## **Hadith Movement**

#### 1 Hadith to Edges

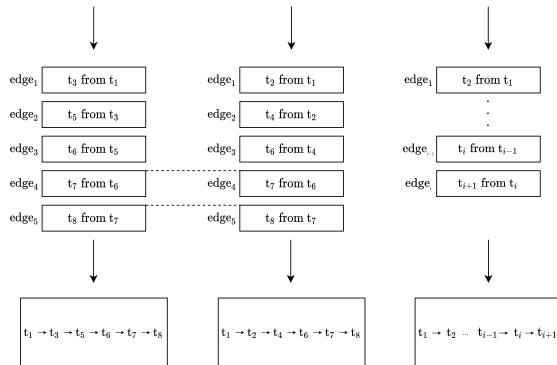
#### Hadith - 1

#### Hadith - 2

#### $Hadith - \alpha$

Bukhārī (id:  $t_8$ ) writes: 'Ubaydallāh b. Musā (id:  $t_7$ ) narrated to us, saying: Ḥanzala b. Abī Sufyān (id:  $t_6$ ) reported to us about 'Ikrima b. Khālid (id:  $t_5$ ): about Ibn 'Umar (id:  $t_3$ ), may God be pleased with them both, that he said that the Prophet (id:  $t_1$ ), peace and blessings be upon him, said: "Islam is built on five things: testifying that there is no god but God and that Muhammad is the messenger of God, establishing daily prayer, giving the charity tax, the pilgrimage, and fasting in Ramaḍān."

Bukhārī (id:  $t_{\rm g}$ ) writes: Ubaydallāh b. Musā (id:  $t_{\rm 7}$ ) narrated to us, saying: Ḥanzala b. Abī Sufyān (id:  $t_{\rm g}$ ) reported to us about al-Qāsim b. Muḥammad (id:  $t_{\rm 4}$ ) about 'Ā'isha (id:  $t_{\rm 2}$ ), may God be pleased with her, that she said: "the Prophet (id:  $t_{\rm 1}$ ), peace and blessings be upon him, used to pray thirteen cycles during the night, including the witr and dawn prayers."



### 2 Edges to HSN

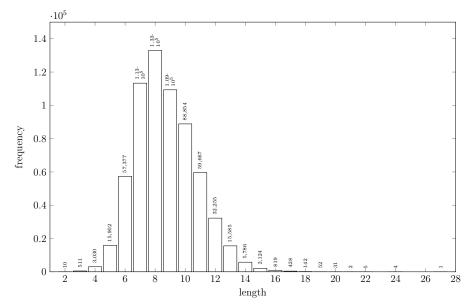
$$\begin{array}{c|c} \operatorname{Hadith} - 1 \\ \hline t_1 \to t_2 \to t_3 \to t_4 \to t_5 \end{array} \begin{array}{c} + \end{array} \begin{array}{c} \operatorname{Hadith} - 2 \\ \hline t_1 \to t_2 \to t_3 \to t_6 \to t_7 \to t_9 \end{array} \begin{array}{c} + \end{array}$$

$$\begin{vmatrix} \text{Hadith} - 3 \\ t_1 \rightarrow t_8 \rightarrow t_3 \rightarrow t_6 \rightarrow t_4 \rightarrow t_5 \end{vmatrix} + \begin{vmatrix} \text{Hadith} - 4 \\ t_1 \rightarrow t_8 \rightarrow t_6 \rightarrow t_7 \rightarrow t_{10} \rightarrow t_{11} \end{vmatrix} + \cdots =$$

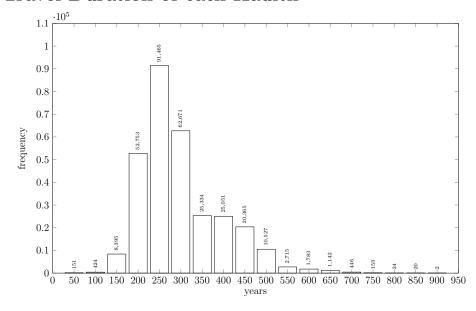
Hadith Social Network 
$$t_1 < t_8 > t_3 > t_3 < t_4 \rightarrow t_5$$
 ...

