



Cloud Computing Survey

Perception of the
companies

DPDP - Macedonia

Survey regarding the awareness of the companies in relation to Cloud computing in Macedonia

Executive summary

The survey was conducted on 249 companies with different size and coming from various sectors, in cooperation between the Directorate for Personal Data Protection and MASIT (Economic Chamber for Information and Communication Technologies). Realized in the period of big movements in the sphere - launching of two new providers of cloud computing – „Neocloud“ and „Telecom Cloud partnerships“ and when the surveys show that until 2015 one third of the global data will be transferred through „cloud“¹, the survey is dealing with a subject that becomes every day more and more important in Macedonia as well.

The results point towards the fact that the term „cloud computing“ still lacks recognition, in the sense that there is just partial awareness present amongst the companies. Still, almost two thirds from the participants in the survey claim that they know what the term represents at least partially. As biggest perceived advantage for using cloud computing (both amongst those that already use it as well as within that still haven't started) is the possibility to access the data from any location and any time, better access to services, decreased expenses, availability, easier cooperation, easier data recovery etc. The importance of the personal data and its protection as a primary goal of this research, is acknowledged with the fact that the lowest perceived advantage by the companies is the security and control of the data.

Looking at the biggest disadvantages shows that lack of appropriate training is believed to be most influential in the decision not to use the Cloud, but also the insufficient technical support, the complications related to data migration etc.

More than half of the included companies have stated that they don't use cloud computing, while 42% of them stated that they do (most of them have 1-50 employees), while small percentage plan to introduce it in their company. Still, taking into consideration that the term doesn't have enough recognition within the companies, especially those that don't belong in the IT sector, it can be said that there are such using it but simply not aware. More than half use it for internal purposes (most often for e-mail, but also data bases and other needs) while 44% use it for both internal needs and for third parties. Talking about offering services to third parties, most of the companies work with direct users, but there are such that offer the services to other companies, as well as those that combine the above.

Most offered service is the software (SaaS) as it is chosen from more than half of those that offer the service, but also big percentage have chosen Infrastructure as service (IaaS) and Platform as service (PaaS). Most present are those companies that have up to 50 records of personal data information and those are most often kept in Macedonia.

Biggest number of companies believe that the data in the cloud is safe. Still, almost one third are either not sure or don't know at all. Biggest number of those that have answered the questionnaire are aware that while using cloud services they should lean on the legislation for personal data protection in order to protect themselves from computer crime, so the rule books (for personal data protection) are the main choice for such protection for 80% of the surveyed, followed by those that have chosen Firewall and ISO standards for IT security. More of the

¹ Based on a statement on the press conference of T-Mobile in Macedonia

companies use multiple ways of protection, including other ways of protection such as encryption, log management, DDoS, NGFW, international certificates etc. 80% from the companies have personal data protection officer and in 66% of those companies this person is responsible for protection of the data in the cloud as well. Surprisingly, the companies that are offering cloud computing as service towards external parties believe that those are safe more often compared to those that use them only for internal usage, which can be based on the greater knowledge regarding the subject within this target audience.

Regarding the legislation, the results show that only 20% from the surveyed have knowledge on this subject. Remarkable 62% are not at all aware that there is a Law for personal data protection, while 18% believe that there is a separate Law covering this subject. As it can be expected, those that don't use as well as those that are in just in the planning phase to introduce cloud computing know least about the existing legislation.

The qualitative part of the survey, conducted through discussions with professionals in the IT sector have confirmed the results from the quantitative part – the fact is that this target audience (unlike the rest of the companies) is much better informed regarding the subject, therefore those that offer or intensively use such services are more likely to be the ones to lead the regulation rather than just to follow. The continual, daily monitoring of what is going on with the subject, combined with the new problems that arise and for which solutions should be found, as well as the need to stay within the borders of what is legally allowed makes them most relevant for completing the regulation for cloud computing that would be good to exceed the policy level, moving towards full control not only regarding keeping but also accessing the personal data.

Methodology

The quantitative survey was conducted through questionnaire with 20 questions from closed type, 4 of which contained the variables. The questionnaire was designed for companies from different size and sectors, revolved around the awareness and perceptions connected to cloud computing in Macedonia, and the possibility to answer was also allowed to the companies that don't use it yet. Those representatives answering the survey, were given slightly different way of moving through the questionnaire. The questionnaire was designed using the Qualtrix system and distributed via e-mail - in cooperation with MASIT it was sent to their members, but it was also distributed through the Directorate for Personal Data Protection using its own data base. The mail that accompanied the link to the questionnaire contained explanation that the survey is anonymous and guidelines were given so that the questionnaire should be filled in by persons that are part of the management, IT or personal data protection officers.

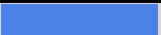









Structure

The survey involved 249 companies, from the sector of education, ICT, healthcare, banking and finance, telecommunications, insurance, civil society organizations but also government institutions, municipalities, notaries, chambers of commerce, companies dealing in consultancy etc. 40% of them stated to have 50-250 employees, 35% have 10-50 employees, followed by those with 1-10 employees and those with over 250 employees (i.e. 9% belong to large companies). 33% of those who answered the questionnaire are part of the administration of the company, 22% are managers and with identical percent are the representatives from the IT department, 13% said that they belong to another part of the company, 6% are employed in the financial department, and 4% in sales.

The biggest part of the respondents belong to the most important target group – the management or the IT sector, however it seems that the personal data protection officers are part of the administration in the companies, and therefore were relevant to complete the questionnaire. This is confirmed by the fact that 63% of those who answered the questionnaire are personal data protection officers in the companies in which they work.


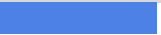
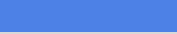

RESULTS

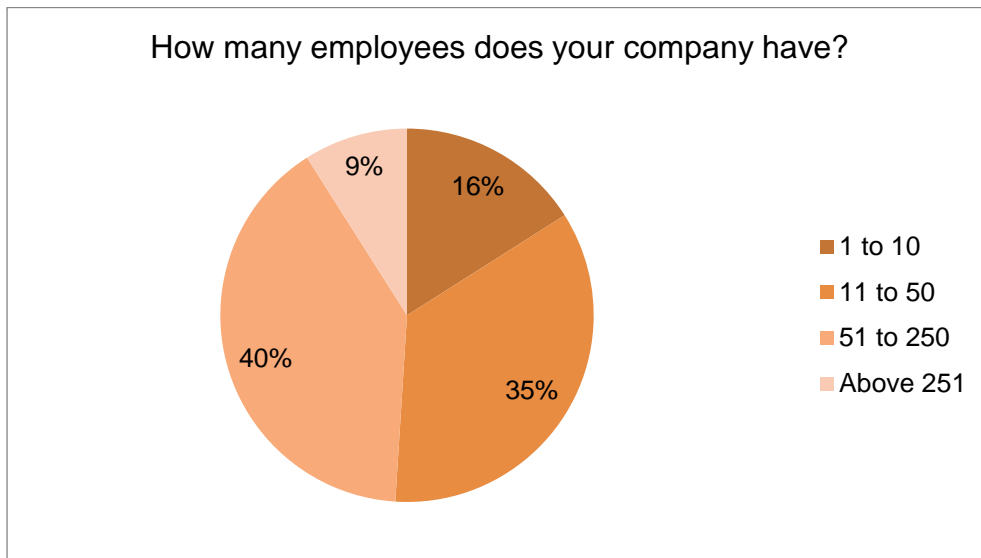
1. Your company belongs to the sector:

1	a. Education		35%
2	b. ITC		11%
3	c. Telecommunication		4%
4	d. Production		3%
5	e. Research and development		2%
6	f. Health		6%
7	g. Banking and financial services		6%
8	h. Real estate		0%
9	i. Insurance		4%
10	j. Media		0%
11	k. Civil society organizations		3%
12	Other		28%
Total			100%

The survey involved 249 companies, from the following sectors: education, ICT, healthcare, banking and finance, telecommunications, insurance, civil society organizations but also government institutions, municipalities, notaries, chambers of commerce, consultancy etc.

