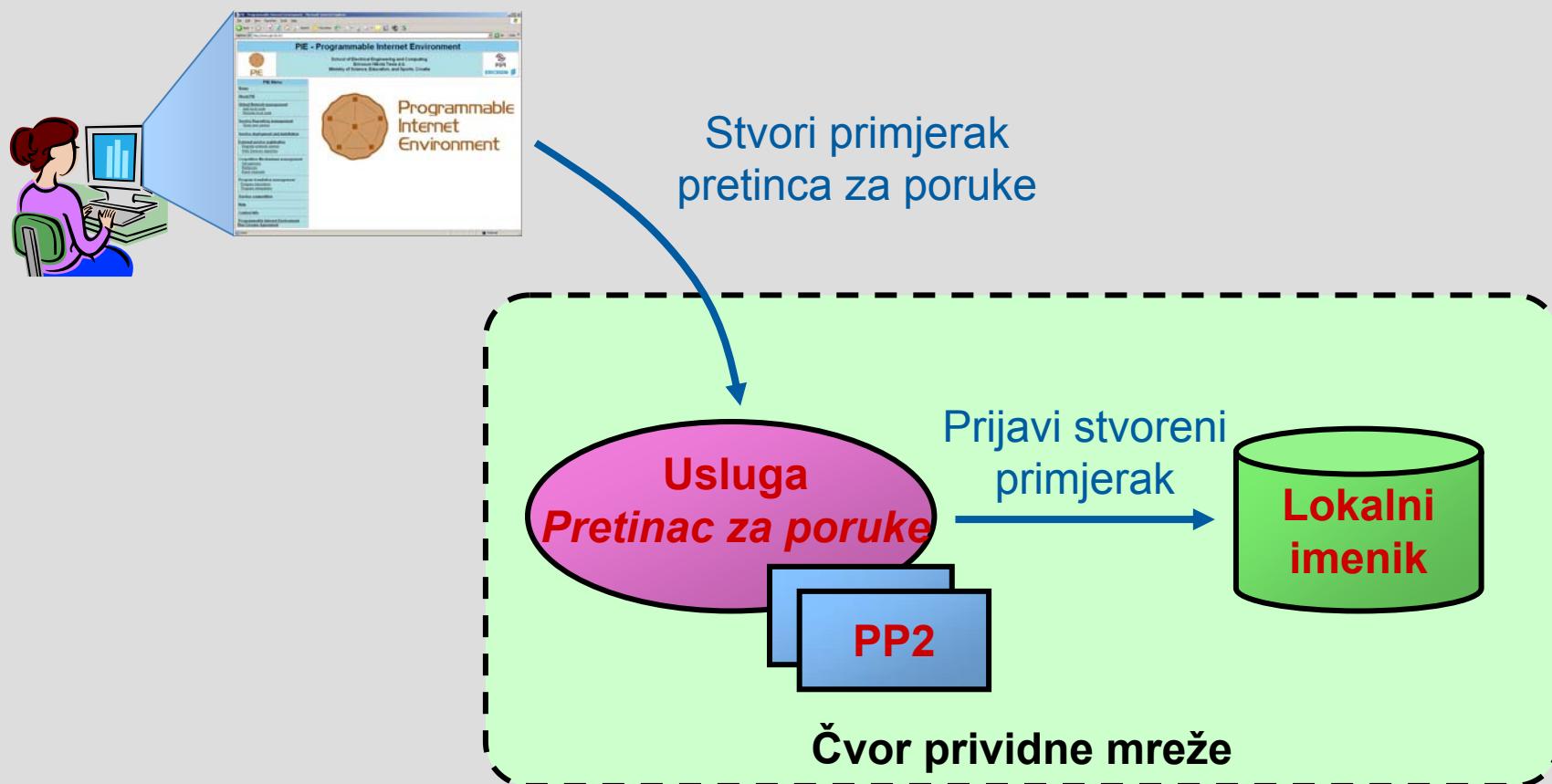
Create new MailBox instance

Virtual network node: Instance name: [Done](#)

