

, « »

4013 -2

230105 65 -

_____	• •
_____	• •

«_____» _____ 2013 .

_____ • • •

, 2013

	.....	4
1.	.	8
1.1.	-	8
1.1.1.	-	8
1.1.2.	-	9
1.2.	.....	10
1.2.1.	.....	10
1.2.2.	.....	12
1.3.	-	13
1.3.1.	.....	13
1.3.2.	.....	14
1.3.3.	-	15
1.4.	.....	18
1.4.1.	.....	18
1.4.2.	-	20
1.4.3.	.....	21
2.	. .....	23
2.1.	.....	23
2.1.1.	.....	23
2.1.2.	.....	25
2.1.3.	.....	26
2.2.	.....	29
2.2.1.	.....	29
2.2.2.	.....	30
2.2.3.	.....	32
2.2.4.	.....	33

3.	.....	34
3.1.	.....	34
3.1.1.	.....	34
3.1.2.	...	35
3.1.3.	.....	36
3.1.4.	.....	36
3.2.		37
3.2.1.	.....	37
3.2.2.	.....	40
	.....	44
	.....	46
	· - ·	53
	· ·	54
.1.	.....	54
.2.	.....	55

XXI .

,

.

,

,

.

.

,

,

.

.

,

,

.

,

		.	-
	,	,	-
		.	
	,	.	
		,	-
	.		
	,		-
	,	.	
			-
	.		-
		.	-
	.		
		,	,
			.
	:		
1.			-
	.		
2.			-
	.		
3.		.	
4.		.	
5.			.
6.			-

7.

8.

1.

2.

3.

4.

5.

6.

,

.

1.1. -

[12, . 31], [12, . 148],
 , -
 ,
 ,

[14, . 55] « — ,

». [14, . 55]

1.2.

1.2.1.

[19],

， ， — ， -
[20, . 27],

· -
，
，
，

， -
[12, . 30 - 31], [20, . 30]

， -
·
[12, . 31] « -
()

».
， [20, . 30],
-
，
·

· [78, . 6]
， ()
，
， -

·
， PMBOK [54, . 8],
，
-
·
，

1.2.2.

. 34]

1.3.

[20, . 14]

1.3.1.

2006 .

[10, . 27].

[20, . 15],
 — *BPMN* (), *EPC*
 (c).

• , [20, . 15],
 :,
 , , .

SADT (Structured Analysis and Design Technique) IDEF (Integration Definition for Functional Modeling).

- • -
 [20, . 17] c
 , -

- UML (Unified Modeling Language).

- • -
 [20, . 18] -
 , --

• , - ,

BPMN (Business Process Model and Notation),
 ARIS (Architecture of Integrated Information Systems), EPC (
).

1.3.2.

• [16]
 ,

, [16, . 15]
 $C = (P, T, I, O)$, 4- :

1. P ;
2. T ;
3. I ;
4. O .

,
 .

.

[16, . 18]
 $G = V, A$,

$v_i \in V$ $a_i \in A$. V
 $P ($)
 $T ($).

1.3.3. -

-
 .

BPMN. BPMN - ,

— - ,

OMG BPMN.

BPMN

[66, . 26]

:[66, . 30]

1. (flow objects);
2. (data);
3. (connecting objects);
4. (swimlane);
5. (artifacts).

(,
. .). BPMN , -
/ . -
, , .
, - ,
.
YAWL *YAWL (Yet Another Workflow Language)*
(Aalst) (Hofstede) 2003
.
[77],
, YAWL
.
[77, c. 3] :
•
.
• , -
,
•
.
YAWL, [77, . 10], -
,
-
YAWL -
,
.
YAWL (. 1.3.2 . 14).

1.4.

1.4.1.

WfMC [32, . 9]

(Workflow)

(workflow engine).

[22, . 31 -- 35], workflow-

()

:

—

() —

—

,

.

Workflow-

Workflow,

[7, . 127],

Workflow

-

Workflow,

[7],

:

—

,

,

—

,

,

.

—

,

-

—

,

.

Workflow-

workflow

-

Cunningham LLP Zagiel S.A.,

[27], [23].

Cunningham LLP

,

,

,
 . Zagieli S.A.

, , -
 ,
 .

1.4.2. -

. BPM- [1] -
 - (, BPMS) « -
 , , -
 . BPMS
 - ,
 -
 ».