2. How many employees does your company have?

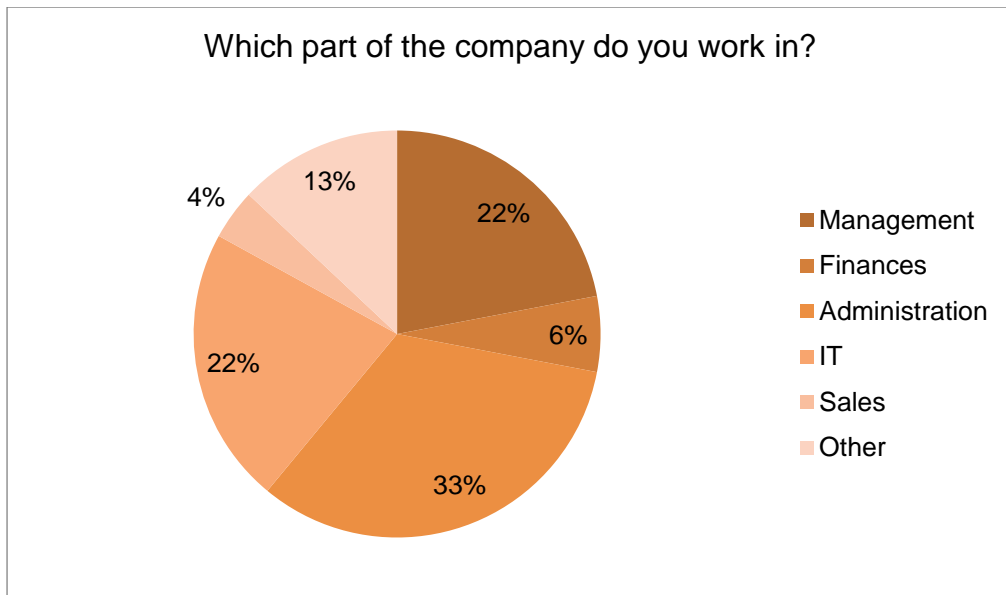
1	1-10		16%
2	11-50		35%
3	51-250		40%
4	Above 251		9%
Total			100%



40% of companies that responded to the questionnaire have 51-250 employees (i.e. belonging to the category of medium-sized enterprises), 35% have 11-50 employees (small businesses), followed by those with 1-10 employees (micro, 16%) and those over 250 employees (i.e. 9% belong to large companies).

3. Which part of the company do you work in?

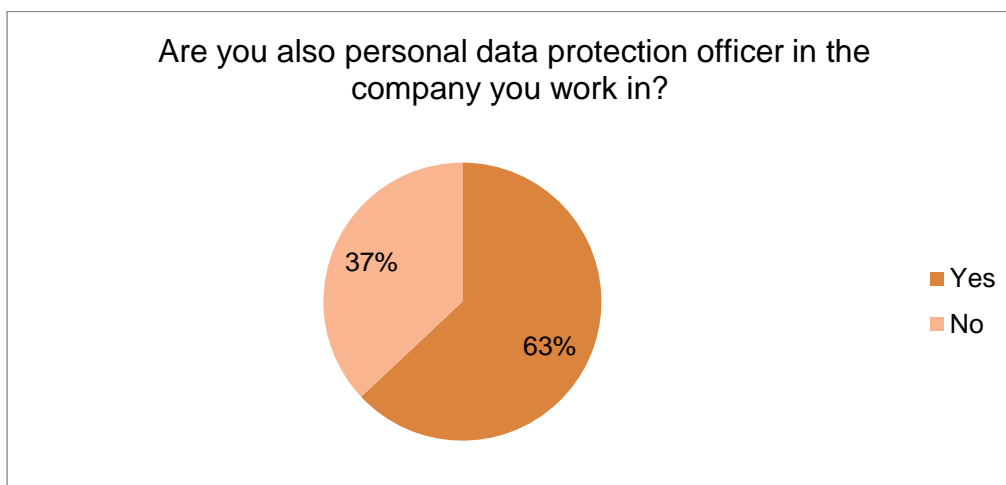
1	a. Management	22%
2	b. Finances	6%
3	c. Administration	33%
4	d. IT	22%
5	e. Sales	4%
6	f. Other	13%
Total		100%



33% of those who answered the questionnaire are part of the administration of the company, 22% are managers with identical percentage are represented those from the IT department, 13% said that they belong to another part of the company, 6% are employed in the financial department and 4 % in sales. Most of the respondents belong to the most important target group - management or IT sector, however it seems that the personal data protection officers in companies belong in the administration, and therefore were relevant to complete the questionnaire.

4. Are you also personal data protection officer in the company you work in?

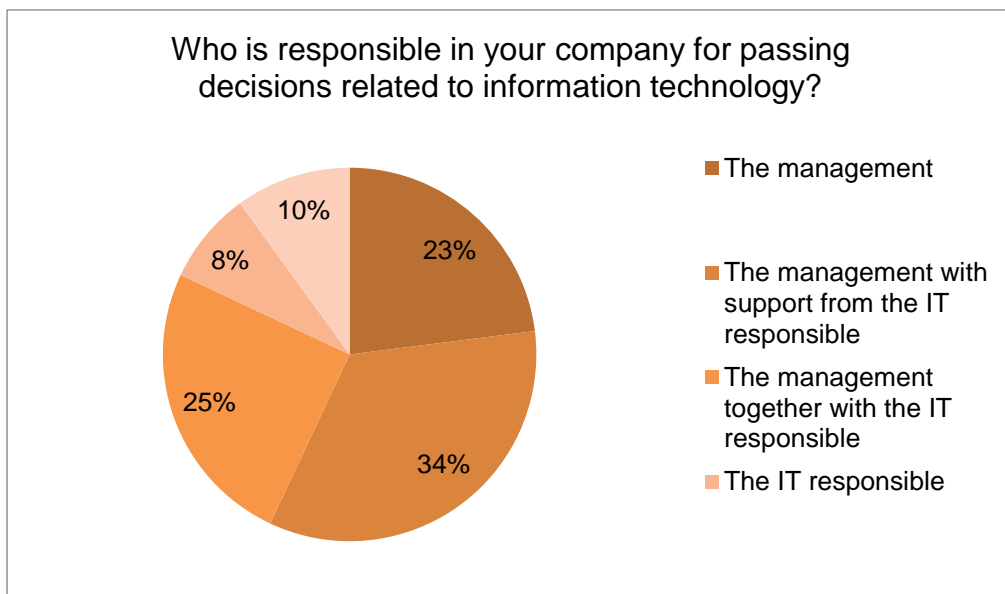
1	Yes	63%
2	No	37%
Total		100%



63% of those who answered the questionnaire are personal data protection officers in the companies in which they work in. 37% are not.