Internet

Korisničke funkcije PIE posrednika

- **Gospodarenje uslugama**
 - Rukovanje uslugama za suradnju i natjecanje



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Program Translator Management

Destination Virtual Network node

All nodes
Marge
Bart
Homer

[Refresh lists](#)

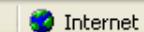
Installed Program Translators

Logical Node	Installed
Marge	<input checked="" type="checkbox"/>

[Submit changes](#)

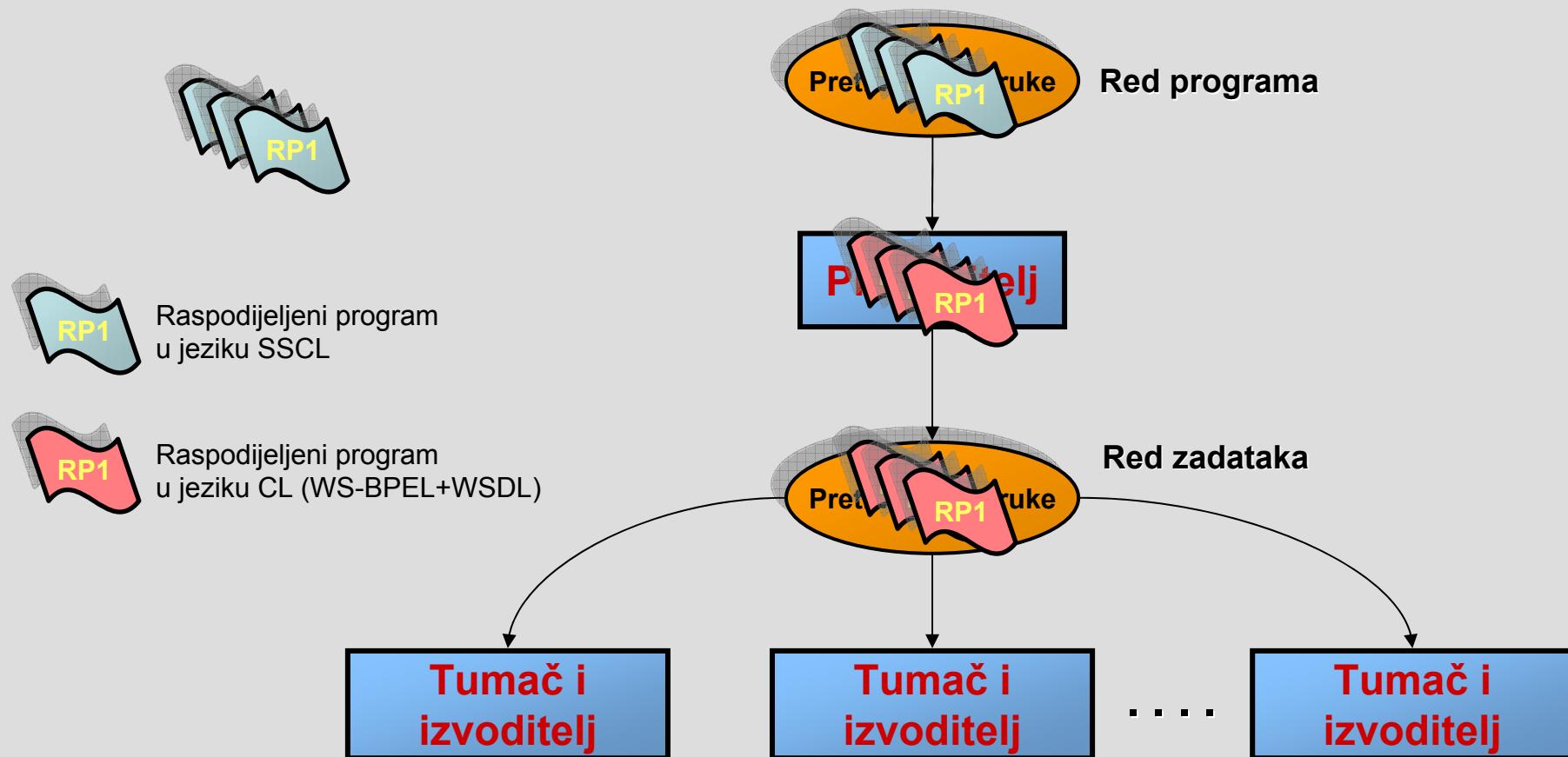
Program Translator State

Logical Node	Status	Actions