• , -
 - , «
 »[63] -

,
 - . -
 -
 :
 — ,
 - .
 — -
 - .
 — ,
 ,
 —

1.4.3.

PMBOK Guide [54, . 33]

e

,

[8, c. 91 - 93]),

:

•

;

•

;

•

;

•

;

•

,

;

•

,

;

•

;

•

.

•

[43]

-

,

-

.

,

.

-

-

.

,

-

.

,

.

2.1.

-

.

-

-

.

2.1.1.

(. [6], [5])

-

,

.

-

.

-

.
 ,
 .
 [11]
 ,
 .
 ,
 .
 ,
 .
 ,
 [11],
 ,
 ,
 .
 ,
 .
 —
 ,
 .
 [34]
 .
 ,
 ,
 .
 ,
 .
 ,
 .

,
 () , ,
 .
 ,
 ,
 .
 ,
 [18] [4],
 ,
 , , ,
 .
 .
 , -
 .
 , -
 .
 .
 .
 .
 , -
 -
 -
 , -
 .
 — [37], -
 [74], [35],
 [24].

2.1.3.

(agility) - .

, [62], [44], -
 ,
 , ,
 .
 - .
 , [61] [24],
 -
 , --
 . ,
 [37] .
 workflow,
 .
 , -
 - .
 [76]
 , . -
 c (. [68], [69])
 workflow -
 . -
 - , -
 .
 -
 -
 , [9, . 95] -
 (. . 53).

:
 — ,
 ,
 ,
 .
 —
 , —
 .
 — ,
 ,
 .
 —
 .
 —
 , , —
 ,
 .
 —
 —
 [65],
 [25] —
 —
 ,
 .
 eTOM [2] — SCOR [3]
 — .
 , APQC [30].

2.2.

2.2.1.

— ,

• -

-

• -

• -

Gartner Inc. (. [48]) Forrester Research [47]) 2009 – 2013

• ,

[48], [47],

•

• -

The Forrester Wave [75], [73], [29], [28],

Gartner Magic Quadrant [56], [57], [58], [59].

• , -

• , -

• , -

• :

• : PegaSystems, IBM, Appian, Progress Software,

Metastorm — -

• -

•

•

• : Fujitsu, EMC, Global360, Bosh Software Innovations

2.2.2.

:

: Appian BPM Suite[33], OpenText MBPM [50], Cordys BPMS [49], Pegasystems BPM [51], Fujitsu Interstage BPM [41], Tibco Active Matrix BPM [52];

: jBPM [60], BonitaBPM [26], Taverna Workflow [64], Activiti BPM [45], Pegasus [71], Intalio BPMS [55].

.

-

.

:

•

-

;

•

;

•

;

•

.

,

:

•

,

-

;

•

;

•

;

•

.

,

10-

,

(.

).

-

,

,

.

2.2.3.

OpenText (Cordys BPMS, MBPM), Appian. Appian (jBPM, Activiti)

2.2.4.

				-
				.
				-
			.	
	,			
			.	
jBPM	Activiti		,	-
	,		.	

3.1.

· -
-
·
· -

·

3.1.1.

-
-
,
· , [79],
- , —
,
·
,
[79] — ,

[79] —

·
-

TOGAF. TOGAF 9

[42]

· TOGAF ,

	,	-	-
.			
	,		-
GERAM [38].		GERAM	
	,		
	.	GERAM	
		,	-
	.		
3.1.2.			-
	-	.	-
	-		-
	.		-
,			-
.		,	-
	.		
,			
.			
Appian	OpenText MBPM,		
	,		
.			-

3.1.3.

VERAM [21],

GERAM.