5. Who is responsible in your company for passing decisions related to information technology?

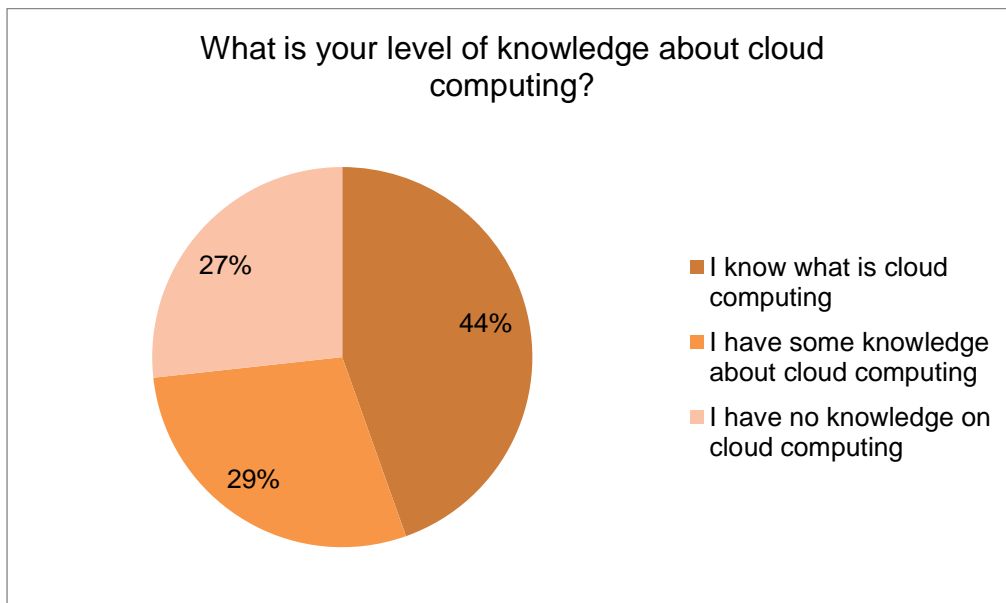
1	a. The management	23%
2	b. The management with support from the IT responsible	34%
3	c. The management together with the IT responsible	25%
4	d. The IT responsible	8%
5	e. Other	10%
Total		100%



The decisions related to information technology management is often brought by the management with support by the IT responsible (or department) - it is the case in 34% of companies. Immediately after them with almost identical results are those that make decisions together with the IT responsible (25%), or the decisions are done only by the management (23%). Less frequent, but still present is some totally different way (10%) - steering committee, Supervisory Board etc. but this category often also includes the management or the IT responsible (Director, IT Manager). Rarest, yet present is the situation where only the person responsible for IT makes the decisions (8% of the responses).

6. What is your level of knowledge about cloud computing?

1	a. I know what is cloud computing	45%
2	b. I have some knowledge about cloud computing	29%
3	c. I have no knowledge on cloud computing	27%
Total		100%



45% of respondents claim to know what is cloud computing, and together with those who say that they have some knowledge (29%) they reach 74%. However, almost one third (27%) do not know what the term cloud computing refers to, which doesn't mean that they don't use it.

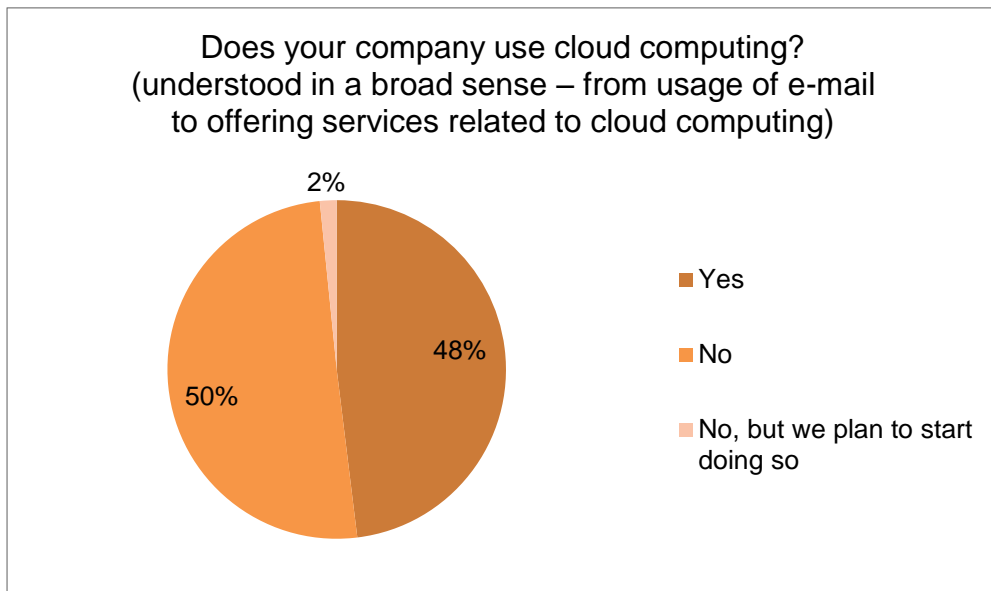
7. Regardless if your company offers or uses cloud computing or no, please indicate from the list below which of the items and to what extent you consider advantage for using cloud computing (1 – I do not consider it advantage at all to 5 – I consider it a big advantage).

		1	2	3	4	5	Total	Av.
1	Availability and easy access to hardware and software	5	7	40	40	60	152	3.94
2	Better data safety and control	13	15	44	34	46	152	3.56
3	Better organization of the data	10	5	46	42	50	153	3.76
4	Easier cooperation / information exchange with other organizations	7	8	36	39	61	151	3.92
5	Better quality of service /products	4	14	44	33	56	151	3.81
6	Better access to services that are offered on--line	7	8	30	38	68	151	4.01
7	Better gathering and data processing	10	6	41	35	57	149	3.83
8	Access to the data at anytime / from any location	4	2	24	26	94	150	4.36
9	Better economic efficiency (reduced capital investment)	5	9	32	38	65	149	4.00
10	Reduced IT staff needed for systems support	8	18	38	38	47	149	3.66
11	Reduced system administration	5	11	39	41	53	149	3.85
12	Easier data recovery	5	13	32	40	56	146	3.88

While ranking the advantages of using cloud computing the feature that was considered as the biggest advantage is the ability to access the data at any time and from any place (rated with an average of 4.36 out of a possible 5), better access to services (4.1), reduced costs (4), availability, easier collaboration, easier data recovery etc. Although all features individually were perceived more positive than negative (the average was always above 3), however, the feature evaluated as one with the smallest advantage was safety and control of the personal data (3.56). This points to the fact that the issues related to personal data is something that concerns most of the users as well as the potential users.