Marge	Started	Details

[Help](#)

Korisničke funkcije PIE posrednika

- **Prevodenje raspodijeljenih programa**
 - Dvorazinski sustav prevodenja



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Program Translator Management

Destination Virtual Network node

- All nodes
- Marge
- Bart
- Homer

[Refresh lists](#)

Installed Program Translators

Logical Node	Installed
Marge	<input checked="" type="checkbox"/>

[Submit changes](#)

Program Translator State

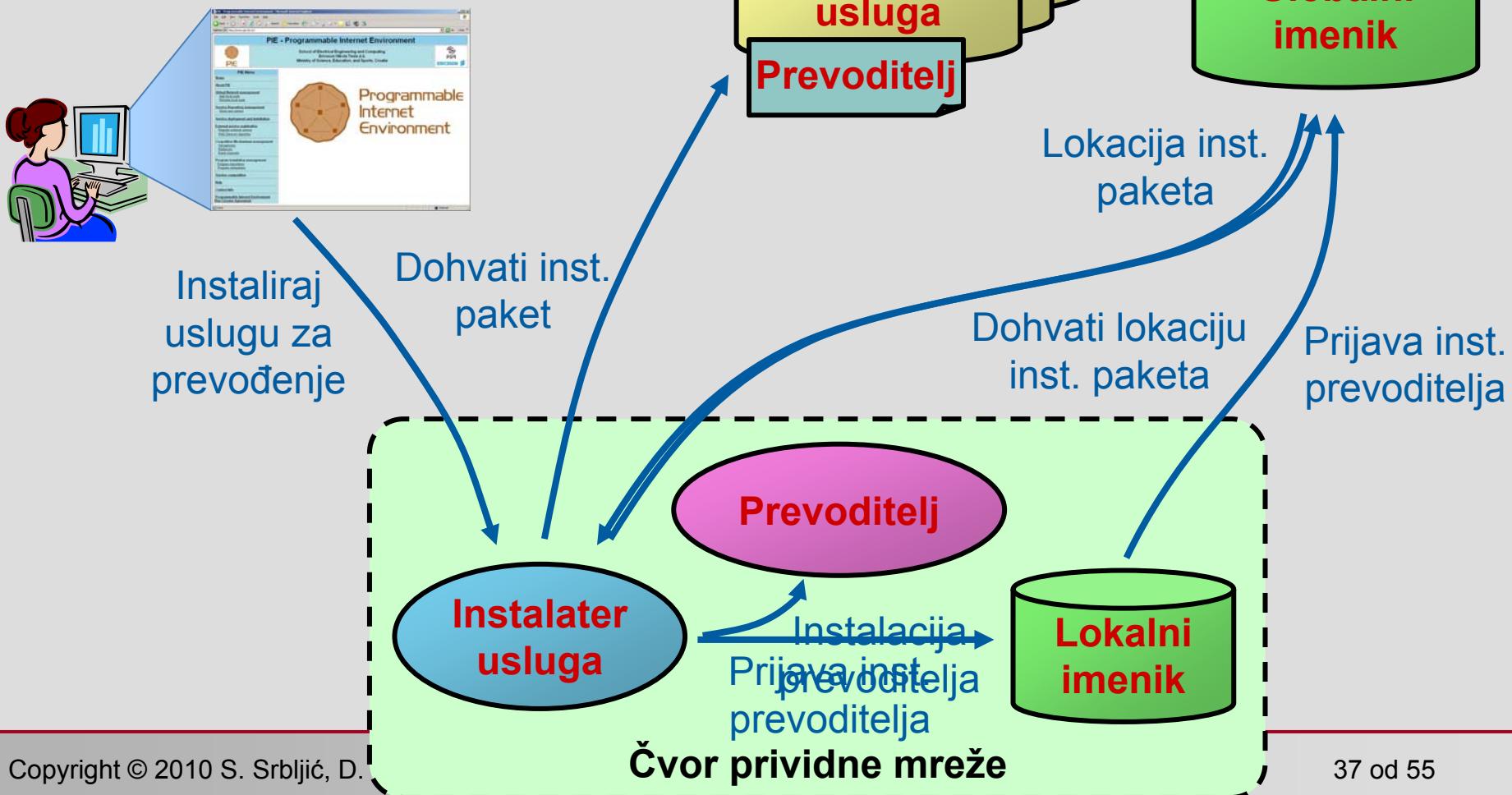
Logical Node	Status	Actions
Marge	Started	Details