VERAM

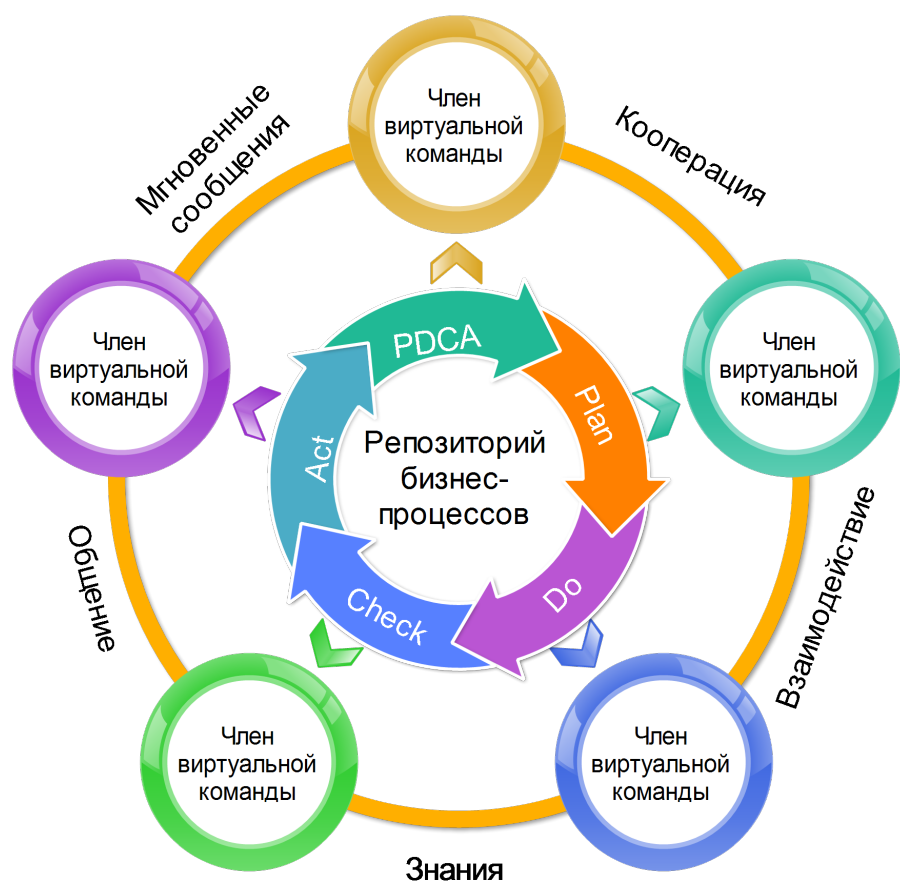
VERAM

3.1.4.

TOGAF.

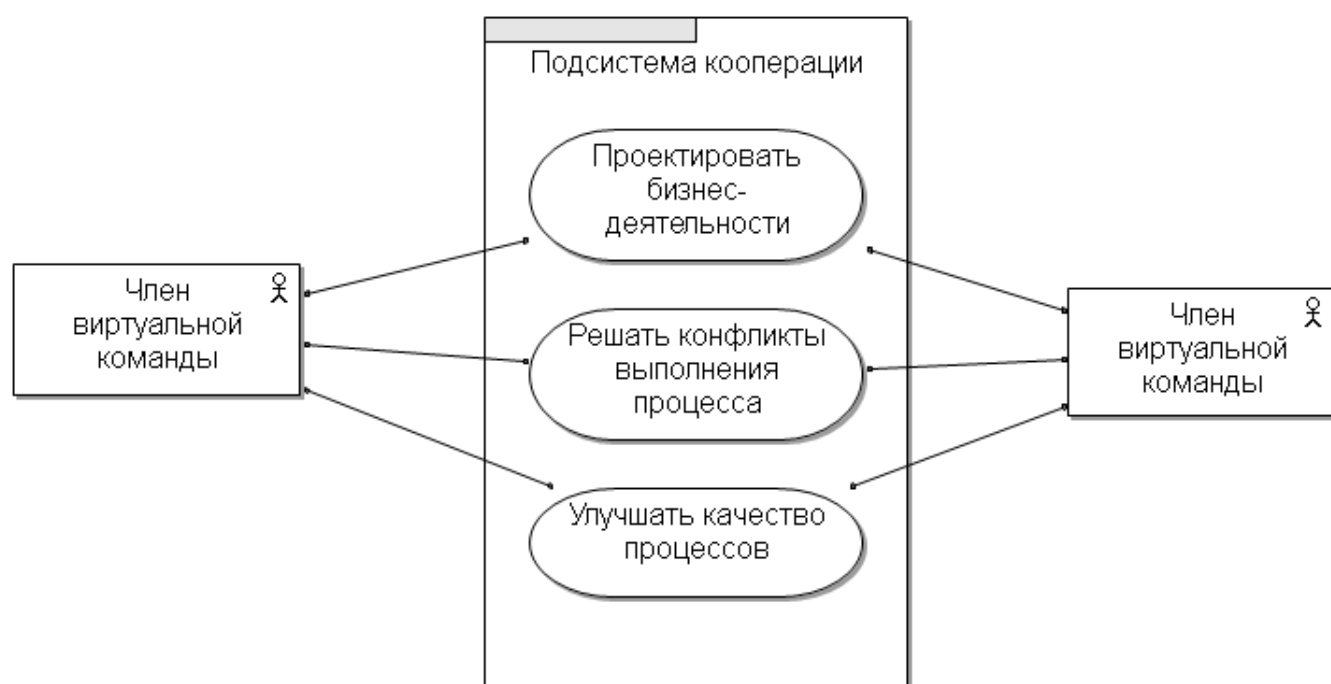
3.2.