8. Does your company use cloud computing? (understood in a broad sense – from usage of e-mail to offering services related to cloud computing)

1	a. Yes		42%
2	b. No		44%
3	c. No, but we plan to start doing so		14%
Total			100%

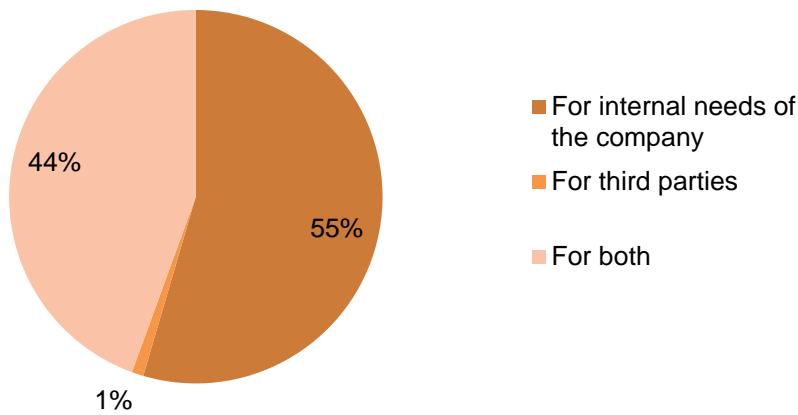


58% of the companies said they don't use cloud computing, but 14% of them plan to introduce it. 42% said they are using some sort of cloud computing.

9. If you are using cloud computing, please tell us what you use it for:

1	a. For internal needs of the company		54%
2	b. For third parties		1%
3	c. For both		44%
Total			100%

If you are using cloud computing, please tell us what you use it for:

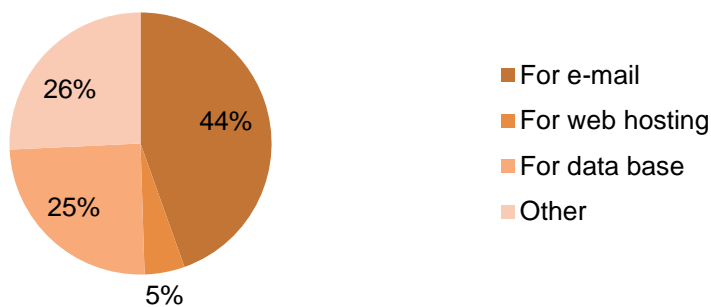


From the 42% of those who use cloud computing, only one percent use it for external purposes - for third parties, while the highest percentage - more than half of the surveyed (54%) use it for personal needs. 44% have stated that they use it both for their own, internal needs and towards third parties.

10. If you use it for internal needs only, please tell us what that is specifically:

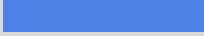

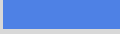
1	a. For e-mail	45%
2	b. For web hosting	5%
3	c. For data base	25%
4	d. Other	26%
Total		100%

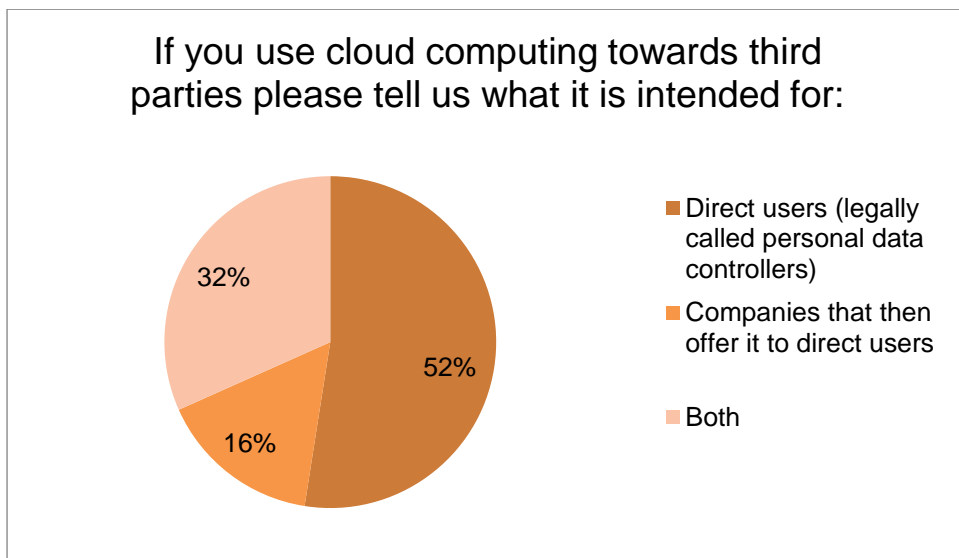
If you use it for internal needs only, please tell us what that is specifically:



From the 54% of the companies that use cloud computing for own needs, most of them use it for e-mail which occurs in 45% of those companies, followed by those that use it for databases (25%) and other uses (such as book keeping, various applications etc.). Only 5% of the companies reported that they use cloud computing for hosting web pages.

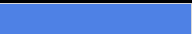

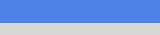

11. If you use cloud computing towards third parties please tell us what it is intended for:

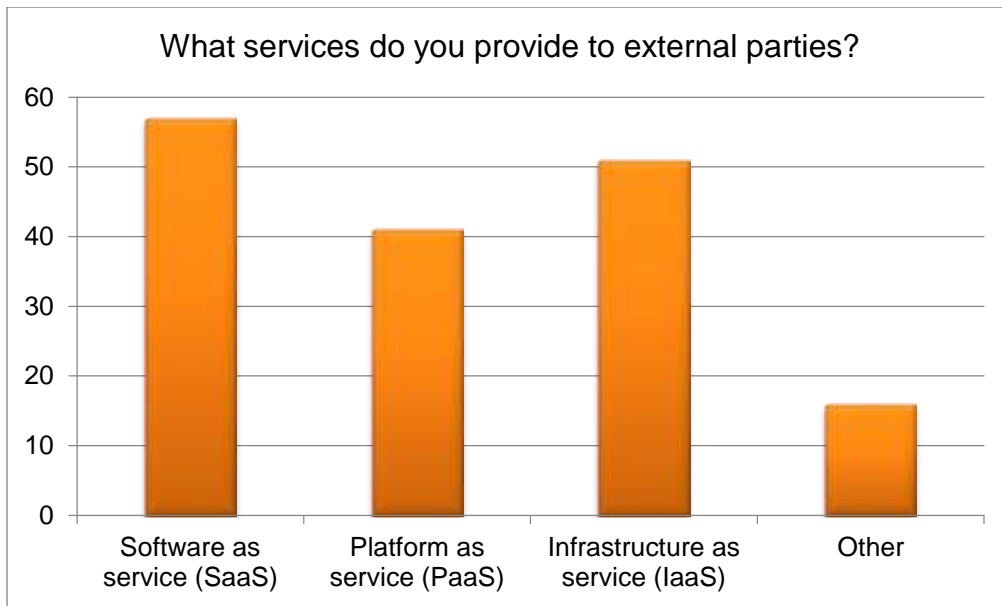
1	a. Direct users (legally called personal data controllers)		53%
2	b. Companies that then offer it to direct users		16%
3	c. Both		32%
Total			100%



Of those 45% that use cloud computing both towards the external audience as well as internally, 53% offer it to direct users (i.e. the controllers of personal data), 16% of companies offer the service to companies that then offer it to third parties, and 32% use both of this ways.