## 3 Travel Analysis

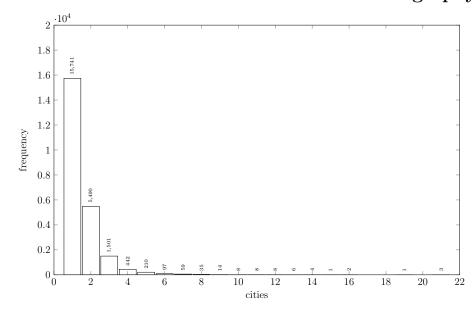
#### 3.1 Number of Transmitters in each Isnad



#### 3.2 Travel Duration of each Hadith



### 3.3 Number of Cities in each Transmitter's Biography



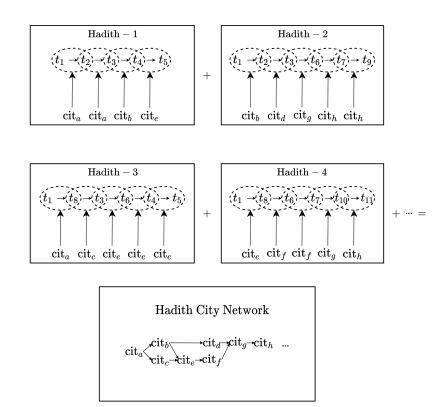
## 4 City Analysis

	1.11				
city	biography				
	count				
bghdad	4,966				
dmshq	3,533				
bsrh	3,136				
kwfh	2,802				
almdynh	2,209				
msr	1,744				
sham	1,191				
asbhan	1,144				
nysabwr	1,068				
mkh	965				
mrw	586				
alhjaz	506				
alry	503				
wast	476				
hms	471				
khrasan	429				
jrjan	339				
qzwyn	273				
hrah	267				
hlb	257				
al'eraq	244				
bkhara	237				
hran	206				
almwsl	205				
alymn	201				

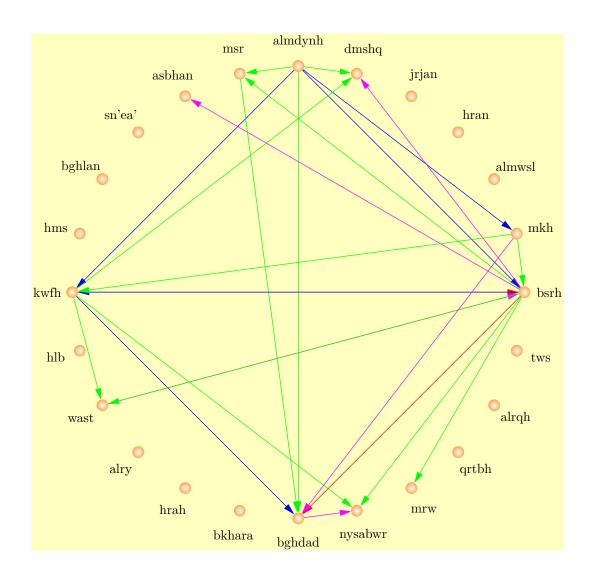
city	transmission			
	count			
bsrh	187,293			
bghdad	173,657			
kwfh	158,428			
almdynh	131,375			
msr	65,989			
dmshq	54,425			
nysabwr	43,123			
mkh	37,688			
asbhan	23,323			
wst	17,686			
mrw	15,774			
hms	14,429			
sn'ea'	13,376			
alry	7,911			
qrtbh	6,806			
hran	5,439			
bghlan	4,302			
hrah	4,140			
alrqh	3,067			
jrjan	2,921			
aljzyrh	2,757			
almwsl	2,542			
bkhara	2,503			
nsa	2,135			
aylh	1,916			

city	transmission		
	count		
bsrh	187,293		
bghdad	173,657		
kwfh	158,428		
almdynh	131,375		
msr	65,989		
dmshq	54,425		
nysabwr	43,123		
mkh	37,688		
asbhan	23,323		
wast	17,686		
mrw	15,774		
hms	14,429		
sn'ea'	13,376		
alry	7,911		
qrtbh	6,806		
hran	5,439		
bghlan	4,302		
hrah	4,140		
alrqh	3,067		
jrjan	2,921		
almwsl	2,542		
bkhara	2,503		
hlb	1,878		
tws	1,323		