[Help](#)

Korisničke funkcije PIE posrednika

- **Gospodarenje uslugama**

- Instalacija usluge za prevođenje rasp. prog.



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Destination Virtual Network node

All nodes
Marge
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Homer

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Installed Program Translators

Logical Node	Installed
Marge	<input checked="" type="checkbox"/>

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Logical Node	Status	Actions
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Program Translator Management

Program Queue

Virtual Network node	Instance name
Marge	
Bart	
Homer	
Lisa	
MrBurns	
Itchy	



Program Translator

Marge



Job Queue

Virtual Network node	Instance name
Marge	
Bart	
Homer	
Lisa	
MrBurns	
Itchy	

[Start](#)

[Stop](#)

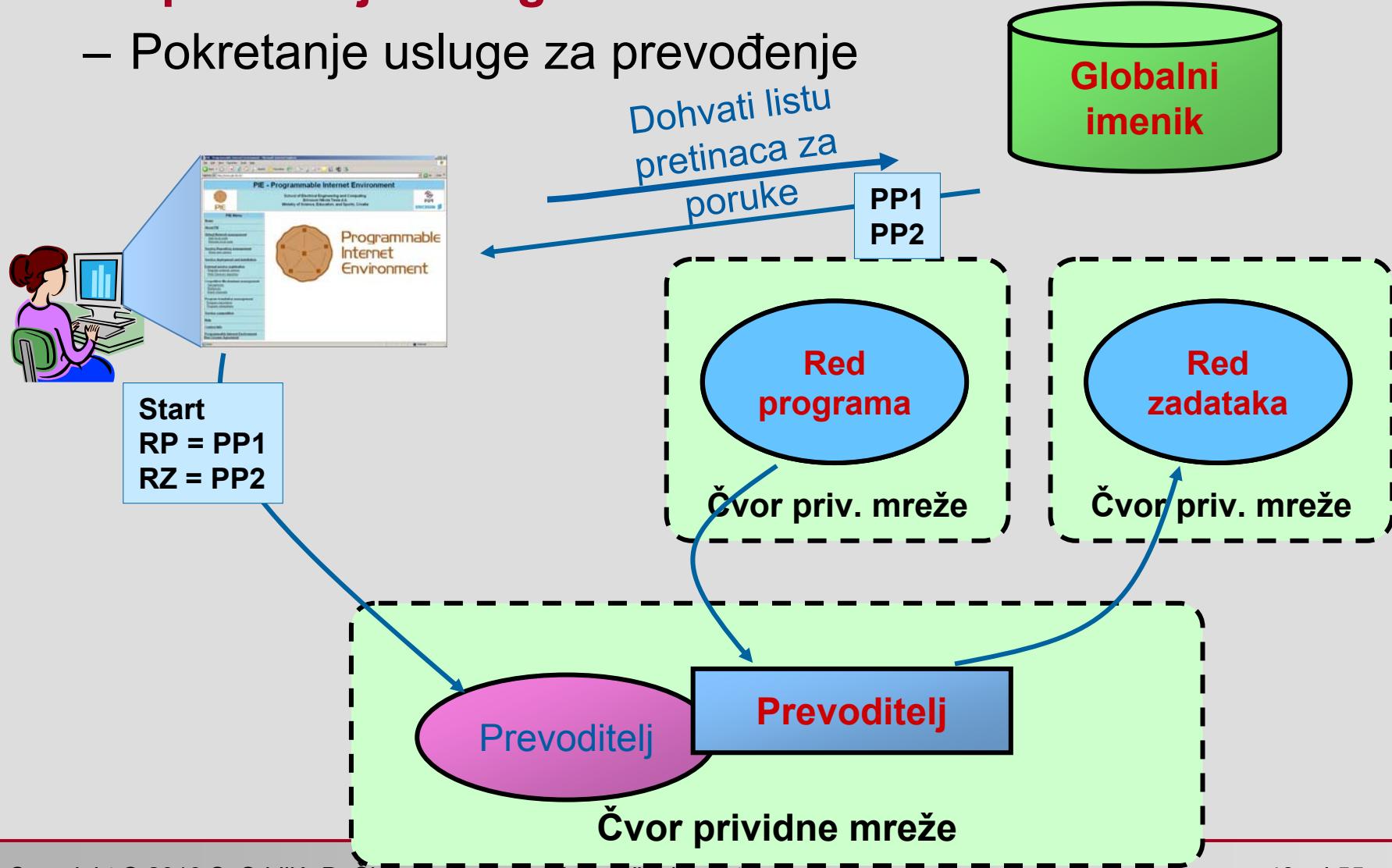
[Cancel](#)