12. What services do you provide to external parties?

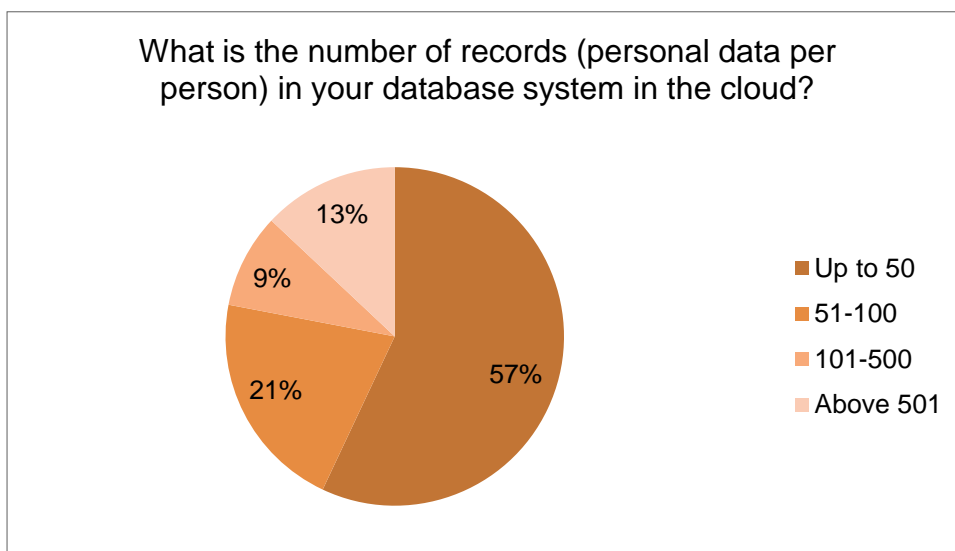
#			%
1	a. Software as service (SaaS)		57%
2	b. Platform as service (PaaS)		41%
3	c. Infrastructure as service (IaaS)		51%
4	d. Other		16%



Of those offering services to external parties, most common is offering software as a service (SaaS) chosen by over half of the companies participating in the survey (57%), but this question that has possibility for more responses, 51% said that they also offer Infrastructure as service (IaaS), 41% Platform as a service (PaaS), and other services such as supervision (16%).

13. What is the number of records (personal data per person) in your database system in the cloud?

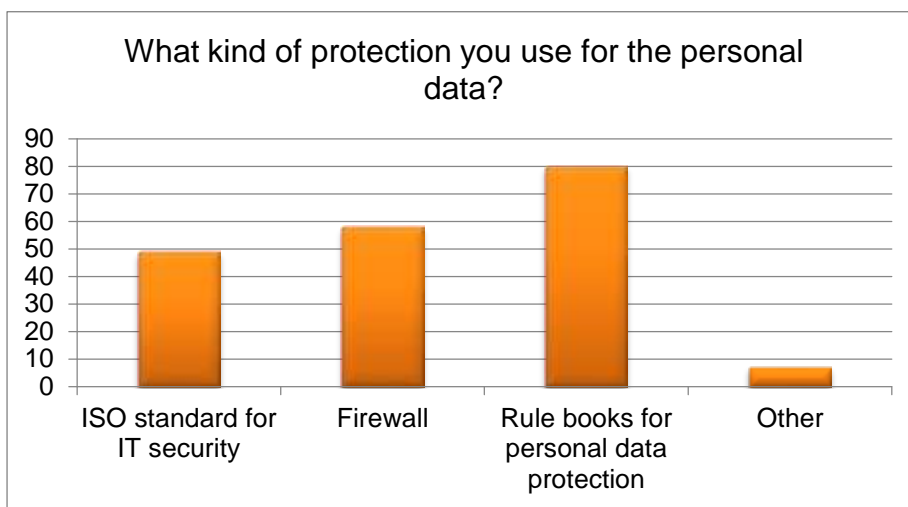
1	a. Up to 50	57%
2	b. 51-100	21%
3	c. 101-500	9%
4	d. Above 501	13%
Total		100%



From those offering cloud computing to third parties, most common are those database with personal records is up to 50 (57%), followed by those with 51-100 records (21%), above 501 (13%) and between 101-500 (9 %).

14. What kind of protection you use for the personal data?

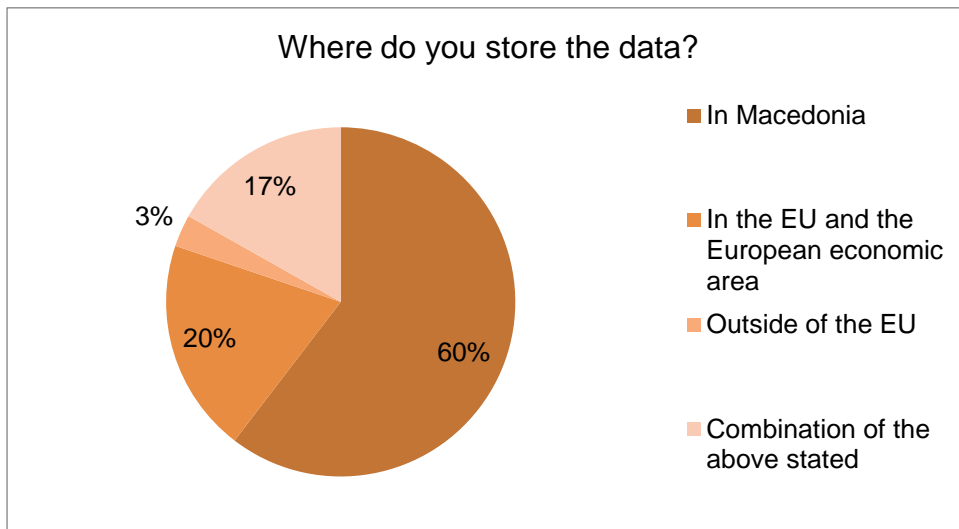
1	a. ISO standard for IT security	49%
2	b. Firewall	58%
3	c. Rule books for personal data protection	80%
4	d. Other	7%



The most common way used for protection are the Rule books for personal data protection, as answered by 80% of the respondents. However, one should take into consideration that 63% of the respondents are personal data protection officers, and consequently are familiar with the regulations. Firewall protection is indicated by 58% of companies and 49% also chose ISO standard for IT security. This indicates that more companies use multiple types of protection, or combined methods. 7% of respondents included other forms of protection such as encryption, log management, DDoS, NGFW, international certificates etc.

15. Where do you store the data?

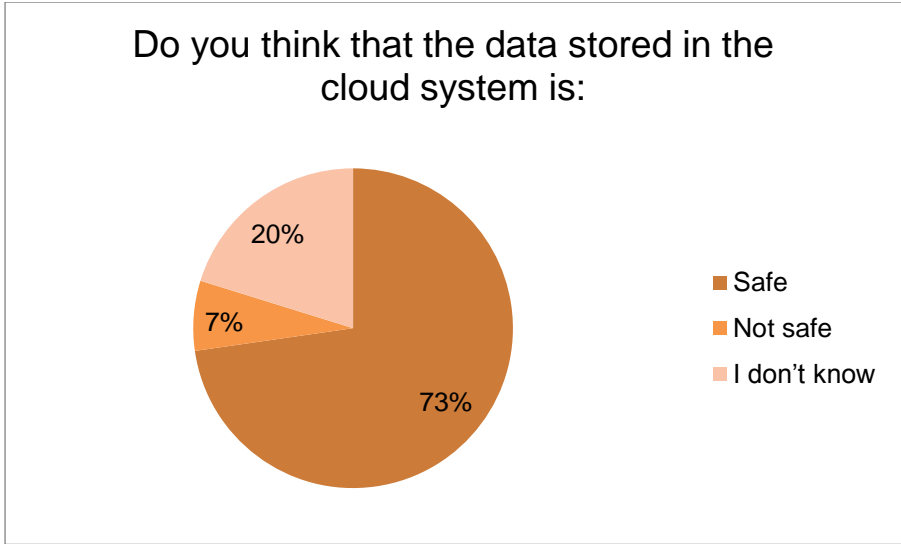
1	a. In Macedonia	61%
2	b. In the EU and the European economic area	20%
3	c. Outside of the EU	3%
4	d. Combination of the above stated	17%
Total		100%



Most companies claim to keep the data in Macedonia (61%), 20% in the European Union or the European Economic Area, while 17% combine multiple locations. Only 3% of companies said that they keep the data outside the EU, but haven't stated where.