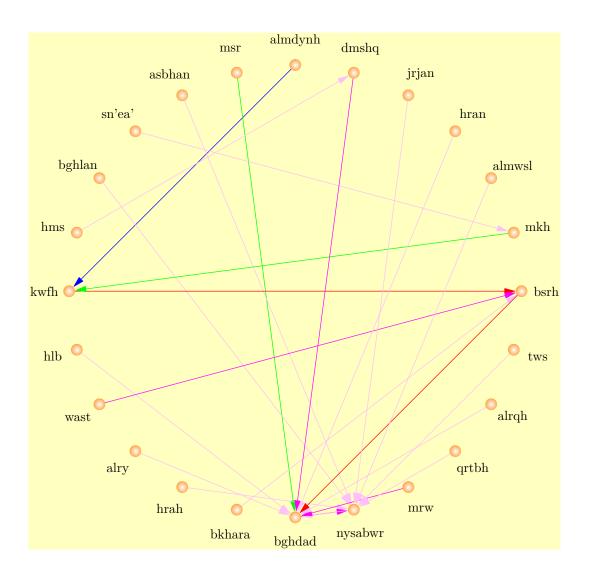
### 5 Edges to City Network



# 6 Top 24 Outgoing Paths in Entire City Network (nodes as cities)



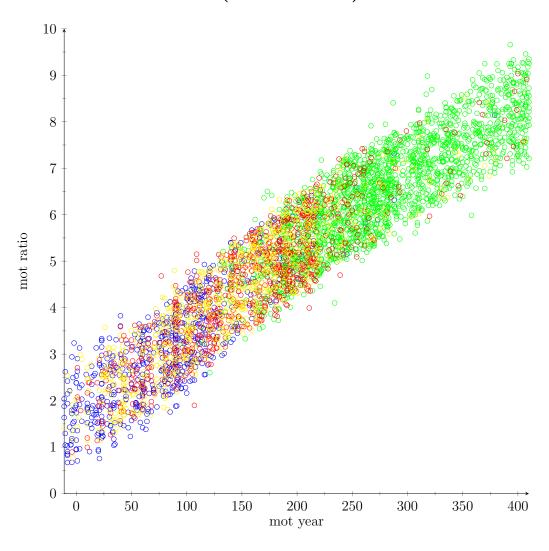
# 7 Top Outgoing Path from Each City in City Network (nodes as cities)



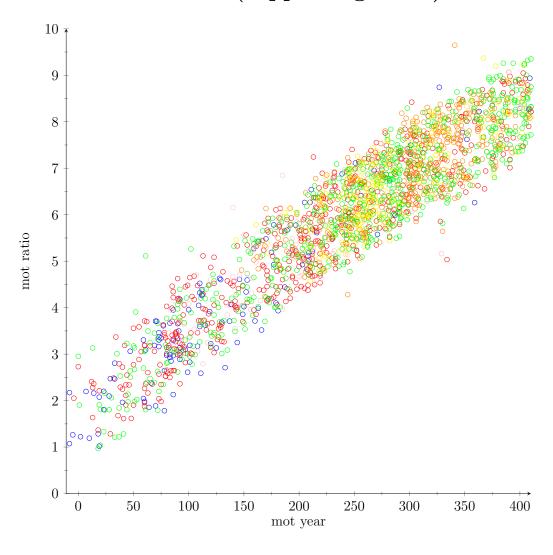
# 8 Top 10 Paths in City Network (nodes as cities) in Each 30 Year Partitioned Network