3.2.1.



. 3.1.

3.1



. 3.2. :

3.2.2.

jBPM Activiti.

(. 2.2.2 . 30)

jBPM Activiti.

,

,

Activiti.

Activiti

(BPMN 2.0 XML),

jBPM

- ,

jBoss Drools,

XML

jPDL.

Activiti,

[45],

Alfresco [46],

Activiti

Apache,

[39],

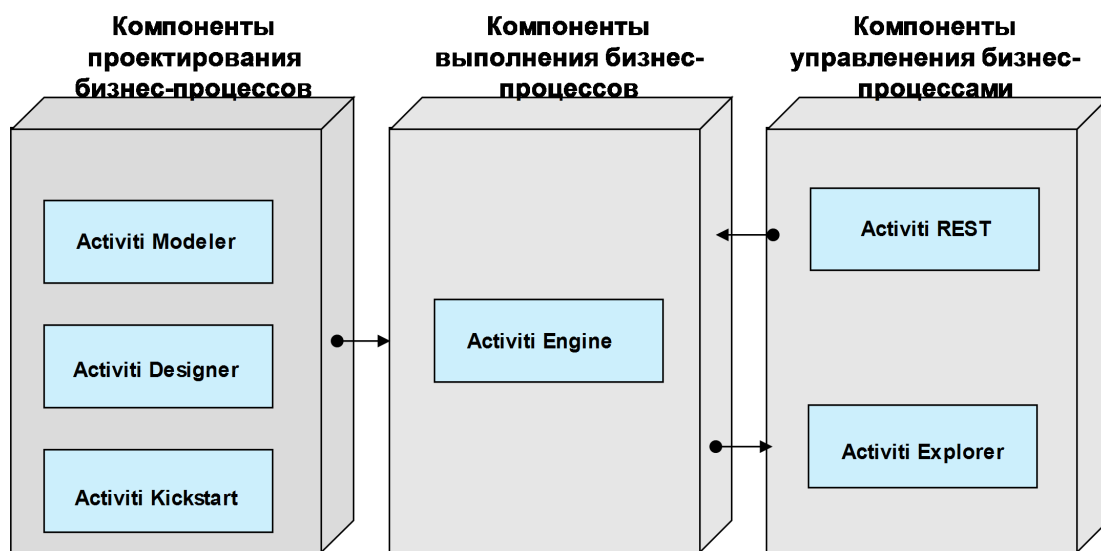
Activiti.

Activiti

(Activiti Modeler, Activiti Designer)

(Activiti Engine). 3.3

Activiti.



3.3. "

Activiti [45]

Eclipse IDE.

BPMN 2.0 XML.

BPMN XML,

git.

git,

[67], [70],

git

XML

git

XMPP.

XMPP

.	Openfire.	XMPP	-
			.
			[40],
			OpenFire [72].
		OpenFire	-
		,	-
		Openfire	-
LDAP,			
	. Openfire		Open Source Apache,
		,	
			.

—

—

1

,

,

—

1

1

.

1. BPM. BPMS (- ,).
URL: <http://abpmp.org.ru/resource/bpm-glossary>. ????
2. eTOM Business Process Framework. URL: <http://www.tmforum.org/businessprocessframework/1647/home.html>. ????
3. SCOR - Supply Chain Council. URL: <http://www.supply-chain.org/scor/>. ????
4. -
(). : - , 2005. 260 .
5.
// . 2003. 4. . 89 –93.
6. . . . : , 2001. 336 .
7.
: . . :
, 2007. 336 .
8. . . I. - :
<< - >>, 2004. 400 .
9. *e* . . : , 2007.
370 .
10. . . , ,
- . : , 2006. 240 .
11. . . - . : -
, 2009. 120 .