16. Do you think that the data stored in the cloud system is:

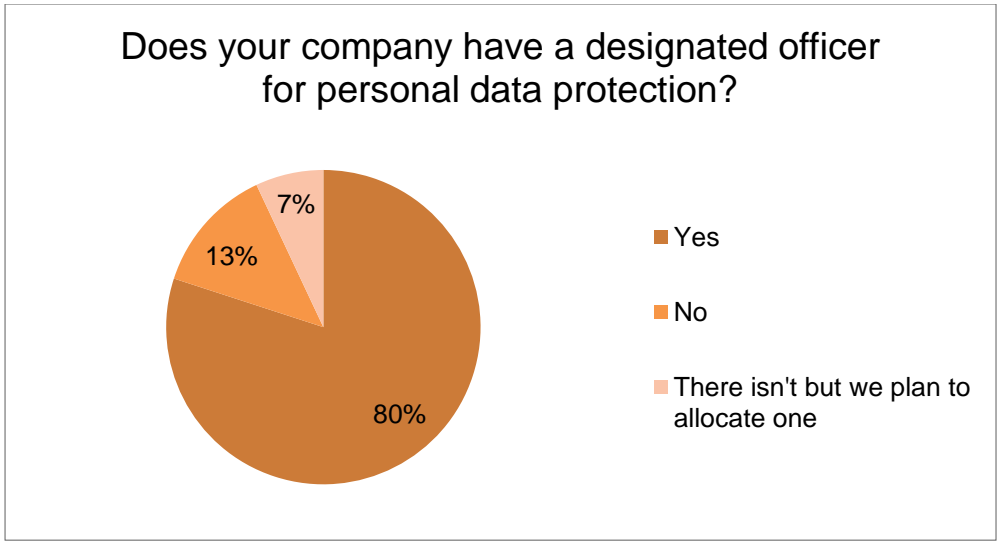
1	a. Safe	72%
2	b. Not safe	7%
3	c. I don't know	20%
Total		100%



72% of enterprises believe that the data in the cloud is secure. However, almost one third are not reliable or don't know (27%).

17. Does your company have a designated officer for personal data protection?

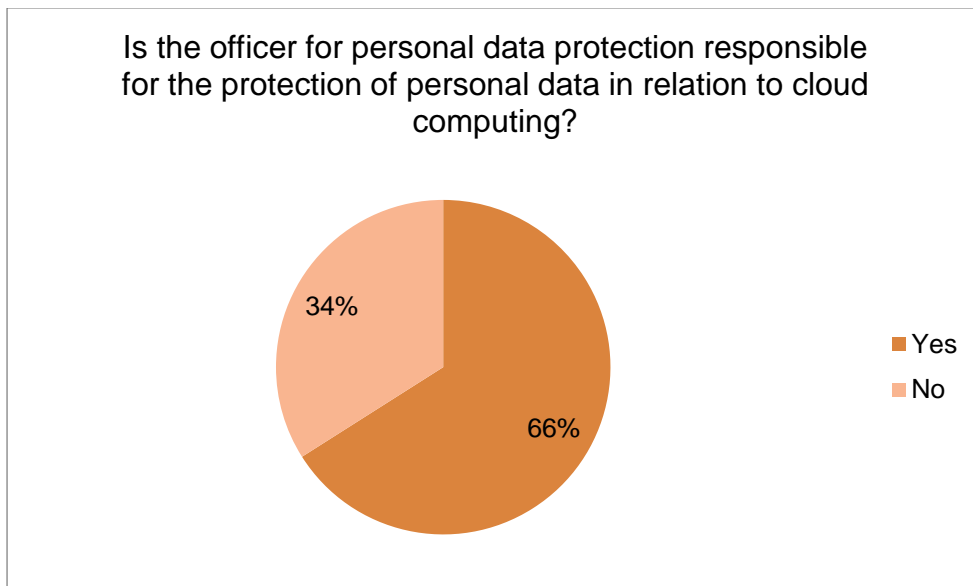
1	a. Yes		80%
2	b. No		13%
3	c. There isn't but we plan to allocate a person		7%
Total			100%



80% of the companies that have answered the questionnaire have an officer for personal data protection, 13% don't, while 7% plan to allocate such person.

18. Is the officer for personal data protection responsible for the protection of personal data in relation to cloud computing?

1	a. Yes		66%
2	b. No		34%
Total			100%

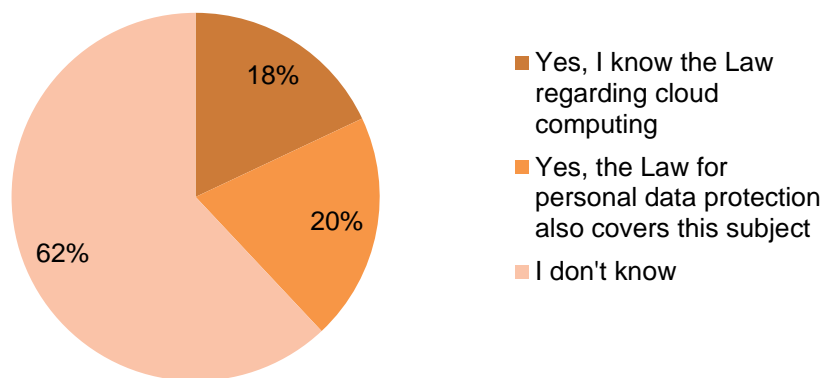


Within 66% of the companies, the personal data protection officer is the one that is responsible for protecting the data on the cloud.

19. Are you familiar with the legislation in relation to cloud computing?

1	a. Yes, I know the Law regarding cloud computing		18%
2	b. Yes, the Law for personal data protection also covers this subject		20%
3	c. I don't know		62%
Total			100%

Are you familiar with the legislation in relation to cloud computing?



The correct answer that the Law on personal data protection is the one that covers the issue of cloud computing is known to only 20% of respondents. 62% don't know that such Law exists, and 18% believe that there is a special law covering this issue.

20. If your organization doesn't use cloud computing can you please point out to the reasons (1 – major disadvantage, 5 – small disadvantage).