	-11 - 30 $30 - 60$				60 — 90				
From	То	Count	From	То	Count	From	То	Count	
almdynh	almdynh	3798	almdynh	almdynh	16053	almdynh	almdynh	14248	
almdynh	kwfh	2274	almdynh	kwfh	2157	kwfh	kwfh	3950	
almdynh	dmshq	264	almdynh	mkh	1746	almdynh	mkh	2565	
almdynh	mkh	208	almdynh	bsrh	1164	almdynh	kwfh	1885	
almdynh	hms	201	kwfh	kwfh	1011	almdynh	bsrh	1061	
almdynh	bsrh	38	almdynh	dmshq	423	bsrh	bsrh	1024	
kwfh	kwfh	37	almdynh	hms	394	mkh	mkh	1010	
almdynh	msr	27	almdynh	msr	373	almdynh	hms	733	
almdynh	alhjaz	27	almdynh	mrw	178	mkh	kwfh	538	
almdynh	alrbdh	22	mkh	mkh	68	almdynh	dmshq	286	
	90 — 120	-	120 - 150			150 - 180			
From	To	Count	From	To	Count	From			
almdynh	almdynh	16002	kwfh	kwfh	20461	bsrh	bsrh	28105	
bsrh	bsrh	7733	almdynh	almdynh	16475	kwfh	kwfh	20811	
kwfh	kwfh	7145	bsrh	bsrh	16309	almdynh	almdynh	14733	
almdynh	mkh	2724	kwfh	bsrh	3860	kwfh	bsrh	10413	
mkh	mkh	2666	almdynh	kwfh	3765	msr	msr	6306	
almdynh	bsrh	2449	mkh	kwfh	3145	almdynh	kwfh	3500	
almdynh	dmshq	1771	mkh	mkh	2971	almdynh	bsrh	2945	
almdynh	kwfh	1209	almdynh	bsrh	2874	almdynh	bghdad	2838	
mkh	kwfh	777	mkh	sn'ea'	1918	wast	bsrh	2832	
kwfh	bsrh	754	msr	msr	1847	bsrh	kwfh	2374	
	100 210			210 240			240 270		
	180 — 210 To	Count		210 — 240 To	Count		240 — 270 To	Count	
From	То	Count 30458	From	То	Count 35677	From	То	Count 15641	
From kwfh	To kwfh	30458	From bsrh	To bsrh	35677	From bsrh	To bsrh	15641	
From kwfh bsrh	To kwfh bsrh	30458 30108	From bsrh kwfh	To bsrh kwfh	35677 25904	From bsrh msr	To bsrh msr	15641 10576	
From kwfh bsrh bsrh	To kwfh bsrh bghdad	30458 30108 7452	From bsrh kwfh bghdad	To bsrh kwfh bghdad	35677 25904 9959	From bsrh msr kwfh	To bsrh msr kwfh	15641 10576 9345	
From kwfh bsrh bsrh msr	To kwfh bsrh bghdad msr	30458 30108 7452 7120	From bsrh kwfh bghdad bsrh	To bsrh kwfh bghdad bghdad	35677 25904 9959 9312	From bsrh msr kwfh bghdad	To bsrh msr kwfh bghdad	15641 10576 9345 5970	
From kwfh bsrh bsrh msr sn'ea'	To kwfh bsrh bghdad msr sn'ea'	30458 30108 7452 7120 5862	From bsrh kwfh bghdad bsrh msr	To bsrh kwfh bghdad bghdad msr	35677 25904 9959 9312 6688	From bsrh msr kwfh bghdad bsrh	To bsrh msr kwfh bghdad bghdad	15641 10576 9345 5970 4436	
From kwfh bsrh bsrh msr sn'ea' kwfh	To kwfh bsrh bghdad msr sn'ea' bsrh	30458 30108 7452 7120 5862 5563	From bsrh kwfh bghdad bsrh msr kwfh	bsrh kwfh bghdad bghdad msr bghdad	35677 25904 9959 9312 6688 5841	From bsrh msr kwfh bghdad bsrh kwfh	To bsrh msr kwfh bghdad bghdad bghdad	15641 10576 9345 5970 4436 3425	
From kwfh bsrh bsrh msr sn'ea' kwfh kwfh	To kwfh bsrh bghdad msr sn'ea' bsrh bghdad	30458 30108 7452 7120 5862 5563 4947	From bsrh kwfh bghdad bsrh msr kwfh kwfh	bsrh kwfh bghdad bghdad msr bghdad dmshq	35677 25904 9959 9312 6688 5841 5584	From bsrh msr kwfh bghdad bsrh kwfh bsrh	To bsrh msr kwfh bghdad bghdad bghdad msr	15641 10576 9345 5970 4436 3425 3147	
From kwfh bsrh bsrh msr sn'ea' kwfh kwfh almdynh	To kwfh bsrh bghdad msr sn'ea' bsrh bghdad msr	30458 30108 7452 7120 5862 5563 4947 4676	From bsrh kwfh bghdad bsrh msr kwfh kwfh dmshq	bsrh kwfh bghdad bghdad msr bghdad dmshq dmshq	35677 25904 9959 9312 6688 5841 5584 3481	From bsrh msr kwfh bghdad bsrh kwfh bsrh bsrh	To bsrh msr kwfh bghdad bghdad bghdad msr nysabwr	15641 10576 9345 5970 4436 3425 3147 2403	