12. . . : -
 , 2006. 528 .
13. . . - : : , 1997. 224 . . .
 . . .
14. :
 , 2006. 287 . .
 . . .
15. . . - : , 2006.
 400 .
16. . : ,
 1984. 264 . . .
17. . . : " 2005.
 608 .
18. . . :
 : - , 2002. 504 .
19. . // —
 : . , . , . 1923. .
 - .
20. . . . : -
 : - , 2013. 118 .
21. *A. Zwegers J. Versterager M. Tolle. VERAM: Virtual Enterprise Reference Architecture and Methodology. 2003.*

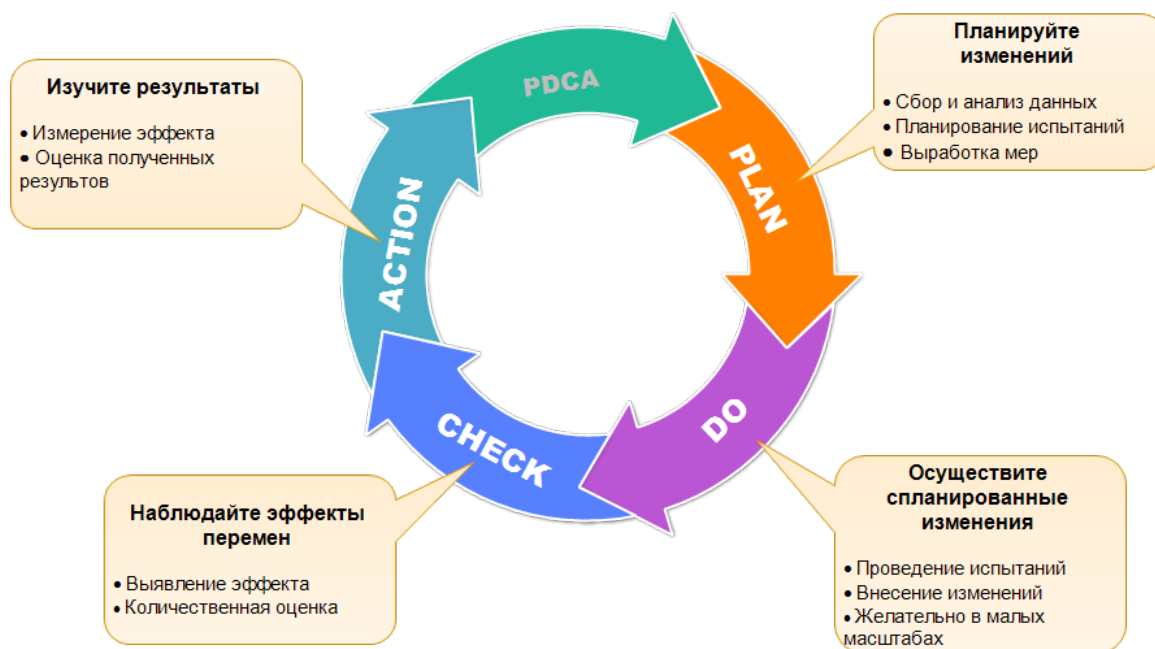
22. *Aalst Kees Max van Hee Wil van der*. Workflow Management. Massachusetts, London: The MIT Press Cambridge, 2002. 363 .
23. *Adams John*. A SMOOTHER FLOW OF WORK // Bank Technology News. 2012. 25, 8. . 22 –25.
24. *AIIM* . Adaptive Case Management. 2010.
25. *Barros O*. Business process patterns and frameworks: Reusing knowledge in process innovation // Business Process Management Journal. 2007. 13, 1. . 47 –69.
26. *Bonitasoft Groupe Bull*. Bonita BPM Suite // [].
<<http://www.bonitasoft.com/>>. (17.12.2013).
27. *Bragonier Dwayne*. WORKFLOW IN A NEW AGE // CA Magazine. 2013. 146, 7. . 30 –34.
28. *C. Clair D. Miers*. The Forrester Wave: Dynamic Case Management, Q1 2011. 2011.
29. *C. Richardson D. Miers*. The Forrester Wave: BPM Suites, Q1 2013. 2013.
30. *Center American Productivity & Quality*. PCF - Process Classification Framework // [].
<<http://www.apqc.org/process-classification-framework>>. (14.12.2013).
31. *Charvat Jason*. Project management methodologies: selecting, implementing, and supporting methodologies and processes for projects. Hoboken, New Jersey: John Wiley & Sons, Inc., 2003. 264 .
32. *Coalition Workflow Management*. Workflow Management Coalition. Terminology & Glossary. Hampshire, United Kingdom: Workflow Management Coalition, 1999. Issue 3.0. 65 .