		1	2	3	4	5	Total	Av.
1	The cloud computing is not organized in a way that my organization can depend on it	14	17	40	11	18	100	3.02
2	Insufficient incentive for using the Cloud services	20	17	39	10	15	101	2.83
3	General resistance to change	16	14	40	15	15	100	2.99
4	Due to legal regulations - not transmitting data abroad	25	16	35	7	16	99	2.73
5	Concerns regarding integrating in the Cloud with the existing IT applications	24	11	37	11	13	96	2.77
6	Concerns over data security and privacy protection of personal data	24	18	30	8	15	95	2.71
7	Concerns over not losing the data	23	15	32	12	15	97	2.80
8	General lack of confidence in the Cloud computing model and Cloud providers	15	17	40	7	16	95	2.92
9	The data is used for commercial purposes, and not for the purpose for which it is collected	15	16	38	9	16	94	2.95
10	We are investing in own network infrastructure, and wouldn't receive sufficient support or saving	22	16	33	9	15	95	2.78
11	Lack of adequate training	33	21	25	4	14	97	2.43
12	Lack of technical support from the Cloud providers	22	22	33	8	11	96	2.63
13	The migration of existing applications is	27	17	31	7	13	95	2.60

	too difficult / costly							
14	The monthly costs are too high	20	18	32	12	13	95	2.79
15	The installation and configuration are too expensive	17	20	37	8	11	93	2.74
16	The management does not understand / support the use of Cloud computing	22	17	34	10	15	98	2.79
17	I have no detailed knowledge of what is Cloud computing (from legal, IT and practical aspect) to know what are the obstacles	24	16	31	6	23	100	2.88

This part of the survey, that was answered only by those that still don't use Cloud reveals that lack of training is perceived as one of the biggest drawbacks when it comes to using it. This is followed by the insufficient technical support, complications associated with the migration of data and so on. As minor flaws are considered the organization of the Cloud and general resistance to change.

Annex 1 – cross tabulation

		4. Are you also personal data protection officer in the company you work in?		Total
		Yes	No	
6. What is your level of knowledge about cloud computing?	a. I know what cloud computing is	41	38	79
		36.61%	56.72%	44.13%
	b. I have some knowledge about cloud computing	35	17	52
		31.25%	25.37%	29.05%
	I have no knowledge on cloud computing	36	12	48
		32.14%	17.91%	26.82%
Total	112	67	179	
	100.00%	100.00%	100.00%	

It is surprising that a large percentage (over 56%) of those that are not personal data protection officers claim to know what cloud computing is.

		5. Who is responsible in your company for passing decisions related to information technology?					Total
		a. The management	b. The management with support from the IT responsible	c. The management together with the IT responsible	d. The IT responsible	e. Other	
6. What is your level of knowledge about cloud computing?	b. The management with support from the IT responsible	17	25	26	7	5	80
	c. The management together with the IT responsible	41.46%	40.98%	59.09%	46.67%	29.41%	44.94%
	d. The IT responsible	10	22	12	3	5	52
	e. Other	24.39%	36.07%	27.27%	20.00%	29.41%	29.21%
	I have no knowledge on cloud	14	14	6	5	7	46

	computing	34.15%	22.95%	13.64%	33.33%	41.18%	25.84%
	Total	41	61	44	15	17	178
		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

The companies in which the management together with IT responsible make the decisions connected to cloud computing claim to that know the most regarding the subject compared to other surveyed groups.

		2. How many employees does your company have?				
		01-10	10-50	50-250	Above 250	Total
8. Does your company use cloud computing?	a. Yes	14	32	20	8	74
		50.00%	50.79%	29.85%	47.06%	42.29%
	b. No	8	23	38	6	75
		28.57%	36.51%	56.72%	35.29%	42.86%
	c. No, but we plan to introduce it	6	8	9	3	26
		21.43%	12.70%	13.43%	17.65%	14.86%
Total	28	63	67	17	175	
	100.00%	100.00%	100.00%	100.00%	100.00%	

The research shows that most of the companies that use cloud computing have between 1-50 employees.

		9. If you are using cloud computing, please tell us what you use it for:			
		a. For internal needs of the company	b. For third parties	c. For both	Total
2. How many employees does your company	01-10	8	0	4	12

have?		22.22%	0.00%	13.33%	18.18%
	10-50	5	0	22	27
		13.89%	0.00%	73.33%	40.91%
	50-250	17	0	2	19
		47.22%	0.00%	6.67%	28.79%
	Above 250	6	0	2	8
		16.67%	0.00%	6.67%	12.12%
	Total	36	0	30	66
100.00%		100.00%	100.00%	100.00%	

The companies that have between 50-250 employees often use cloud computing for their internal needs, while those with between 10-50 employees use it towards third parties as well as their personal needs.

		4. Are you also personal data protection officer in the company you work in?		
		Yes	No	Total
19. Are you familiar with the legislation in relation to cloud computing?	a. Yes, I know the Law regarding cloud computing	15	8	23
		15.79%	13.79%	15.03%
	b. Yes, the Law for personal data protection also covers this subject	18	11	29
		18.95%	18.97%	18.95%
	c. I don't know	62	39	101
		65.26%	67.24%	66.01%
Total	95	58	153	
	100.00%	100.00%	100.00%	

The officers for personal data protection as well as those who are not are equally familiar with the legislation in terms of cloud computing.

		9. If you are using cloud computing, please tell us what you use it for:			
		a. For internal needs of the company	b. For third parties	c. For both	Total
16. Do you think that the data stored in the cloud system is:	a. Safe	25	0	24	49
		71.43%	0.00%	77.42%	73.13%
	b. Not safe	2	1	2	5
		5.71%	100.00%	6.45%	7.46%
	c. I don't know	8	0	5	13
		22.86%	0.00%	16.13%	19.40%
Total	35	1	31	67	
		100.00%	100.00%	100.00%	100.00%

Surprisingly but companies that use cloud computing as a service to third parties believe that they were safe at slightly greater degree than those who use only for internal purposes. This may be based on greater knowledge on the issue within this surveyed group.

		6. What is your level of knowledge about cloud computing?			
		a. I know what is cloud computing	b. I have some knowledge about cloud computing	c. I have no knowledge on cloud computing	Total
19. Are you familiar with the legislation in relation to cloud computing?	a. Yes, I know the Law regarding cloud computing	18	4	1	23
		24.66%	9.09%	2.70%	14.94%
	b. Yes, the Law for personal data protection also covers this subject	18	10	2	30
		24.66%	22.73%	5.41%	19.48%
	c. I don't know	37	30	34	101
		50.68%	68.18%	91.89%	65.58%
Total	73	44	37	154	

		100.00%	100.00%	100.00%	100.00%
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Those that don't know what cloud computing is also don't know the law regarding the issue.

		8. Does your company use cloud computing?			
		a. Yes	b. No	c. No, but we plan to start doing so	Total
19. Are you familiar with the legislation in relation to cloud computing?	a. Yes, I know the Law regarding cloud computing	18	10	1	29
		26.47%	14.71%	4.17%	18.13%
	b. Yes, the Law for personal data protection also covers this subject	17	10	4	31
		25.00%	14.71%	16.67%	19.38%
	c. I don't know	33	48	19	100
		48.53%	70.59%	79.17%	62.50%
	Total	68	68	24	160
		100.00%	100.00%	100.00%	100.00%

Those who don't use as well as those who plan to introduce cloud computing are least familiar with the legislation.

		15. Where do you store the data?				
		a. In Macedonia	b. In the EU and the European economic area	c. Outside of the EU	d. Combination of the above stated	Total
16. Do you think that the data stored in the cloud system is:	a. Safe	25	12	0	10	47
		62.50%	92.31%	0.00%	100.00%	72.31%
	b. Not safe	3	1	0	0	4
		7.50%	7.69%	0.00%	0.00%	6.15%

	c. I don't know	12	0	2	0	14
		30.00%	0.00%	100.00%	0.00%	21.54%
	Total	40	13	2	10	65
		100.00%	100.00%	100.00%	100.00%	100.00%

Those who keep the data in Macedonia believe that it isn't safe or don't know if it is. Those that keep it the EU and European Economic Area almost absolutely believe that the data is safe.