From kwfh bsrh bsrh msr sn'ea' kwfh kwfh almdynh almdynh	To kwfh bsrh bghdad msr sn'ea' bsrh bghdad msr bsh	30458 30108 7452 7120 5862 5563 4947 4676 4365	From bsrh kwfh bghdad bsrh msr kwfh kwfh dmshq almdynh	bsrh kwfh bghdad bghdad msr bghdad dmshq dmshq almdynh	35677 25904 9959 9312 6688 5841 5584 3481 3401	From bsrh msr kwfh bghdad bsrh kwfh bsrh bsrh dmshq	To bsrh msr kwfh bghdad bghdad bghdad msr	15641 10576 9345 5970 4436 3425 3147 2403 2082	
From kwfh bsrh bsrh msr sn'ea' kwfh kwfh almdynh almdynh almdynh	To kwfh bsrh bghdad msr sn'ea' bsrh bghdad msr bsh almdynh	30458 30108 7452 7120 5862 5563 4947 4676	From bsrh kwfh bghdad bsrh msr kwfh kwfh dmshq almdynh kwfh	bsrh kwfh bghdad bghdad msr bghdad dmshq dmshq almdynh bsrh	35677 25904 9959 9312 6688 5841 5584 3481	From bsrh msr kwfh bghdad bsrh kwfh bsrh dmshq mkh	To bsrh msr kwfh bghdad bghdad bghdad msr nysabwr dmshq mkh	15641 10576 9345 5970 4436 3425 3147 2403	
From kwfh bsrh bsrh msr sn'ea' kwfh kwfh almdynh almdynh almdynh	To kwfh bsrh bghdad msr sn'ea' bsrh bghdad msr bsh	30458 30108 7452 7120 5862 5563 4947 4676 4365 4035	From bsrh kwfh bghdad bsrh msr kwfh kwfh dmshq almdynh kwfh	bsrh kwfh bghdad bghdad msr bghdad dmshq dmshq almdynh	35677 25904 9959 9312 6688 5841 5584 3481 3401 3167	From bsrh msr kwfh bghdad bsrh kwfh bsrh dmshq mkh	To bsrh msr kwfh bghdad bghdad bghdad msr nysabwr dmshq	15641 10576 9345 5970 4436 3425 3147 2403 2082 1466	
From kwfh bsrh bsrh msr sn'ea' kwfh kwfh almdynh almdynh almdynh	To kwfh bsrh bghdad msr sn'ea' bsrh bghdad msr bsrh almdynh  270 — 300 To	30458 30108 7452 7120 5862 5563 4947 4676 4365 4035	From bsrh kwfh bghdad bsrh msr kwfh kwfh dmshq almdynh kwfh	bsrh kwfh bghdad bghdad msr bghdad dmshq dmshq almdynh bsrh  300 — 330	35677 25904 9959 9312 6688 5841 5584 3481 3401 3167	From bsrh msr kwfh bghdad bsrh kwfh bsrh dmshq mkh	To bsrh msr kwfh bghdad bghdad bghdad msr nysabwr dmshq mkh  330 — 360	15641 10576 9345 5970 4436 3425 3147 2403 2082 1466	
From kwfh bsrh bsrh msr sn'ea' kwfh kwfh almdynh almdynh almdynh	To kwfh bsrh bghdad msr sn'ea' bsrh bghdad msr bsrh almdynh  270 — 300 To bghdad	30458 30108 7452 7120 5862 5563 4947 4676 4365 4035 Count 8837	From bsrh kwfh bghdad bsrh msr kwfh kwfh dmshq almdynh kwfh  From bghdad	bsrh kwfh bghdad bghdad msr bghdad dmshq dmshq almdynh bsrh  300 — 330 To bghdad	35677 25904 9959 9312 6688 5841 5584 3481 3401 3167 Count 9271	From bsrh msr kwfh bghdad bsrh kwfh bsrh dmshq mkh  From bghdad	To bsrh msr kwfh bghdad bghdad bghdad msr nysabwr dmshq mkh  330 — 360 To bghdad	15641 10576 9345 5970 4436 3425 3147 2403 2082 1466 Count 10419	
From kwfh bsrh bsrh msr sn'ea' kwfh kwfh almdynh almdynh almdynh bghdad bsrh	To kwfh bsrh bghdad msr sn'ea' bsrh bghdad msr bsrh almdynh  270 — 300 To bghdad bsrh	30458 30108 7452 7120 5862 5563 4947 4676 4365 4035 Count 8837 7288	From bsrh kwfh bghdad bsrh msr kwfh kwfh dmshq almdynh kwfh  From bghdad bsrh	bsrh kwfh bghdad bghdad msr bghdad dmshq dmshq almdynh bsrh  300 — 330  To bghdad bghdad bghdad	35677 25904 9959 9312 6688 5841 5584 3401 3167 Count 9271 2206	From bsrh msr kwfh bghdad bsrh kwfh bsrh dmshq mkh  From bghdad nysabwr	To bsrh msr kwfh bghdad bghdad bghdad msr nysabwr dmshq mkh  330 — 360 To bghdad nysabwr	15641 10576 9345 5970 4436 3425 3147 2403 2082 1466 Count 10419 2537	