33. *Corporation Appian.* BPM Suite // [].
<<http://www.appian.com/bpm-software/bpm-suite.jsp>>. (17.12.2013).
34. *D. Duarte N. Snyder.* Mastering virtual teams: strategies, tools, and techniques that succeed. New York: Jossey-Bass Inc., 2001. 256 .
35. *Davenport T.* Process Management for Knowledge Work // Handbook on Business Process Management. Berlin, Heidelberg: Springer, 2010. . 17 –36.
36. *Davenport Thomas H.* Process Innovation: Reengineering Work through Information Technology. Boston, MA, USA: Harvard Business School Press, 1993.
37. *Druker P.* Knowledge-Worker Productivity: The Biggest Challenge. 1999.
38. *Force IFIP-IFAC Task.* GERAM: Generalised Enterprise Reference Architecture and Methodology. 1999.
39. *Foudation The Apache Software.* Apache License, Version 2.0 // []. <<http://apache.org/licenses/LICENSE-2.0.html>>. (18.12.2013).
40. *Foundation XMPP Software.* XMPP Software list // [].
<<http://xmpp.org/xmpp-software/>>. (19.12.2013).
41. *Global Fujitsu.* Interstage BPM Suite // [].
<<http://www.fujitsu.com/global/services/software/interstage/solutions/bpmgt/bpm/>>. (17.12.2013).
42. *Group The Open.* The Open Group Architecture Framework (TOGAF). 2009.
43. *H. Smith P. Fingar.* Business process management: the third wave. 2003.
44. *Hugos M.* Business Agility. Sustainable Prosperity in a Relentlessly Competitive World. 2009.

45. *Inc. Alfresco Software.* Activiti BPM Platform // [].
<<http://www.activiti.org/>>. (17.12.2013).
46. *Inc. Alfresco Software.* Alfresco // [].
<<http://www.alfresco.com>>. (18.12.2013).
47. *Inc Forrester Research.* Forrester Research // [-
]. <<http://www.forrester.com/aboutus>>. (17.12.2013).
48. *Inc. Gartner.* Gartner Inc. // [].
<<http://www.gartner.com/technology/about.jsp>>. (17.12.2013).
49. *Inc. Opentext Software.* Cordys BPMS // [
]. <<http://www.cordys.com/bpms-business-process-management-suite>>.
(17.12.2013).
50. *Inc. Opentext Software.* MBPM (Metastorm BPM) // [-
]. <<http://www.opentext.com/What-We-Do/Products-/Business-Process-Management/Business-Process-Management-BPM-/OpenText-MBPM>>. (17.12.2013).
51. *Inc. Pegasystems.* BPM Suite // []. <<http://www.pegasystems.com/business-process-management-suite>>. (17.12.2013).
52. *Inc. Tibco Software.* Active Matrix BPM Suite // [].
<<https://docs.tibco.com/products/tibco-activematrix-bpm-2-2-0>>. (17.12.2013).
53. *Institute Project Management.* A Guide to the Project Management Body of Knowledge (PMBOK Guide) - Fifth Edition. 2004. 388 .
54. *Institute Project Management.* A Guide to the Project Management Body of Knowledge (PMBOK Guide) - Third Edition. 2004. 388 .
55. *Intalio* . Open Source BPM Suite // [].
<<http://www.intalio.com/products/bpms/overview/>>. (17.12.2013).

