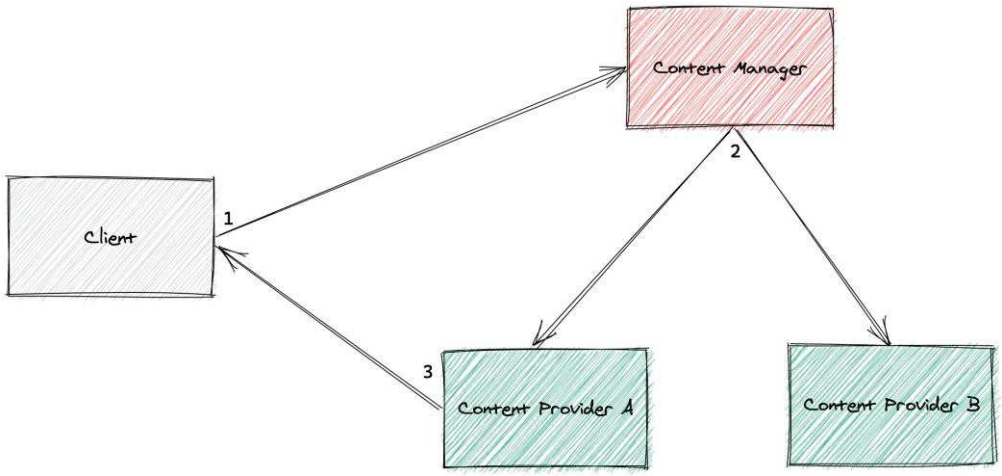

Рисунок 1 – Схема работы ICN сети

Таким образом, была спроектирована и реализована модель информационно-ориентированной сети. В сеть можно послать запрос на получение файла и, если запрашиваемый файл есть на одном из провайдеров, клиент получает нужный файл. Парадигма информационно-ориентированных сетей означает, что сети больше не сосредоточены на информационных центрах, а вместо этого сама сеть построена на контенте.

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BENEFITS AND ANALYSIS OF SEMANTIC INFORMATION-CENTRIC NETWORKING

Model of Semantic Information Centric Networking (SICN) was introduced in [1-3]. We present analytical results of simulation models for DONA, PURSUIT, CBCB, KBN and SICN to understand the performance of each with some assumptions. As show in Table 1 below they have different routing approach, naming structure, caching and backward comparability. Four scenarios were applied. Each scenario represents a certain abstract content level dependent of data types and request types [4].

Table 1 - ICN project parameters

ICN Models/ ICN Parameter	DONA	PURSUIT	CBCB	KBN	SICN
Routing approach	name resolution		name based routing		
Naming structure	flat naming <P:L>		set of paired attribute value	set of key-words ontological categorization	hierarchical human friendly (Geo = IP)
Routing	pull		push pull		pull
Caching	on-path off path				on-path
Abstract level	data		information	knowledge	
Backward compatibility	yes (work over IP)		no		yes

It were computed three metrics:

1. Time delay (TD) – minimum number of hops starting from requesting data by a subscriber till receiving the requested data per subscriber assuming that there is no queuing for subscribers and it is constant for subscribers, TD € *N*, *N* is a nature number, [0, ∞ [.

2. Flooding or traffic (F) – total number of links occupied starting from requesting data till receiving it, F€ *N*, [0, ∞ [.

3. Efficiency Reuse factor for data (ER) – the ratio of the interests number of a certain data to the data travel distance.

Let held the following assumptions: u – number of users; n – publisher depth (defined as number of extended branches from root of tree subscriber to data source); d – DNS depth (defined as number of branches from root of tree subscriber to DNS, $d = n/2$; c – cache depth (defined as number of branches from root of tree subscriber to cache, $c = n/2$; r – sharing factor (defined as the utilization factor from sharing paths between subscribers, $r = 1 + s(u - 1)$; l – total number of extended branches for each subscriber to data source, $l = 2^{(n+1)} - 2$, it is supposed that each node has two branches.

The transmitted content is cached data. Subscribers ask for specific data from specific publisher, for example, asking for a certain cached file in cloud. We suppose that the file is asked enough requests by the users to reach the threshold and cached. Each subscriber will send his request carrying Pub-ID and the semantic addresses, and also the Geo-Id address. It is supposed that all tables are converged, which means that the request was done before. The data sources where data is cached will send message to the subscribers. In this case metrics can be evaluated as shown in Table 2.

Table 2 - Metrics evaluation

ICN parameters / ICN models	TD	F	ER
IP	$2(d + n)$	$2u(d + n)$	$1/n$
SICN	$2c$	$4uc$	$1/c$
DONA	$2(d + c)$	$2u(d + c)$	$1/c$
PURSUIT	$2(d + c)$	$2u(d + c)$	$1/ c$
CBCB	$2c$	$2rc$	$u/(rc)$
KBN	$2c$	$2rc$	$u/(rc)$

We can notice that IP has the highest time delay. IP doesn't use caching and it is obligatory to find content in the publisher only. DONA and PURSUIT performs better than IP. KBN, CBCB and SICN have the lowest TD.

Also IP has the highest flooding. DONA and PURSUIT performs better than IP as they use cache. CBCB and KBN performs better than IP as they benefit from common branching while SICN doesn't.

CBCB and KBN achieve better efficiency of data compares to other schemas followed by SICN. In fact, the metric ER depends on the distance travelled for the message, and CBCB and KBN can benefit from the shared paths in minimizing this distance.

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