From kwfh bsrh bsrh msr sn'ea' kwfh kwfh almdynh almdynh almdynh bsrh	To kwfh bsrh bghdad msr sn'ea' bsrh bghdad msr bsrh almdynh  270 — 300 To bghdad bsrh bghdad	30458 30108 7452 7120 5862 5563 4947 4676 4365 4035 Count 8837 7288 6910	From bsrh kwfh bghdad bsrh msr kwfh kwfh dmshq almdynh kwfh  From bghdad bsrh kwfh	bsrh kwfh bghdad bghdad msr bghdad dmshq dmshq almdynh bsrh  300 — 330  To bghdad bghdad bghdad bghdad	35677 25904 9959 9312 6688 5841 5584 3401 3167 Count 9271 2206 1993	From bsrh msr kwfh bghdad bsrh kwfh bsrh dmshq mkh  From bghdad nysabwr dmshq	To bsrh msr kwfh bghdad bghdad bghdad msr nysabwr dmshq mkh  330 — 360 To bghdad nysabwr dmshq	15641 10576 9345 5970 4436 3425 3147 2403 2082 1466 Count 10419 2537 1488	
From kwfh bsrh bsrh msr sn'ea' kwfh kwfh almdynh almdynh almdynh bsrh bsrh kwfh	To kwfh bsrh bghdad msr sn'ea' bsrh bghdad msr bsrh almdynh  270 — 300 To bghdad bsrh bghdad bghdad bghdad	30458 30108 7452 7120 5862 5563 4947 4676 4365 4035 Count 8837 7288 6910 2968	From bsrh kwfh bghdad bsrh msr kwfh kwfh dmshq almdynh kwfh  From bghdad bsrh kwfh nysabwr	bsrh kwfh bghdad bghdad msr bghdad dmshq dmshq almdynh bsrh  300 — 330  To bghdad bghdad bghdad bghdad nysabwr	35677 25904 9959 9312 6688 5841 5584 3401 3167 Count 9271 2206 1993 1825	From bsrh msr kwfh bghdad bsrh kwfh bsrh dmshq mkh  From bghdad nysabwr dmshq bghdad	To bsrh msr kwfh bghdad bghdad bghdad msr nysabwr dmshq mkh  330 — 360 To bghdad nysabwr dmshq asbhan	15641 10576 9345 5970 4436 3425 3147 2403 2082 1466 Count 10419 2537 1488 1458	
From kwfh bsrh bsrh msr sn'ea' kwfh kwfh almdynh almdynh almdynh bghdad bsrh bsrh kwfh dmshq	To kwfh bsrh bghdad msr sn'ea' bsrh bghdad msr bsrh almdynh  270 — 300 To bghdad bsrh bghdad bsrh bghdad dmshq	30458 30108 7452 7120 5862 5563 4947 4676 4365 4035 Count 8837 7288 6910 2968 2429	From bsrh kwfh bghdad bsrh msr kwfh kwfh dmshq almdynh kwfh  From bghdad bsrh kwfh nysabwr bsrh	bsrh kwfh bghdad bghdad msr bghdad dmshq dmshq almdynh bsrh  300 — 330  To bghdad bghdad bghdad bghdad bghdad bshdad bshdad bshdad bshdad bshdad bshdad	35677 25904 9959 9312 6688 5841 5584 3481 3401 3167 Count 9271 2206 1993 1825 1582	From bsrh msr kwfh bghdad bsrh kwfh bsrh dmshq mkh  From bghdad nysabwr dmshq bghdad dmshq	bsrh msr kwfh bghdad bghdad bghdad msr nysabwr dmshq mkh  330 — 360  To bghdad nysabwr dmshq asbhan asbhan	15641 10576 9345 5970 4436 3425 3147 2403 2082 1466 Count 10419 2537 1488 1458 1327	
From kwfh bsrh bsrh msr sn'ea' kwfh almdynh almdynh almdynh bghdad bsrh bsrh kwfh dmshq msr	To kwfh bsrh bghdad msr sn'ea' bsrh bghdad msr bsrh almdynh  270 — 300 To bghdad bsrh bghdad bsrh bghdad dmshq msr	30458 30108 7452 7120 5862 5563 4947 4676 4365 4035 Count 8837 7288 6910 2968 2429 2408	From bsrh kwfh bghdad bsrh msr kwfh kwfh dmshq almdynh kwfh  From bghdad bsrh kwfh nysabwr bsrh msr	To bsrh kwfh bghdad bghdad msr bghdad dmshq dmshq almdynh bsrh  300 — 330 To bghdad bghdad bghdad bghdad bshdad nysabwr bsrh msr	35677 25904 9959 9312 6688 5841 5584 3481 3401 3167 Count 9271 2206 1993 1825 1582 1089	From bsrh msr kwfh bghdad bsrh kwfh bsrh dmshq mkh  From bghdad nysabwr dmshq bghdad dmshq msr	To bsrh msr kwfh bghdad bghdad bghdad msr nysabwr dmshq mkh  330 — 360 To bghdad nysabwr dmshq asbhan asbhan asbhan	15641 10576 9345 5970 4436 3425 3147 2403 2082 1466 Count 10419 2537 1488 1458 1327 1179	