Conclusions

- One of the opening questions regarding the decisions making concerning information technologies indicate that such decisions are **most often made by the management with support from the IT responsible** (or department), followed by those made by the management together with the IT responsible or only by the management. A less common situation is when it is done in another way (steering committee, Supervisory Board etc.). Sparsely, but still present is when only the person responsible for IT makes the decisions (8% of the situations).

- **45% of respondents claim to know what cloud computing is**, and together with those who say that they have some knowledge on the subject (29%) they reach 74%. However, almost a third don't know what the term cloud computing refers to, which doesn't mean that they don't use it.

- **The biggest perceived advantage** for using cloud computing is **the ability to access the data at any time and from any place**, better access to services, reduced costs, availability, easier collaboration, easier data recovery etc. Although all of the features are individually perceived as more positive than negative, **as the lowest priority feature is rated the safety and control of data.**

- **58% of companies said they do not use cloud computing**, but 14% of them plan to introduce it. 42% said they use cloud computing.

- Of those using cloud computing, only one percent use it for external purposes, **while more than half use it for their own needs**, and 44% use it for both.

- Companies that use **cloud computing for internal needs, most commonly use it for e-mail** which occurs in 45% of the companies, followed by the **databases and other needs** (such as book keeping, various applications etc.). Only 5% said that they use cloud computing for **hosting web pages**.

- Of those who offer the service externally, **53% do so towards direct users, 16% to companies who then offer the service to direct users, and 32% use both modes of service.**

- The most common offered **service is the software (SaaS)** in more than half of the companies offering services (**57%**), but 51% also said that they offer Infrastructure as a Service (IaaS), 41% offer Platform as a service (PaaS) but also other services, such as supervision.

- Most common are the companies in which **the number of personal records is 50 (57%)**, followed by those with 51-100 (21%), above 501 (13%), and between 101-500 are 9%.

- The most common way for protection are the **Rule books for personal data protection, chosen by 80%** of the respondents, **Firewall protection is indicated by 58% of companies and 49% also round up the answer ISO standard for IT security.** It indicates that more companies use multiple types of protection or combined methods. 7% of respondents supplemented the answer with other forms of protection such as encryption, log management, DDoS, NGFW, international certificates etc.

- Most companies claim to **keep the data in Macedonia (61%)**, 20% in the European Union or the European Economic Area, a 17% combine multiple locations. Only **3% of companies said they keep data outside the EU.**

- **72% of enterprises believe that the data in the cloud is secure.** However, almost one third are not sure or don't know (27%).

- **80% of companies have personal data protection officer,** 18% don't, while 7% plan to allocate one.

- **Within 66% of the companies, the personal data protection officer is the one that is responsible for protecting the data on the cloud.**

- The correct answer that **the Law on personal data protection is the one that covers the issue of cloud computing is known for only 20% of respondents.** Remarkably **62%** are not aware that there is such a law, while 18% believe that there is a special law covering this issue.

- **Lack of training is perceived as one of the biggest drawbacks when it comes to using Cloud,** the insufficient technical support, complications associated with the migration of data and so on. **As minor flaws are considered the organization of Cloud and general resistance to change within the company.**

- The Cross tabulations show that:

- o The companies where the management together with the IT responsible make the decisions related to cloud computing seem to know about what the cloud computing term represents compared to the other surveyed groups.

- o The Cloud is used mostly by companies that have between 1-50 employees.

- o Companies that have between 51-250 employees commonly use cloud computing for their own needs, while those with between 11-50 employees externally as well as internally.

- o Both the personal data protection officers as well as those who aren't seem to be equally familiar with the legislation in terms of cloud computing.

- o Surprisingly, but companies that use cloud computing as a service to third parties believe that the data is safe in a slightly greater degree than those who use it only internally, which may be based on the increasing awareness on the issue.

- o Those who don't know what cloud computing is also don't know the law regarding the issue.

- o Those who use but also those who plan to introduce cloud computing are least familiar with the legislation.

- o Those who keep the data in Macedonia believe that it is safe or don't know whether it is. Those who keep it in the EU and the European Economic Area almost absolutely believe that it is safe.

Qualitative research

Taking in consideration that the quantitative part of the survey included companies from different areas and in order to enter deeper into the issue of cloud computing, the research team opted for qualitative part of the survey through conversations with people actively involved in IT companies and thus have good knowledge of the topic. These interviews accomplished more in-depth understanding of local conditions, not only about the companies where these people work, but also in creating the picture of the general situation in Macedonia.

Usage of cloud computing in the country

"The cloud computing is currently not regulated (in terms of who can be a provider of services and defining the details about it) - which on one hand is good because there is a lot of space, but the other is bad because there are users that because of this decide not to use it. "- as one of the respondents pointed out.

The participants in the survey agreed that the term cloud computing, although currently popular isn't something new, but rather gather IT services that have been present long time before and have now been placed under this "Buzzword". The large companies, especially those whose main area of work is IT, and more specifically those that offer services using cloud computing very well know what the term represents, using precise definitions for the same. However, they are aware that the limits when it comes to usage are set much wider - "Everyone has a set of data – the only question is whether it is simple one or complicated as it is the one with personal identity numbers data ..."

Therefore, there are quite a lot smaller companies such as book keeping firms which unknowingly take their customers data out of the country, as stated by one of the respondents. One of the interviewees mentioned the problem with programmers in terms that often the ones working in these small companies don't know how to make decisions that are web based, and therefore that the main problems appear from there. Least knowledge about cloud computing have the users who use this service through another company - they often don't have enough knowledge about this issue even when they are giving away data which is extremely important for their company.

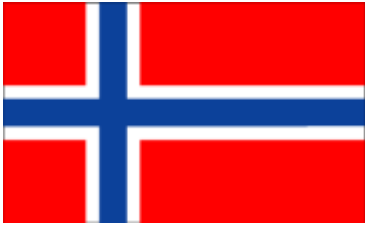
In addition, alignment with the EU rules on the road to becoming a member imposes additional steps when using these services through the Internet, that not all companies are aware of.

Role of personal data while using cloud computing

For the participants in the interviews personal data protection is a key element while using cloud computing. In this respect, the companies in the IT sector are aware of the opportunities for abuse and what is necessary to be done in order to prevent it. Again the end users are those who are often not aware of what they agree to. So, even when they have information in form of guidelines for privacy protection they often don't read them which leads to complains or surprise afterwards from aspects that they should have already been familiar with. The privacy statements are in most cases too long and boring for a common person, so people rarely take interest in it but rather just sign the consent at the end of the text, which is not a matter of conscious choice.

From legislation to fully regulated market

At the moment, for some of the respondents the legislation is quite sufficient and appropriate to the conditions in Macedonia, and even more specific compared to some other European countries. However, for those who are deeply involved in this subject, the legislation is not sufficient. Notably, several of the respondents stated that the problem is not in the area of following the rules by the companies but in the systematic control. Namely, for some of the respondents, the controls that the Directorate for Personal data Protection is implementing are more on the policy level, by ensuring that companies follow the rules and have the necessary regulations. However, until there are no control mechanisms for data access - by controlling through audit trail, no one can say for sure what has been happening with the personal data. Therefore, the system, which already exists in the financial institutions, should also be applied in the cloud computing services so that this sector can be really regulated. However, for this to take place it is necessary to start using the ISO certification (27000), and to establish a general framework which is most likely to be controlled by the AEC – Agency for Electronic Communications (and which will include who may offer such services and how), and then the Directorate can take care about the aspect of personal data protection.



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