Internet

Korisničke funkcije PIE posrednika

- **Gospodarenje uslugama**
 - Pokretanje usluge za prevođenje



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Program Interpreter Management

Destination Virtual Network node

All nodes
Marge
Bart
Homer

[Refresh lists](#)

Installed Program Interpreters

Logical Node	Installed
Marge	<input checked="" type="checkbox"/>

[Submit changes](#)

Program Interpreter State

Logical Node	Status	Actions
Marge	Started	Details

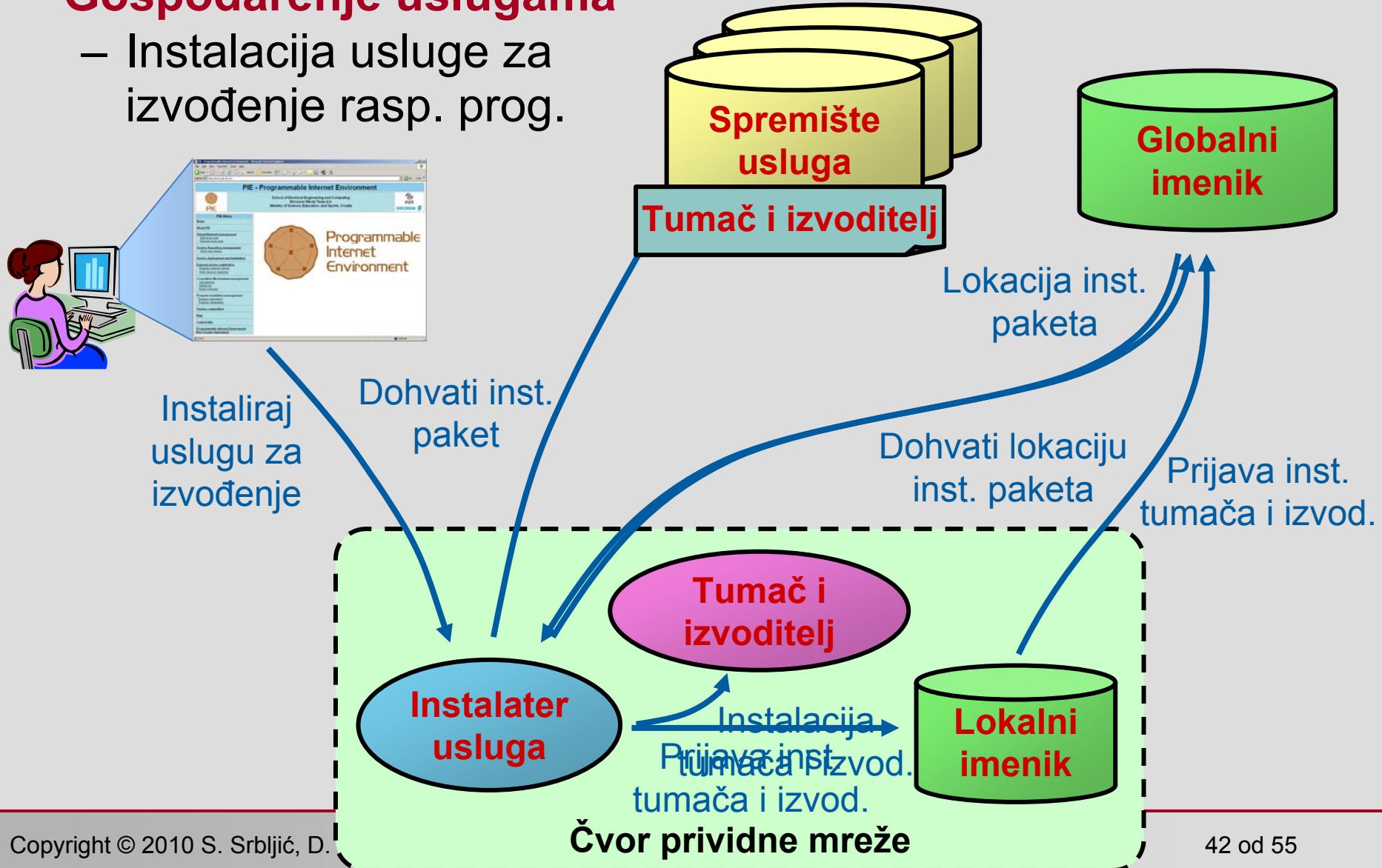
[Help](#)



Korisničke funkcije PIE posrednika

- Gospodarenje uslugama**

- Instalacija usluge za izvođenje rasp. prog.



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Program Interpreter Management

Destination Virtual Network node

All nodes
Marge
Bart
Homer

[Refresh lists](#)

Installed Program Interpreters

Logical Node	Installed
Marge	<input checked="" type="checkbox"/>

[Submit changes](#)

Program Interpreter State

Logical Node	Status	Actions
Marge	Started	Details

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Program Interpreter Management

Job Queue	
Virtual Network node	Instance name
Marge	
Bart	
Homer	
Lisa	
MrBurns	
Itchy	