From kwfh bsrh bsrh msr sn'ea' kwfh almdynh almdynh almdynh bghdad bsrh bsrh kwfh dmshq msr mrw	To kwfh bsrh bghdad msr sn'ea' bsrh bghdad msr bsrh almdynh  270 — 300 To bghdad bsrh bghdad bsrh bghdad dmshq msr bghdad	30458 30108 7452 7120 5862 5563 4947 4676 4365 4035 Count 8837 7288 6910 2968 2429 2408 1666	From bsrh kwfh bghdad bsrh msr kwfh kwfh dmshq almdynh kwfh  From bghdad bsrh kwfh nysabwr bsrh msr bsrh	bsrh kwfh bghdad bghdad msr bghdad dmshq dmshq almdynh bsrh  300 — 330  To bghdad bghdad bghdad bghdad bghdad nysabwr bsrh msr nysabwr	35677 25904 9959 9312 6688 5841 5584 3481 3401 3167 Count 9271 2206 1993 1825 1582 1089 1086	From bsrh msr kwfh bghdad bsrh kwfh bsrh dmshq mkh  From bghdad nysabwr dmshq bghdad dmshq msr bghdad	To bsrh msr kwfh bghdad bghdad bghdad msr nysabwr dmshq mkh  330 — 360 To bghdad nysabwr dmshq asbhan asbhan asbhan nysabwr	15641 10576 9345 5970 4436 3425 3147 2403 2082 1466 Count 10419 2537 1488 1458 1327 1179 1097	
From kwfh bsrh bsrh msr sn'ea' kwfh almdynh almdynh almdynh bghdad bsrh bsrh kwfh dmshq msr mrw mkh	To kwfh bsrh bghdad msr sn'ea' bsrh bghdad msr bsrh almdynh  270 — 300 To bghdad bsrh bghdad bsrh bghdad bsrh bghdad bghdad dmshq msr bghdad bghdad bghdad	30458 30108 7452 7120 5862 5563 4947 4676 4365 4035 Count 8837 7288 6910 2968 2429 2408 1666 1395	From bsrh kwfh bghdad bsrh msr kwfh dmshq almdynh kwfh  From bghdad bsrh kwfh nysabwr bsrh msr bsrh bghdad	bsrh kwfh bghdad bghdad msr bghdad dmshq dmshq almdynh bsrh  300 — 330  To bghdad bghdad bghdad bghdad nysabwr bsrh msr nysabwr almwsl	35677 25904 9959 9312 6688 5841 5584 3481 3401 3167 Count 9271 2206 1993 1825 1582 1089 1086 1056	From bsrh msr kwfh bghdad bsrh kwfh bsrh dmshq mkh  From bghdad nysabwr dmshq bghdad dmshq msr bghdad msr	To bsrh msr kwfh bghdad bghdad bghdad msr nysabwr dmshq mkh  330 — 360 To bghdad nysabwr dmshq asbhan asbhan asbhan nysabwr bghdad	15641 10576 9345 5970 4436 3425 3147 2403 2082 1466 Count 10419 2537 1488 1458 1327 1179 1097 1061	
From kwfh bsrh bsrh msr sn'ea' kwfh almdynh almdynh almdynh bghdad bsrh bsrh kwfh dmshq msr mrw	To kwfh bsrh bghdad msr sn'ea' bsrh bghdad msr bsrh almdynh  270 — 300 To bghdad bsrh bghdad bsrh bghdad dmshq msr bghdad	30458 30108 7452 7120 5862 5563 4947 4676 4365 4035 Count 8837 7288 6910 2968 2429 2408 1666	From bsrh kwfh bghdad bsrh msr kwfh kwfh dmshq almdynh kwfh  From bghdad bsrh kwfh nysabwr bsrh msr bsrh	bsrh kwfh bghdad bghdad msr bghdad dmshq dmshq almdynh bsrh  300 — 330  To bghdad bghdad bghdad bghdad bghdad nysabwr bsrh msr nysabwr	35677 25904 9959 9312 6688 5841 5584 3481 3401 3167 Count 9271 2206 1993 1825 1582 1089 1086	From bsrh msr kwfh bghdad bsrh kwfh bsrh dmshq mkh  From bghdad nysabwr dmshq bghdad dmshq msr bghdad	To bsrh msr kwfh bghdad bghdad bghdad msr nysabwr dmshq mkh  330 — 360 To bghdad nysabwr dmshq asbhan asbhan asbhan nysabwr	15641 10576 9345 5970 4436 3425 3147 2403 2082 1466 Count 10419 2537 1488 1458 1327 1179 1097	