56. *J. Hill E. Deitert M. Kerremans M. Cantara.* Magic Quadrant for Business Process Management Suites. 2007.
57. *J. Hill M. Kerremans D. Plummer M. Cantara.* Magic Quadrant for Business Process Management Suites. 2009.
58. *J. Sinur J. Hill.* Magic Quadrant for Business Process Management Suites. 2010.
59. *J. Sinur J. Hill T. Jones W. Schulte.* Magic Quadrant for Intelligent Business Process Management Suites. 2012.
60. *JBoss Red Hat.* Community jBPM Suite // [].
<<http://www.jboss.org/jbpm/>>. (17.12.2013).
61. *K. Swenson N. Palmer.* Taming the Unpredictable. 2011.
62. *L. Sanchez R. Nagi.* A review of agile manufacturing systems // International Journal of Production Research. 2001. 39, 16. . 3561 –3600.
63. *M. El-Mekawy N. Ahmed K. Shahzad.* Modeling and Managing Business Processes // Handbook on Business Information Systems. Singapore: World Scientific Publishing Co., 2010. 943 .
64. *Manchester University of.* Taverna Workflow Management System // [-
]. <<http://www.taverna.org.uk/>>. (17.12.2013).
65. *O. Barros C. Julio.* Enterprise and process architecture patterns // Business Process Management Journal. 2011. 17, 4. . 598 –618.
66. *OMG .* Business Process Model and Notation (BPMN) Version 2.0. 2011. .
. . elma-bpm.ru.
67. *Opensource .* Distributed Git - Distributed Workflows // [].
<<http://git-scm.com/book/Distributes-Workflows>>. (19.12.2013).

68. *P. Dadam M. Reichert. ADEPT2. Next Generation Process Management - Technology. 2007.*
69. *P. Dadam M. Reichert. From ADEPT to AristaFlow BPM Suite: A Research Vision has become Reality // Business Process Management Workshops. 2010.*
70. *Potter S. Git // The Arhitecure of Open Source Applications. 2011.*
71. *Project The Pegasus. Workflow Management System // [].*
<<http://pegasus.isi.edu/>>. (17.12.2013).
72. *Realtime Ignite. Openfire real time collaboration server // [].*
<<http://igniterealtime.org/projects/openfire>>. (19.12.2013).
73. *Richardson C. The Forrester Wave: Bussiness Process Management Suites, Q3 2010. 2010.*
74. *T. Davenport S. Jarvenpaa. Knowledge Work Process // Sloan management review. 1996.*
75. *Vollmer K. The Forrester Wave: Itegration-Centric Bussiness Process Management Suites, Q4 2008. 2008.*
76. *W. Aalst T. Baster. Adaptive Workflow // Enterprise Information Systems. 2000. . 63 –70.*
77. *W. van der Aalst A. ter Hofstede. YAWL: Yet Another Workflow Language (Revised Version). Queensland University of Technology, Brisbane, 2003.*
78. *Wysocki Robert K. Effective Project Management. Traditional, Agile, Extreme. Indianapolis: John Wiley & Sons, Inc., 2012. 6th edition. 710 .*
79. *Zachman J.A. A framework for information systems architecture // IBM Systems Journal. 1987. 26, 3. . 276 –292.*



. .1. "

-

[9, . 97]

.1.

.1.

	Des	Org	Ctrl	Res
Appian BPM Suite	9	8	9	7
OpenText MBPM	8	7	8	10
Cordys BPMS	10	8	6	9
Pegasystems BPM	10	9	10	9
Fujitsu Interstage BPM	7	7	6	5
Tibco Active Matrix BPM	6	10	9	9
jBPM	8	7	8	7
BonitaBPM	8	8	10	7
Taverna Workflow	5	10	6	7
Activiti BPM	7	6	7	5
Pegasus	5	10	8	8
Intalio BPMS	9	6	8	5

Des

Org

Ctrl

Res

.2.

.2.

	Des	Org	Ctrl	Res
Appian BPM Suite	8	5	8	6
OpenText MBPM	7	8	6	7
Cordys BPMS	3	10	3	1
Pegasystems BPM	4	10	5	9
Fujitsu Interstage BPM	8	5	8	8
Tibco Active Matrix BPM	0	1	2	0
jBPM	2	6	2	0
BonitaBPM	7	5	3	3
Taverna Workflow	3	2	4	0
Activiti BPM	0	2	0	2
Pegasus	1	0	1	0
Intalio BPMS	1	1	3	1

VE
LC
KM
AM