↓

Program Interpreter
Marge

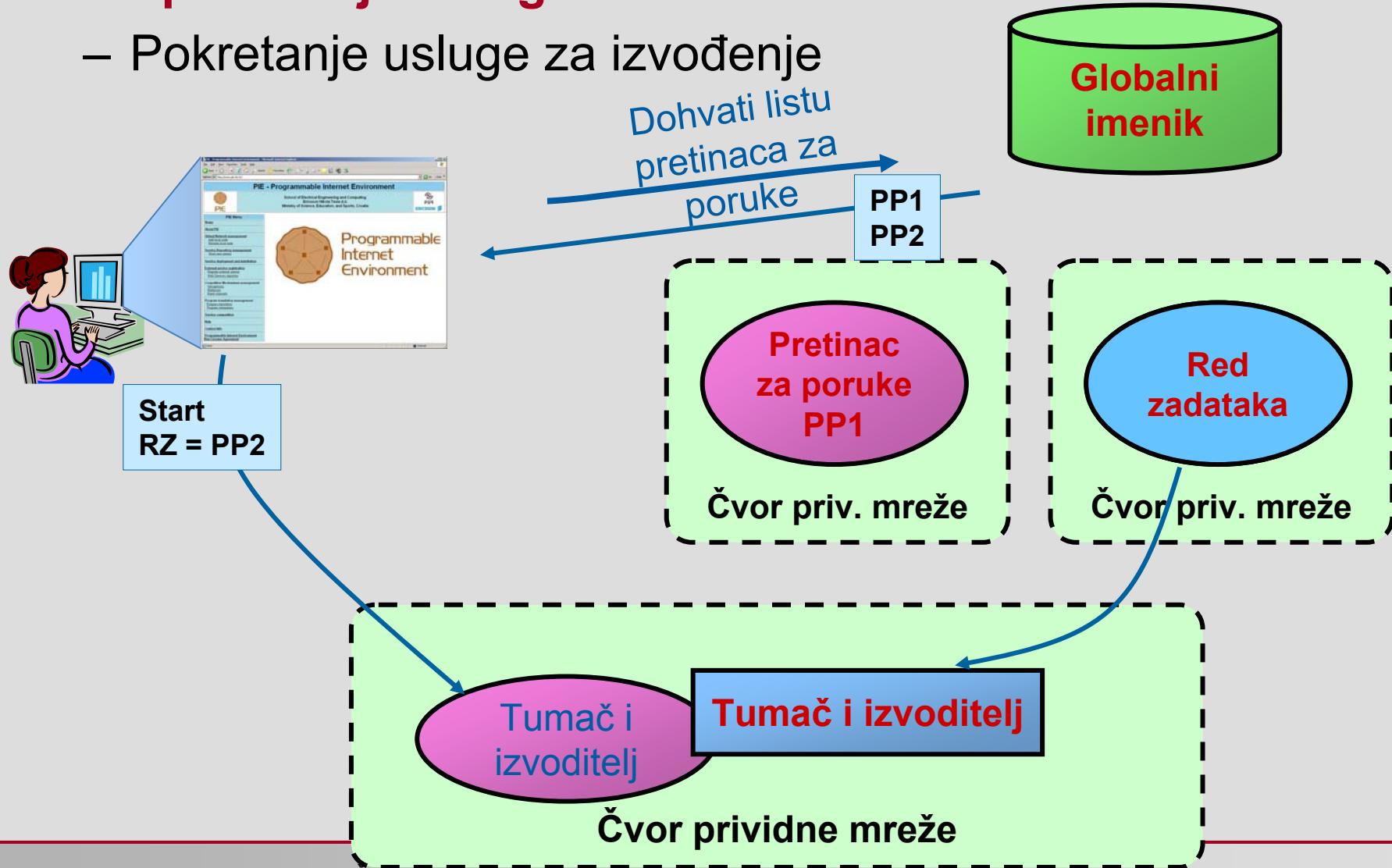
[Start](#) [Stop](#) [Cancel](#)

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Korisničke funkcije PIE posrednika

- **Gospodarenje uslugama**
 - Pokretanje usluge za izvođenje



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Application composition

Existing applications:

BillAndPayment
BillAndPaymentCreateInfrastructure
BillAndPaymentDestroyInfrastructure
CRONavigationSystem
CRONavigationSystemCreateInfrastructure
CRONavigationSystemDestroyInfrastructure
TaskSystem
TaskSystemCreateInfrastructure
TaskSystemDestroyInfrastructure

New

Open

Delete

Start

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Application Name: CRONavigationSystem

Coopetition programs:

CCCP3
CCCP4
CCCP5
CCCP6
CCCP7
CCCP8

New CP

Remove CP

Coopetition program listing:

```
getmessage "Homer", "inst7", podaciBlizina
getmessage "Homer", "inst7", podaciSmjer
getmessage "Homer", "inst8", podaciKut
invoke "Homer", "TvornicaCro", "NapraviID", id
invoke "Homer", "TvornicaCro", "UnesiUdaljenostiBlizina", id, podaciBlizi
invoke "Homer", "TvornicaCro", "UnesiUdaljenostiSmjer", id, podaciSmjer,
invoke "Homer", "TvornicaCro", "UnesiKuteve", id, podaciKut, bul3
invoke "Homer", "TvornicaCro", "Rezultat", id, rezultat
invoke "Homer", "TvornicaCro", "UnistiID", id
putmessage "Homer", "inst10", rezultat
putmessage "Homer", "inst12", rezultat
```

Up

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New Statement

Edit Statement

Delete Statement

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Create New Statement

Statement Type:

- [Application Service Invocation](#)
- [External Application Service Invocation](#)
- [Coopetition Service Invocation](#)
- [Conditional Branch](#)
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- [Assignment](#)
- [Waiting](#)

[Next](#)

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Done

Internet

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Application Service Invocation

Service name:

SecurityServiceDirectory

GUT

Calculator

TestService

ProgramTranslator

ProgramInterpreter

Service location:

Merge

Operation:

Add

Sub

Mul

Div

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Application Service Invocation

Service name: **Calculator**

Service location: **Marge**

Operation: **Mul**

Number of parameters: **3**

Variable for **input** parameter: **x**

- mass
- force
- acceleration

Variable Name:

[Add](#)[Rename](#)[Delete](#)[Back](#)[Next](#)

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Application Service Invocation

Service name: **Calculator**

Service location: **Marge**

Operation: **Mul**

Number of parameters: **3**

Variable for input parameter: **y**

mass

force

acceleration

Variable Name:

acceleration

Add

Rename

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Contact Info

Application Service Invocation

Service name: **Calculator**

Service location: **Marge**

Operation: **Mul**

Number of parameters: **3**

Variable for **output** parameter: **MulResult**

mass

force

acceleration

Variable Name:

force

Add

Rename

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Done

Internet

100%

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Statement creation complete

Generated statement:

```
invoke "Marge", "Calculator", "Mul", mass, acceleration, force
```

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Application Name: CRONavigationSystem

Coopetition programs:

CCCP3
CCCP4
CCCP5
CCCP6
CCCP7
CCCP8

New CP

Remove CP

Coopetition program listing:

```
getmessage "Homer", "inst7", podaciBlizina
getmessage "Homer", "inst7", podaciSmjer
getmessage "Homer", "inst8", podaciKut
invoke "Homer", "TvornicaCro", "NapraviID", id
invoke "Homer", "TvornicaCro", "UnesiUdaljenostiBlizina", id, podaciBlizi
invoke "Homer", "TvornicaCro", "UnesiUdaljenostiSmjer", id, podaciSmjer,
invoke "Homer", "TvornicaCro", "UnesiKuteve", id, podaciKut, bul3
invoke "Homer", "TvornicaCro", "Rezultat", id, rezultat
invoke "Homer", "TvornicaCro", "UnistiID", id
putmessage "Homer", "inst10", rezultat
putmessage "Homer", "inst12", rezultat
invoke "Marge", "Calculator", "Mul", mass, acceleration, force
```

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New Statement

Edit Statement

Delete Statement

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Application composition

Existing applications:

BillAndPayment

BillAndPaymentCreateInfrastructure

BillAndPaymentDestroyInfrastructure

CRONavigationSystem

CRONavigationSystemCreateInfrastructure

CRONavigationSystemDestroyInfrastructure

TaskSystem

TaskSystemCreateInfrastructure

TaskSystemDestroyInfrastructure

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Start application

Select program queue:

Program Queue Location	Program Queue Name	Select
Marge	pq	<input checked="" type="radio"/>
Marge	jq	<input type="radio"/>

[Run](#)

[return to start page](#)

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