## 9 Network Flow (main cities)



## 10 Network Flow (supporting cities)



## 11 Centrality Metrics

		Centrality Metrics						
		PageR	lank	Betweeness				
From	То	City	Value	City	Value			
-11	30	almdynh	0.0878	almdynh	192.567			
30	60	mkh	0.065	almdynh	595.083			
60	90	almdynh	0.0568	almdynh	901.914			
90	120	msr	0.0579	almdynh	1212.98			
120	150	kwfh	0.0441	bsrh	1767.34			
150	180	kwfh	0.0426	bsrh	2570.18			
180	210	bghdad	0.0416	kwfh	4151.41			
210	240	bghdad	0.0466	bghdad	4248.02			
240	270	bghdad	0.0479	bghdad	5816.34			
270	300	bghdad	0.0464	bghdad	6749.24			
300	330	bghdad	0.0686	bghdad	9006.63			
330	360	bghdad	0.0654	bghdad	8021.82			
360	390	bghdad	0.0639	bghdad	6961.39			
390	420	bghdad	0.0622	bghdad	4431.1			
420	450	dmshq	0.0744	bghdad	3401.95			
450	480	bghdad	0.068	bghdad	2772.14			
480	510	bghdad	0.0843	bghdad	1651.06			

## 12 Degree Histogram of City Network

